

EUROPEAN PATENT OFFICE
U.S. PATENT AND TRADEMARK OFFICE

CPC NOTICE OF CHANGES 751

DATE: JANUARY 1, 2020

PROJECT DP0203

The following classification changes will be effected by this Notice of Changes:

<u>Action</u>	<u>Subclass</u>	<u>Group(s)</u>
DEFINITIONS:		
Definitions New:	G06F	16/00, 16/10, 16/113, 16/116, 16/119, 16/122, 16/125, 16/128, 16/13, 16/134, 16/137, 16/14, 16/144, 16/148, 16/152, 16/156, 16/16, 16/162, 16/164, 16/166, 16/168, 16/17, 16/172, 16/1724, 16/1727, 16/173, 16/1734, 16/1737, 16/174, 16/1744, 16/1748, 16/1752, 16/1756, 16/176, 16/1767, 16/1774, 16/178, 16/1787, 16/1794, 16/18, 16/1805, 16/181, 16/1815, 16/182, 16/1824, 16/1827, 16/183, 16/1834, 16/1837, 16/184, 16/1844, 16/1847, 16/185, 16/1858, 16/1865, 16/1873, 16/188, 16/192, 16/196, 16/20, 16/21, 16/211, 16/212, 16/213, 16/214, 16/215, 16/217, 16/219, 16/22, 16/221, 16/2219, 16/2228, 16/2237, 16/2246, 16/2255, 16/2264, 16/2272, 16/2282, 16/2291, 16/23, 16/2308, 16/2315, 16/2322, 16/2329, 16/2336, 16/2343, 16/235, 16/2358, 16/2365, 16/2372, 16/2379, 16/2386, 16/2393, 16/24, 16/242, 16/243, 16/245, 16/248, 16/243, 16/2433, 16/2435, 16/2438, 16/244, 16/2443, 16/2445, 16/2448, 16/245, 16/2452, 16/24522, 16/24524, 16/24526, 16/24528, 16/2453, 16/24532, 16/24534, 16/24535, 16/24537, 16/24539, 16/2454, 16/24542, 16/24544, 16/24545, 16/24547, 16/24549, 16/2455, 16/24552, 16/24553, 16/24554, 16/24556, 16/24557, 16/24558, 16/2456, 16/24561, 16/24562, 16/24564, 16/24565, 16/24566, 16/24568, 16/24569, 16/2457, 16/24573, 16/24575, 16/24578, 16/2458, 16/2462, 16/2465, 16/2468, 16/2471, 16/2474, 16/2477, 16/248, 16/25, 16/252, 16/254, 16/256, 16/258, 16/26, 16/27, 16/273, 16/275, 16/278, 16/28, 16/282, 16/283, 16/284, 16/285, 16/287, 16/288, 16/289, 16/29, 16/30, 16/31, 16/313, 16/316, 16/319, 16/322, 16/325, 16/328, 16/3322, 16/3323, 16/3326, 16/3328, 16/3329, 16/3331, 16/3332, 16/3334, 16/3335, 16/3337, 16/3338, 16/334, 16/3341, 16/3343, 16/3344, 16/3346, 16/3347, 16/3349, 16/335, 16/337, 16/338, 16/34, 16/345, 16/35, 16/353,

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<u>Action</u>	<u>Subclass</u>	<u>Group(s)</u>
		16/355, 16/358, 16/36, 16/367, 16/374, 16/38, 16/381, 16/382, 16/40, 16/41, 16/43, 16/432, 16/433, 16/434, 16/435, 16/436, 16/437, 16/438, 16/4387, 16/4393, 16/44, 16/444, 16/447, 16/45, 16/48, 16/483, 16/487, 16/489, 16/50, 16/51, 16/53, 16/532, 16/535, 16/538, 16/54, 16/55, 16/56, 16/58, 16/583, 16/5838, 16/5846, 16/5854, 16/5862, 16/5866, 16/587, 16/60, 16/61, 16/63, 16/632, 16/634, 16/635, 16/636, 16/637, 16/638, 16/639, 16/64, 16/65, 16/68, 16/683, 16/685, 16/686, 16/687, 16/70, 16/71, 16/73, 16/732, 16/7328, 16/7335, 16/7343, 16/735, 16/738, 16/739, 16/74, 16/743, 16/745, 16/748, 16/75, 16/78, 16/783, 16/7834, 16/7837, 16/784, 16/7844, 16/7847, 16/785, 16/7854, 16/7857, 16/786, 16/7864, 16/7867, 16/787, 16/80, 16/81, 16/83, 16/832, 16/835, 16/8358, 16/8365, 16/8373, 16/84, 16/86, 16/88, 16/90, 16/901, 16/9014, 16/9024, 16/9027, 16/903, 16/90324, 16/90339, 16/90344, 16/90348, 16/904, 16/907, 16/93, 16/94, 16/95, 16/951, 16/9535, 16/9537, 16/954, 16/955, 16/9554, 16/9558, 16/9562, 16/9566, 16/957, 16/9574, 16/9577, 16/958, 16/972, 16/986

No other subclasses/groups are impacted by this Notice of Changes.

This Notice of Changes includes the following [Check the ones included]:

1. CLASSIFICATION SCHEME CHANGES

- A. New, Modified or Deleted Group(s)
- B. New, Modified or Deleted Warning(s)
- C. New, Modified or Deleted Note(s)
- D. New, Modified or Deleted Guidance Heading(s)

2. DEFINITIONS

- A. New or Modified Definitions (Full definition template)
- B. Modified or Deleted Definitions (Definitions Quick Fix)

3. REVISION CONCORDANCE LIST (RCL)

4. CHANGES TO THE CPC-TO-IPC CONCORDANCE LIST (CICL)

5. CHANGES TO THE CROSS-REFERENCE LIST (CRL)

2. A. DEFINITIONS (new)

Insert: The following NEW definitions.

G06F 16/00

Definition statement

This place covers:

- Systems and methods for retrieving digital information stored in databases, data repositories or file systems, locally or remotely.
- Details of the organisation and preparation of information for use during the retrieving of digital information, e.g. generation of indexing information or query formulation.
- Details of data structures used for information retrieval, such as trees, lists or hashing.
- Details of query processing and the presentation of query results, e.g. in textual or graphical form on graphical user interfaces [GUIs].
- Details of browsing digital information.
- Details of architectures of databases, data repositories or file systems, e.g. physical, logical, virtual, central or distributed architectures.
- Details of managing data stored in databases, data repositories or file systems, e.g. tuning, replication, archiving, synchronisation, concurrency control and interfaces therefor such as GUIs.
- Details of optimising the storage and retrieval of digital information, e.g. de-duplication of stored data, application-specific caching and pre-fetching in file systems, (distributed) databases or web browsers.
- Systems and methods for retrieving data from structured databases and for their management. Examples of such structured databases are relational, object-oriented, multidimensional, spatial, temporal and geographical databases.
- Systems and methods for retrieving semi-structured data, e.g. XML formatted data or comma separated values.
- Systems and methods for retrieving text, audio, image, video or multimedia data from databases or for managing document libraries.
- Systems and methods for information retrieval from and browsing in the World Wide Web.

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Relationships with other classification places

- Content-based information retrieval in databases storing media data, e.g. audio, image or video data, involves the comparison of a search query with a corresponding representation of the data. The generation of the search query and the representation of the data can involve the analysis of the data and the subsequent low-level and high-level feature extraction. [G06F 16/00](#) covers aspects of the actual process of comparison, e.g. similarity matching. The analysis and feature extraction is covered by [G06K 9/00](#), [G06T 7/00](#), [G10H](#) and [G10L](#), depending on the type of data.
- Distributed repositories involve the use of networks for data transmission. Specific protocols for information interchange, including on the application layer, are found generally under [H04L](#).
- Physical data storage details generally are found in [G06F 3/06](#), [G11B](#) or [G06F 12/00](#).
- The mere use of databases in specific application fields (e.g. administrative or financial processing systems) is covered by the respective application field, e.g. [G06Q](#).

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Version control, e.g. searching in source database; configuration management, in particular source code databases	G06F 8/71
Error recovery, backup, mirroring	G06F 11/14
CAD database applications	G06F 30/00
Biological and chemical applications	G16B 50/00 , G16C 20/00
Access control or security in information retrieval systems and repositories; anonymising queries and database content	G06F 21/00
Pattern recognition	G06K 9/00
Business, financial and administrative related applications	G06Q 10/00 - G06Q 90/00

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Image analysis	G06T 7/00
Musical instruments; music analysis	G10H
Speech analysis	G10L
Medical applications	G16H
Code conversion and compression	H03M 7/00
Network protocols, addressing and routing	H04L 29/00, H04L 67/00
Telephone directories in telephonic communication systems	H04M
Digital picture intermediate information storage	H04N 1/21
TV guides, electronic programming guides, video distribution, interactive television, VOD (video on demand)	H04N 21/00

Special rules of classification

1. For documents dealing with how a given type of data is retrieved or how the database or repository for this particular type of data is organised, classification should generally take place in the indicated subgroup for the data type as follows:

- In multimedia databases - G06F 16/40
- Geographical information - G06F 16/29
- Still images - G06F 16/50
- Structured information, records - G06F 16/20
- Unstructured text - G06F 16/30
- Audio information (e.g. music, speech) - G06F 16/60
- Video information - G06F 16/70
- Semi-structured information (e.g. XML, CSV) - G06F 16/80

2. If, however, more than one particular data type is described in some detail, classification under each of the corresponding subgroups should be considered.

3. If no specific data type is indicated at all, or an explicit hint is given that the disclosed mechanism can be used for retrieval of arbitrary data types, e.g. a list of alternative data types, then for "generic" data type, use subgroups under G06F 16/90.

4. In the case of annotated data/metadata-based retrieval, the type of data used for the retrieval is sometimes different from the data type to be finally retrieved (e.g. associated images are used to retrieve text documents).

In this case, the classification should be decided according to the level of disclosed details concerning each aspect:

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- According to the data type retrieved if the use of that metadata of different type is only casually described, and
- According to the data type used for retrieval, e.g. type of the metadata if specific details of this use are disclosed.

In the cases where both aspects are well-covered, double classification can be warranted.

Note: Many problems with generic data types, such as under rule 3, arise for documents describing querying systems/methods using metadata wherein the data type of the data finally retrieved is arbitrary or does not really matter. Using the above approach, these documents simply can be classified under the data type used for the retrieval and in the metadata subgroup under the generic data type subgroup. A similar approach can be applied in case of browsing a data type using a different data type.

- For example: browsing a set of audio files by browsing through the titles of the files or through images representing the audio files is to be classified under "browsing of audio data". In case some interesting aspects also merit a classification under text, respectively image browsing, this should be covered by double classification. Again, classification under "browsing of generic data" has to be considered.

5. In this technical field, one does not distinguish between invention and additional information in the sense of the IPC Guide § 77-80. Thus, symbols are allocated only as "invention information" (INV) type, irrespective of the true nature of the information: invention or additional.

G06F 16/10

Definition statement

This place covers:

Details of file systems and file servers. In particular, this group covers all aspects of generating, accessing and managing files.

Relationships with other classification places

Relationship of [G06F 16/10](#) with its subgroups:

- For a proper functioning of the file system, management services are used by file system administrators to ensure that the file system provides the expected services; see the definitions below for the subgroup [G06F 16/10](#). A file is an abstract data

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container used in file systems to manage a set of data. The internal structure of a file normally is not known by the file system, i.e. the file is opaque from the viewpoint of the file system. The internal structure and size of a file is defined by the application generating and using the file but is independent of the underlying physical storage system used to store the file. Access of user or applications to a file is granted by a file system via its file system interface providing services to create, use and manage files. These user or application oriented services are implemented via file system functionality which is referred to in this group as basic file system functionality; see the definitions below for subgroups [G06F 16/13](#), [G06F 16/14](#) and [G06F 16/16](#).

In addition to this basic file system functionality, many file systems provide further functionalities, e.g. to reduce the consumption of resources, to improve the response time or to adapt the file system to individual user needs; see the definitions below for the subgroup [G06F 16/17](#). File systems are used in many different environments and for different purposes. As a consequence, different file system types have evolved having different capabilities adapted to the specific requirements of the individual use scenarios; see the definitions below for the subgroup [G06F 16/17](#).

- Subgroups [G06F 16/13](#), [G06F 16/14](#) and [G06F 16/16](#) cover user related aspects of file systems of basic file system functionality, namely file storage and access structures, file search and file and folder operations. These aspects may be found in all types of file systems.
- Subgroup [G06F 16/17](#) covers aspects of further file system functionalities by extending the basic functionality of the file systems e.g. to personalise file systems, to reduce the response time or to minimise required resources such as storage space. These aspects may be found in many types of file systems.
- Subgroup [G06F 16/18](#) covers additional aspects of specific types of file systems. These aspects may be found only in one or few types of file systems.

Relationship of [G06F 16/10](#) with [G06F 3/0601](#):

[G06F 16/10](#) covers all aspects related to files where the internal structure and size of a file is independent of the underlying physical storage system used to store the file. This characteristic distinguishes this group from the technical field [G06F 3/0601](#) which covers all aspects of storing and managing data in physical storage systems where the used storage containers, e.g. volumes, LUNs, blocks, sectors, etc., depend on the individual physical storage system. Thus, [G06F 3/0601](#) covers the use of storage oriented or storage dependent data containers, whereas [G06F 16/10](#) covers the use of application oriented and storage independent data containers. In other words, files and directories provide a logical storage organisation on top of a physical storage layout.

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References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of block level storage systems	G06F 3/0604
Details of error detection and correction	G06F 11/14
Addressing of a memory level in which the access to the desired data or data block requires associative addressing means, e.g. caches	G06F 12/0802
Protecting data against unauthorised access or modification	G06F 21/00

Special rules of classification

The classification system of [G06F 16/10](#) is organised in two dimensions. Subgroups [G06F 16/11](#) - [G06F 16/17](#) define different functional aspects of a standard file system. These functional aspects define the first dimension. The subgroup [G06F 16/18](#) defines additional aspects of different file system types. These file system types represent the second dimension. Double classification for functional aspects according to the first dimension and for additional aspects of different file system types according to the second dimension may be considered if a contribution in both dimensions is present.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Data backup	A copy of data created by replicating persistent data from a given storage medium (not from a volatile memory) at a particular point in time for the purpose of potentially later recovering said data in the state it was at said particular point in time. The recovery can either occur through restoration of said replicated data onto a storage medium or memory or by using the memory/medium onto which the copy was created. A backup of data typically is used to at least partially correct or restore lost or corrupted data, although it is accepted that the restored state usually is not identical to the state when the data loss occurred, i.e. some data may be unrecoverable.
File	A file is an abstract data container used in file systems to manage a set of data. The internal structure of a file normally is not known by the file system, i.e. the file is opaque from the viewpoint of the file

	system. The internal structure and size of a file is defined by the application generating and using the file but is independent of the underlying physical storage system used to store the file.
File system	A file system (or filesystem) is a means to organise data expected to be retained after a program terminates by providing procedures to store, retrieve and update data.
Hierarchical Storage Management (HSM)	A particular case of data migration wherein the target medium is lower in a hierarchical storage system and is used for less frequently used data or for data that is no longer actively used. The target medium is suitable for longer-term storage, is slower and has lower cost per unit of data. In contrast to backup, HSM systems do not provide an additional instance of the data.
Data migration	Moving data from one memory or storage medium to another without effectively replicating it since ultimately only one copy persists. Examples: transferring data from a disk to another one having different reliability, performance or cost properties.
Data replication	The act of creating several instances of the same data of which at least two are available in the absence of errors and modifications of the original data. The different instances may be stored on different locations of a given storage medium or memory or they may be stored on physically distinct media or memories. The concept of replication is independent of the purpose for which it is used, e.g. replication may be used for potential restoration of data, for load balancing and performance improvement, for fault tolerance, or for increasing the availability of data, etc. Data replication can occur at different levels of abstraction, e.g. at database level, at file system level, at the level of disk/storage I/O operations or at the level of (main) memory pages or even individual memory write instructions.

G06F 16/113

Definition statement

This place covers:

Long-term storage or digital preservation of historical data object versions whereas the fact that files are stored in an archive is generally known to the user in contrast to Hierarchical Storage Management (HSM) systems in which the actual storage location is NOT known to the user. Whenever a file has been stored in the archive, the original file in the file system will be deleted, normally to free storage space in the file system.

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References***Limiting references****This place does not cover:*

Lifecycle management in storage systems	G06F 3/0649
Backup systems	G06F 11/1446

Informative references*Attention is drawn to the following places, which may be of interest for search:*

Hierarchical storage management (HSM) systems	G06F 16/185
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G06F 16/116**Definition statement***This place covers:*

- Conversion of a file system from a first to a second type or format.
- Upgrade from an older to a newer file system version or vice versa.

References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

File system format conversion of restoring backed-up files	G06F 11/1448
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G06F 16/119

Definition statement

This place covers:

Migration of complete file systems from a first to a second environment, e.g. for replacing old server systems.

References

Limiting references

This place does not cover:

Migration mechanisms in storage systems, e.g. volume migration	G06F 3/0647
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G06F 16/122

Definition statement

This place covers:

- Policy-based management of file systems, e.g. in combination with archiving, allowing automatic management of file systems.
- Quota management.
- Allocation policies.

References

Limiting references

This place does not cover:

Backup policies	G06F 11/1446
File migration policies for HSM systems	G06F 16/185

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G06F 16/125

Definition statement

This place covers:

Policy-based management of file systems characterised by the use of retention policies for managing the lifetime of files (lifecycle management of files).

References

Limiting references

This place does not cover:

Retention policies for HSM systems	G06F 16/185
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G06F 16/128

Definition statement

This place covers:

Management of snapshots of file systems, e.g. snapshot creation, deletion.

References

Limiting references

This place does not cover:

The use of snapshots for specific applications, e.g. backup or recovery should be classified in the application fields	G06F 11/14 , G06F 11/16
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G06F 16/13

Definition statement

This place covers:

- File indexing methods used in file systems and their management, e.g. using directories, trees (e.g. Comprising inodes, vnodes) for indexing and organising files in the file system.
- File indexing methods used in distributed file systems, e.g. the use of a centralised or distributed index in a distributed file system.

References

Limiting references

This place does not cover:

Arrangements of input from, or output to, record carriers	G06F 3/06
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G06F 16/134

Definition statement

This place covers:

Use of distributed indices in file systems, e.g. Distributed Hash Tables (DHT).

G06F 16/137

Definition statement

This place covers:

Use of hashing or hash functions for indexing files in file systems wherein hashing values are calculated from the file content or file metadata, e.g. file name, file path, wherein the internal file structure or the data type of the file content is not relevant for the calculation of the hash-values.

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References***Limiting references****This place does not cover:*

Content-based indexing of textual data	G06F 16/31
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G06F 16/14**Definition statement***This place covers:*

Techniques and architectures for searching files in a file system based on file metadata, e.g. such as file name, associated keywords, time and owner information, creation date, file signatures or dependencies between files.

References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Content-based searching of multimedia data	G06F 16/40
Content-based searching of image data	G06F 16/50
Content-based searching of textual data	G06F 16/30
Content-based searching of audio data	G06F 16/60
Content-based searching of video data	G06F 16/70
Content-based searching of HTML documents	G06F 16/95

G06F 16/144

Definition statement

This place covers:

Specific techniques for generating file search queries.

G06F 16/148

Definition statement

This place covers:

Techniques for processing search queries for files in a file system.

Special rules of classification

Specific techniques for processing search queries for files having specific contents, e.g. image files, audio files, video files, multimedia files, semi-structured files or text files.

Such specific file search processing methods must be classified in the file type specific groups.

G06F 16/152

Definition statement

This place covers:

Techniques for searching files based on file content signatures such as hash values generated from the file content. The calculation of the file content signature does neither take into account internal structures of the file nor the data type of the file content.

Special rules of classification

Specific methods for searching files having specific contents or data types, e.g. image files, audio files, video files, multimedia files, semi-structured files or text files. Such specific file search methods must be classified in the file type specific groups.

G06F 16/156

Definition statement

This place covers:

Specific methods for the presentation of file search/query results.

G06F 16/16

Definition statement

This place covers:

- Details of operations performed on files and folders, in particular at the user level, e.g. file copy, file delete, (automatic) classification of files.
- Generation of file meta data, such as file names.
- Details of user-interfaces specifically adapted to file systems.

G06F 16/162

Definition statement

This place covers:

Erase or delete operations on files and folders, e.g. secure or efficient erase/delete.

References

Limiting references

This place does not cover:

Erasing in storage systems	G06F 3/0652
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G06F 16/164

Definition statement

This place covers:

- Methods for generating metadata for files and folders.
- Methods for generating (content based) names of files and folders.

G06F 16/166

Definition statement

This place covers:

Methods for converting file and folder names, e.g. for adapting the file names to different OS.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

File name conversion of backed up files	G06F 11/1448
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G06F 16/168

Definition statement

This place covers:

Aspects of user-interfaces used for accessing or managing files and folders.

References

Limiting references

This place does not cover:

Presentations of file search/query results	G06F 16/156
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Generic interaction techniques for graphical user interfaces	G06F 3/048
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G06F 16/17**Definition statement**

This place covers:

General optimisations which apply to more than one file system type, e.g. customisation, caching, prefetching, redundancy elimination, support for shared file access, synchronisation, etc.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Specific optimisations which apply only to exactly one file system type	G06F 16/18
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G06F 16/172**Definition statement**

This place covers:

- Details of using local or remote file caches, such as file caches in clients, servers or proxies.
- Details of using methods of prefetching or hoarding of remotely stored files, e.g. for supporting disconnected operations of mobile devices.
- File caching policies, e.g. selection of files to be cached.

Relationships with other classification places

[G06F 16/172](#) covers the application of caching in file systems, namely all aspects of using caches for caching files in file systems whereas [G06F 12/0866](#) covers all aspects and details of implementing caches in storage systems.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Caching for peripheral storage systems, e.g. disk cache; all aspects of caching, applied to file caching, which are not specific to files or file systems, e.g. details of cache management, caching architectures	G06F 12/0866
Caching used in the WWW for retrieving HTML pages	G06F 16/9574
Network-specific arrangements or communication protocols for caching	H04L 67/2842

[G06F 16/1724](#)

Definition statement

This place covers:

Details of file system defragmentation techniques where file system knowledge is used to reduce the number of file fragments stored on the underlying storage system. These techniques typically are performed by the file system so that the underlying storage system is not aware that a defragmentation operation is executed.

Relationships with other classification places

Details of storage system defragmentation techniques performed by the underlying storage systems without using file system knowledge, particularly in management of blocks in storage devices, is classified in [G06F 3/064](#). In this case, the defragmentation is performed by the storage system but not by a file system.

References

Limiting references

This place does not cover:

Saving storage space on storage systems	G06F 3/0608
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Details of storage system defragmentation techniques performed by the underlying storage systems without using file system knowledge	G06F 3/064
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G06F 16/1727

Definition statement

This place covers:

Details of file system free space management where file system knowledge is used to manage the free space on the underlying storage system. These techniques typically are performed by the file system so that the underlying storage system is not aware that free space management is performed.

Relationships with other classification places

Details of storage system free space management performed by the underlying storage systems without using file system knowledge, particularly in management of blocks in storage devices, is classified in [G06F 3/064](#). In this case, the free space management is performed by the storage system but not by a file system.

References

Limiting references

This place does not cover:

Saving storage space on storage systems	G06F 3/0608
Details of storage system free space management performed by the underlying storage systems without using file system knowledge	G06F 3/064

G06F 16/173

Definition statement

This place covers:

- Means and methods for the customisation of file systems.
- Support for localisation (multi-language support).
- Personalisation of the file system to users of the file system.

G06F 16/1734

Definition statement

This place covers:

- Monitoring events, such as changes or updates to files or file metadata and file system metadata.
- Logging changes or updates to files or file metadata and file system metadata.

Special rules of classification

If the techniques of monitoring file system events are used in a specific application domain, e.g. for synchronisation, indexing, backup, etc., classification in the specific application domain must also be considered.

G06F 16/1737

Definition statement

This place covers:

- Specific adaptations of the file system to reduce the power consumption, e.g. in mobile devices.
- Specific adaptations of the file system for copying with limited storage space, e.g. by deleting (policy-based) selected files.

References

Limiting references

This place does not cover:

Saving storage space on storage devices	G06F 3/0608
Power saving in storage systems	G06F 3/0625

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G06F 16/174

Definition statement

This place covers:

Techniques for eliminating redundancies in file systems, e.g. by copy on write, sparse files or deduplication.

References

Limiting references

This place does not cover:

Elimination of redundancy for the purpose of backup	G06F 11/14
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G06F 16/1744

Definition statement

This place covers:

Elimination of redundancies in file systems by using compression methods, e.g. sparse files.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of compression	H03M 7/30
Protocols for data compression	H04L 69/04

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G06F 16/1748

Definition statement

This place covers:

Elimination of redundancies in file systems by deduplication based on segments of a file when the structure of the file is known. The individual segments of the file may have different lengths.

References

Limiting references

This place does not cover:

Deduplication techniques in storage systems for the management of data blocks	G06F 3/0641
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G06F 16/1752

Definition statement

This place covers:

Redundancies in file systems that are eliminated by deduplication based on typically equally sized chunks of a file when the structure of the file is unknown.

G06F 16/1756

Definition statement

This place covers:

Redundancies in file systems that are eliminated by using delta-files, e.g. for storing multiple versions of files whereas only the modifications between subsequent versions of a file are stored in the delta-file.

G06F 16/176

Definition statement

This place covers:

Techniques for supporting shared access to files, i.e. more than one application is allowed to access the same file.

G06F 16/1767

Definition statement

This place covers:

File systems providing support for concurrency control to serialise access to files (pessimistic methods like locking) or provide for conflict resolution methods to resolve file system states where conflicting writes to a file have taken place (optimistic methods).

G06F 16/1774

Definition statement

This place covers:

Locking methods for file systems allowing shared and concurrent access to files.

G06F 16/178

Definition statement

This place covers:

- Details of synchronisation in file systems, e.g. synchronisation architectures, conflict resolution, administration of synchronisation by using synchronisation policies.
- Techniques for transparent or automatic synchronisation of files in file systems whereas no user interaction is necessary to perform the synchronisation, e.g. transparently keeping replicated file copies consistent with each other, e.g. by propagation of changes to all file replicas.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

File management policies in general	G06F 16/122
Change detection in file systems	G06F 16/1734
Distributed file systems	G06F 16/182
Synchronisation of structured data	G06F 16/27
Protocols for data synchronisation between network nodes	H04L 67/1095

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Synchronisation	Synchronisation is a service provided by file systems to synchronise two or more independent file systems or to synchronise replicas in a distributed file system.
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G06F 16/1787

Definition statement

This place covers:

The non-transparent synchronisation of files in file systems whereas user interactions are necessary to perform the synchronisation, e.g. user-based file selection, conflict resolution with user support.

G06F 16/1794

Definition statement

This place covers:

Details of file format conversion during synchronisation, e.g. synchronisation between heterogeneous file systems.

G06F 16/18

Definition statement

This place covers:

Details of specific file system types that are specific to the individual file system types, e.g. details of file systems allowing only read-only access to files.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Generic aspects of file systems	G06F 16/13 , G06F 16/14 , G06F 16/16 , G06F 16/17
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G06F 16/1805

Definition statement

This place covers:

- File systems where data is only appended to existing data
- Append-only file systems using logs to store data

G06F 16/181

Definition statement

This place covers:

File system of type WORM (Write Once Read Many), e.g. by using WORM hardware, by using standard hard disk extended by additional functionality implementing the WORM semantic.

G06F 16/1815

Definition statement

This place covers:

File systems using journals to store files and file metadata.

G06F 16/182

Definition statement

This place covers:

Aspects of distributed file systems, e.g. architectures, specific management aspects.

G06F 16/1824

Definition statement

This place covers:

Systems and methods for storing files in a Network-Attached Storage system (NAS) which provides data access on the file level. The roles of the clients and the file server(s) are distributed over the network.

References

Limiting references

This place does not cover:

Distributed or networked storage systems which provides data access on the block level	G06F 3/067
Protocols for distributed storage of data in a network	H04L 67/1097

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

NAS	network attached storage
SAN	storage area networks

G06F 16/1827

Definition statement

This place covers:

Details of management of NAS, e.g. data placement policies of file or file fragments.

References

Limiting references

This place does not cover:

Management of SAN	G06F 3/067
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G06F 16/183

Definition statement

This place covers:

Details of providing network file services by Network-Attached Storage (NAS) file servers accessed over a network using file access protocols, e.g. by using Network File System (NFS) or Common Internet File System (CIFS) to access files.

References

Limiting references

This place does not cover:

Network file access protocols	H04L 67/1097
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G06F 16/1834

Definition statement

This place covers:

File systems storing files in peer-to-peer like storage networks.

References

Limiting references

This place does not cover:

P2P communication protocols	H04L 67/104
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Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

File system peer	A file system peer implements both the file server and the client role. Thus, a peer may request in its client role a file from another peer. Additionally, the same peer may provide files in its file server role to other peers. Thus, both the client and the server role are distributed over the network.
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G06F 16/1837

Definition statement

This place covers:

Details of file management specifically adapted to peer-to-peer like storage networks, e.g. data placement of file or file fragments.

References

Limiting references

This place does not cover:

Topology management mechanisms of peer-to-peer networks	H04L 67/1042
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G06F 16/184

Definition statement

This place covers:

Details of file systems replicating files on more than one storage place, e.g. a single file or even a complete file system is replicated.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Protocols for supporting replication or mirroring of data between network nodes	H04L 67/1095
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Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Replicated file	A replicated file is a copy of an original file and stored in a different storage place as the original file. The replicated file is kept consistent, i.e. synchronised, with the original file.
File replication	File replication is a service provided by the replicated file system whereas the fact that files are replicated is transparent to the users, such as applications, of the replicated file system.

G06F 16/1844

Definition statement

This place covers:

Details of management of replicated file systems, e.g. data placement policies of file replicas.

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G06F 16/1847

Definition statement

This place covers:

File systems specifically adapted to or used in flash memory, SSDs, etc. File system data structures or corresponding methods are adapted by taking constraints of the static storage into account.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Dedicated interfaces to non-volatile semiconductor memory device	G06F 3/0679
Dedicated interfaces to non-volatile semiconductor memory arrays	G06F 3/0688

G06F 16/185

Definition statement

This place covers:

Hierarchical storage management (HSM) used in file systems, e.g. lifecycle management, whereas the fact that files are stored on different levels of the HSM system is generally NOT known to the user in contrast to archive systems in which the actual storage location is known to the user. Further, in contrast to backup system only one copy of data objects exists. Whenever a file has been migrated from one level to another level of the HSM system the file copy stored in the previous level of the HSM will be deleted, normally to free storage space in the HSM system.

References

Limiting references

This place does not cover:

Archive systems	G06F 16/113
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Life cycle management in storage devices	G06F 3/0649
Hybrid storage combining heterogeneous device types	G06F 3/0685
Backup systems (in backup systems a second, backup copy is created from the original data without deleting the original data in the primary storage)	G06F 11/1446

G06F 16/1858

Definition statement

This place covers:

Details of parallel file systems, e.g. General Parallel File Systems (GPFS).

G06F 16/1865

Definition statement

This place covers:

File systems supporting transactional operations, e.g. commit processing, logging and recovery of file transactions, on file system objects (e.g. files, directories, etc.).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Commit processing in structured data stores	G06F 16/2379
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G06F 16/1873

Definition statement

This place covers:

File system supporting different (historic) versions of e.g. files, directories, etc.

G06F 16/188

Definition statement

This place covers:

Virtual file systems where at least one file system component is virtualised, e.g. transparent access to compressed archives via a virtual file system e.g. Double Space. Another example are virtual file systems implemented by database systems. Thus, file system requests are transparently translated into database queries.

G06F 16/192

Definition statement

This place covers:

Virtual file systems with virtual folders or a virtual folder structure.

G06F 16/196

Definition statement

This place covers:

Details of the file system for accessing devices and non-file objects, e.g. accessing CPU state information, using the standard file system access operations provided by a file system-like interface, e.g. the procfs, sysfs, usbfs, devpts or BSDs kernfs. From an application point of view the devices and non-file objects are accessed as virtual files.

References

Limiting references

This place does not cover:

Dedicated interfaces to storage systems	G06F 3/0601
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G06F 16/20

Definition statement

This place covers:

- Structured data stores comprising all sorts of database management systems based on a particular structured data model such as hierarchical, network (CODASYL), relational, object-relational, object oriented, deductive, and semantic, entity based systems.
- Structured data, in general, means that the data has a certain predetermined structure which is typically the same for a set of managed / stored objects, for example, a set of data records which conform to a certain schema, i.e. the records have a particular number of fields of a certain data type. A schema need not be described explicitly in a document.
- A database system can be implemented on top of a file system, i.e. the records might be simply stored in files. Another indication for structured data could be a sophisticated declarative query / data manipulation language. This criterion should be used when no information about the data type or the storage technology used is available.
- Particular applications of structured data are multidimensional databases that generally are based on specific relational data models.

Relationships with other classification places

Unstructured data being binary data types such as image or audio data, which have merely a bit string structure (binary objects, files) or text documents including documents with mark-up such as HTML. Unstructured data is classified according to the respective data type (audio, image, video, multimedia, web, file systems). For semi-structured data, in particular XML, see [G06F 16/80](#).

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G06F 16/21

Definition statement

This place covers:

Aspects of defining and managing database models and systems at the logical or external levels, above the physical storage. The group is concerned only with aspects of managing a single database system. Details of tools, functions or services used to support a database administrator including data maintenance activities to support front-end applications.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Database storage and indexing details	G06F 16/22
Data updating	G06F 16/23
Data querying (retrieval)	G06F 16/24

G06F 16/211

Definition statement

This place covers:

- Systems which support the creation and maintenance of data dictionaries in database systems.
- Details for mappings between schemas, where the mapping solution is independent of the application.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Uses of mappings between schemas in the relevant application group, e.g. object relational mappers and translation layers in client/server interfaces	G06F 16/252
Abstract models in federated databases systems	G06F 16/256
Replication and update of data dictionaries in distributed database systems	G06F 16/27

G06F 16/212

Definition statement

This place covers:

Support for users to interactively model data dictionaries or conversions from other data models into the data model supported by the DBMS.

G06F 16/213

Definition statement

This place covers:

Facilities that allow the data dictionary of a database to be changed and support the continued operation of the database applications or of other interfacing systems.

G06F 16/214

Definition statement

This place covers:

Facilities to allow a database to be migrated between two different DBMS or between different versions of the same DBMS.

G06F 16/215

Definition statement

This place covers:

Facilities that promote improvements to the quality of existing data of a database.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Support for consistency and integrity of data during update operations	G06F 16/2365
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G06F 16/217

Definition statement

This place covers:

Facilities to support the administration of the database operation, i.e. database tuning, not covered by specific storage tuning [G06F 16/2282](#).

References

Limiting references

This place does not cover:

Database performance monitoring	G06F 11/3409
Storage tuning including database reorganisation	G06F 16/2282

G06F 16/219

Definition statement

This place covers:

Support in a database system to keep the history of changes of records.

References***Limiting references***

This place does not cover:

Querying versioned data	G06F 16/2474
Querying temporal data	G06F 16/2477

Informative references

Attention is drawn to the following places, which may be of interest for search:

Multi-version concurrency control	G06F 16/2336
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G06F 16/22**Definition statement**

This place covers:

How structured data is stored and maintained at the physical level including indexing in structured data.

An index of a structured database is updated periodically.

G06F 16/221**Definition statement**

This place covers:

Details to support databases with storage oriented by columns.

G06F 16/2219**Definition statement**

This place covers:

Details of storing and interfacing with Large Objects in databases, e.g. Binary Large Objects (BLOBs).

G06F 16/2228

Definition statement

This place covers:

Creation and/or assembly of index structures.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Indexing structures for textual data	G06F 16/316
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G06F 16/2237

Definition statement

This place covers:

Bitmap indices and other array oriented indexing structures.

G06F 16/2246

Definition statement

This place covers:

- Hierarchical indexes and functions therefor, e.g. merging of new data entries into the hierarchical index

G06F 16/2255

Definition statement

This place covers:

Details of hash table implementations used for indexing in structured databases.

G06F 16/2264

Definition statement

This place covers:

Any kind of multidimensional indexes for database systems belong in this group. Double classification with the further groups in [G06F 16/2228](#) should be done when needed.

Dimensionality reduction is used for index generation of a multidimensional database.

G06F 16/2272

Definition statement

This place covers:

Automatic or manual management of an already existing index comprising only the organisation but not the modification or updating of index entries. This means that normal adjustments of the index as a consequence of an update operation in a database (insert, delete, update) are not classified here, but reorganisations of the index (e.g. as consequence of degradation due to many updates in the database) are classified here.

Facets: The amount of clustering of an index in a relational database is analysed in order to optimise the index.

G06F 16/2282

Definition statement

This place covers:

Aspects of storing and managing tablespace structures in secondary memory, including partitioning of tables over multiple storage areas, e.g., disks, and reorganisation of databases.

G06F 16/2291

Definition statement

This place covers:

Support for user defined types or abstract data types.

G06F 16/23

Definition statement

This place covers:

Updating a database based on update requests to modify database records; the update requests are made by users or front-end applications.

G06F 16/2308

References

Limiting references

This place does not cover:

Transaction processing	G06F 9/466
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Concurrency control in file systems	G06F 16/1767
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G06F 16/2315

Definition statement

This place covers:

Optimistic approaches for concurrency control, i.e. conflicting accesses are not prevented but resolved later.

G06F 16/2322

Definition statement

This place covers:

Timestamp based concurrency schemes.

G06F 16/2329

Definition statement

This place covers:

Version based concurrency schemes.

G06F 16/2336

Definition statement

This place covers:

Pessimistic approaches (avoiding conflicts) for concurrency control, e.g. locking, multiple versions without time stamps, others.

G06F 16/2343

Definition statement

This place covers:

Locking methods for concurrency control, e.g. multi-granularity/hierarchical/range locking, lock escalation, pre-claiming of locks/consistency levels/predicate locks, distributed locking, locking implementation details, e.g. locking table.

G06F 16/235

Definition statement

This place covers:

Facilitating the definition of requests for updating data.

G06F 16/2358

Definition statement

This place covers:

Details of implementing logging of database update operations; detecting changes for the purpose of notifying users or other systems.

References

Limiting references

This place does not cover:

Use of logging for replication or synchronisation	G06F 16/27
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G06F 16/2365

Definition statement

This place covers:

Ensuring database consistency and other ACID (Atomicity, Consistency, Isolation, Durability) properties. Use of triggers and stored procedures to support update operations and related impact in the database.

G06F 16/2372

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Online updates	G06F 16/2379
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G06F 16/2379

Definition statement

This place covers:

Handling record operations for inserts, edit, deletion, and undo. The operations occur on an individual basis, on batches or in the context of transaction processing.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Aspects of transaction processing regarding CPU programming	G06F 9/466
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G06F 16/2386

Definition statement

This place covers:

Handling bulk updates during operation of the database, e.g. to minimise impact on the performance for users.

References

Limiting references

This place does not cover:

Data conversion details	G06F 16/258
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G06F 16/2393

Definition statement

This place covers:

Aspects of ensuring that materialised views, or persistent queries, are kept up to date during update operations.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Query processing	G06F 16/245
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Use of materialised views for optimisation	G06F 16/24539
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G06F 16/24**Definition statement**

This place covers:

Processing retrieval requests, i.e. finding records matching a query.

References***Informative references***

Attention is drawn to the following places, which may be of interest for search:

Using cached query results	G06F 16/24539
Caching (including caching in Client/Server database systems): for database cache management	G06F 16/24552
Plan operators for distributed queries such as join-algorithms adapted to distributed query processing	G06F 16/24553
Processing of distributed queries	G06F 16/2471

G06F 16/242**Definition statement**

This place covers:

- All aspects of query formulation; textual, graphical, explicit or implicit formulation of database queries.
- User interfaces therefor (including help systems therefor).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Interaction techniques for graphical user interfaces	G06F 3/048
Conversion of a query to an internal format	G06F 16/2452

G06F 16/2423

Definition statement

This place covers:

- Query wizards such as in MS access for constructing queries.
- Query construction based on database schema or entity relationship diagram of database.
Note: Often the user can see the query statement, which allows the user to learn the syntax of the query language.
- Intelligent help systems for the formulation of queries.

Further examples:

- A query assistant that permits the user to enter valid SQL queries; use of dialog boxes.
- Context sensitive help system for formulation of SQL queries; e.g. lists table names.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Interfaces for the formulation of natural language queries	G06F 16/243
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G06F 16/2425

Definition statement

This place covers:

- All iterative approaches to querying; typically the user interacts with a display of the results of a preceding query in order to (re)formulate a new query; for example more restrictive query predicates might be formulated to narrow the focus of the query.
- Feedback on cardinality of qualifying result set.

G06F 16/2428

Definition statement

This place covers:

- Graphical user interfaces (typically displaying charts, plots, images, maps, multi-media documents, or cubes etc.) for specifying query predicates for attribute values.
- (Hierarchical) menus and forms used for specifying query predicates for attributes.
- Menu entries that typically are generated by querying database catalog or tables; also use of menus to select predefined queries.
- Query-by-example languages where the user fills example values into a tabular scheme.

References

Limiting references

This place does not cover:

Graphical user interface is based on a visual database schema	G06F 16/2423
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Iterative querying	G06F 16/2425
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G06F 16/243**Definition statement***This place covers:*

Queries formulated in natural language for querying structured data.

References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Natural language analysis, translation, semantics	G06F 40/20 , G06F 40/40
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G06F 16/2433**Definition statement***This place covers:*

Details of query languages, e.g. SQL features.

References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Optimisation aspects	G06F 16/2453
Implementation aspects concerning the execution of the queries	G06F 16/2455

G06F 16/2435**Definition statement***This place covers:*

Active constructs, e.g. constraints; triggers; Event-condition-action rules.

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References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Implementation aspects	G06F 16/24565
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G06F 16/2438

Definition statement

This place covers:

Embedded query languages, e.g. embedded SQL; data communication structures for cursors, etc.

G06F 16/244

Definition statement

This place covers:

Grouping and aggregation, e.g. GROUP-BY (and Having), SUM, MIN, STDDEV, Percentiles etc.

Examples:

Data Cube: A Relational Aggregation Operator Generalizing Group-By, Cross-Tab, and Sub Totals.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Implementation aspects	G06F 16/24556
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G06F 16/2443

Definition statement

This place covers:

Definition, processing and use of stored procedures.

G06F 16/2445

Definition statement

This place covers:

Data retrieval commands and view definitions, e.g. in SQL, the command SELECT (including all features of select statements, unless there are particular classes for them) and VIEWS including view definitions.

G06F 16/2448

Definition statement

This place covers:

Query languages designed to support particular applications; commands for extensible query languages for adding user-defined/foreign functions etc.

G06F 16/245

Definition statement

This place covers:

Query processing comprises all processing steps that need to be done in order to process a received formulated query: parsing, translation, execution and delivery of the results (or an execution error).

G06F 16/2452

Relationships with other classification places

For Translating queries between clients (applications) and servers (data sources) see [G06F 16/23](#) and [G06F 16/27](#); for parsing see [G06F 8/427](#).

G06F 16/24522

Definition statement

This place covers:

- Translation of the expression in user natural language, e.g. spoken language, of the information to be retrieved, into database queries, e.g. the mapping from natural language (e.g. English) to SQL;
- Question/answering systems;

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Natural language analysis, translation, and semantics	G06F 40/20 , G06F 40/40
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G06F 16/24524

Definition statement

This place covers:

- Generation of code for given access plan;
- Invalidation of access plans when database objects / indexes etc. are dropped.

G06F 16/24526

Definition statement

This place covers:

Translations into an internal format such as query graph models, algebra, parse trees.

G06F 16/24528

Definition statement

This place covers:

Standardisation (conjunctive/disjunctive normal form) and Simplification (general logical transformations like De Morgan etc.).

Note: The standardisation and simplification steps also could be viewed first as simple query optimisation steps, but they have been put under query translation because these steps are often independent of the actual optimiser used; the technical aim is to provide a standardised input format for the query optimiser.

G06F 16/2453

Definition statement

This place covers:

- Rewriting and plan optimisation
- Optimization of application programs by modifying code etc.

G06F 16/24532

Definition statement

This place covers:

Optimisation of queries for parallel database systems with respect to best use of parallel execution possibilities;

Special rules of classification

Double classification could be necessary; for example, when the join order is optimised to enable bushy trees for parallel join processing and additional classification in [G06F 16/24544](#) is needed.

G06F 16/24534

Definition statement

This place covers:

- Transformations of the internal representation of the query: transformations (by means of rewriting rules) between different internal representations on a logical level (e.g. query graph model) and transformations from a logical representation to a physical representation having physical plan operators (i.e. hash join or index-nested-loops-join).
- Transforming a (rewritten) logical internal representation into a physical execution plan with concrete plan operators; typically involves selection of plan operators and their execution order based on estimated execution costs.
- Manual rewriting of query statement; includes also logical tests such as for deciding query containment (for query folding etc.); rewriting one query into several queries.

G06F 16/24535

Definition statement

This place covers:

View integration and subquery decorrelation.

G06F 16/24537

Definition statement

This place covers:

Rules for restrictions, joins, group-bys, aggregations, sorting, etc.

G06F 16/24539

Definition statement

This place covers:

Query folding where a query is mapped to existing results including partial mapping; special case: reuse of cached results of a particular query.

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References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Maintenance of materialised views (updating, replication)	G06F 16/2393
Database cache management in general	G06F 16/24552

G06F 16/2454**Definition statement***This place covers:*

Common subtree recognition and optimisation, also for multi-query optimisation.

References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Query folding (mapping a query to cached results or materialised views)	G06F 16/24539
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G06F 16/24542**Definition statement***This place covers:*

- Enumeration algorithms for plan generation and search strategy;
- Selectivity and cost estimation including learning based techniques for these estimations.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Sampling/generation of statistics	G06F 16/2462
Selectivity estimation or determination for joins	G06F 16/24545

G06F 16/24544

Definition statement

This place covers:

Join enumeration algorithms for determining the join order, e.g. left deep plans vs. bushy plans etc.

G06F 16/24545

Definition statement

This place covers:

- Estimation of the selectivity of query predicates: e.g. estimating the selectivity of the predicate "AGE=40" on a table means estimating which percentage of the records in this table has the value 40 in attribute AGE.
- Other aspects of query cost estimation.

G06F 16/24547

Definition statement

This place covers:

- Extensibility;
- Particular query types, etc. optimiser hints;
- Query modifications to implement security control (e.g. by adding predicates to a query according to a security policy in order to mask data).

References***Informative references***

Attention is drawn to the following places, which may be of interest for search:

Security, Access control	G06F 21/00
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G06F 16/24549**Definition statement**

This place covers:

- Query optimisation at run time of the query.
- Using execution time statistics for re-optimisation.
- Progress estimation during query execution.

G06F 16/2455**Definition statement**

This place covers:

- Actual execution of a single query with a given query execution plan;
- Execution of multiple queries;
- Database hardware, e.g. parallel database machines.

G06F 16/24552**Definition statement**

This place covers:

- Cache management at the database server itself, at the client/workstation or at the application server.
- Cache management strategies such as cache granularity management.
- Semantic cache management.
- Determining what data to cache.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Query optimisation exploiting the cache	G06F 16/24539
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G06F 16/24553

Definition statement

This place covers:

- Physical operators used to execute operators in a query execution plan; includes particular execution strategies such as returning only the top N rows or delayed delivery of full query results.
- Non-standard query processing operations.

G06F 16/24554

Definition statement

This place covers:

- Algorithms for unary operations (which have only one table/data stream as input), such as aggregations/groupings, sorts or scans.
- Data partitioning operators.
- Hash, random, range, window partitioning, etc.
- Can also include (partial) replication.

G06F 16/24556

Definition statement

This place covers:

For example, including algorithms implementing SQL clauses such as having, groupby, cube, rollup, etc.

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References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Corresponding query language aspects	G06F 16/244
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G06F 16/2457**Definition statement***This place covers:*

Scan operators, index access.

G06F 16/2458**Definition statement***This place covers:*

All operators except joins which have two tables (data streams) as input, such as: universal quantification, division, intersection, union, etc.

References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Joins	G06F 16/2456
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G06F 16/2456**Definition statement***This place covers:*

Algorithms for joins such as index nested loops join, sort merge join, hash join, etc.

G06F 16/24561

Definition statement

This place covers:

Compression, bit vectors, surrogate processing, main memory algorithms, etc.

G06F 16/24562

Definition statement

This place covers:

- Pointer-based join operations.
- Fast pointer dereferencing.
- Pointer swizzling.

Special rules of classification

Double classification under [G06F 16/289](#) (OODBMS) should be considered.

G06F 16/24564

Definition statement

This place covers:

- Rules including rule constructs in SQL and active databases;
- Deductive databases in general e.g. datalog; fixpoint semantics; deductive database techniques, in general.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Inference methods or devices	G06N 5/04
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G06F 16/24565

Definition statement

This place covers:

- Trigger and integrity constraints as commonly used in the context of relational or similar database systems; see example in the third version of the Structured Query Language, SQL3.
- Execution models for determining the correct execution order for multiple constraints/triggers that need to be executed.
- Semantical aspects such as relation to statement/transaction atomicity.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Query language aspects	G06F 16/2435
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G06F 16/24566

Definition statement

This place covers:

Operators for computing recursive queries, e.g. in the version of the Structured Query Language adhering to the 1999 standard, SQL1999.

G06F 16/24568

Definition statement

This place covers:

- Query processing for data streams: continuous queries over a data set; the queries are executed continuously over a database, which means that the query must be executed against newly inserted and updated data.
- Event subscription processing where the event filters (= subscription requests or profiles) are seen as continuous queries.

G06F 16/24569

Definition statement

This place covers:

Specific properties of the hardware environment, e.g. GPU, SSDs, on which the query is executed being taken into account.

G06F 16/2457

Definition statement

This place covers:

Query processing based on:

- User profiles.
- Weighting of query attributes specifying preferences of users, e.g. for ranking/relevance.
- User context such as location or user's information needs.

Learning aspects for adapting to user needs, e.g. learning user preferences.

G06F 16/24573

Definition statement

This place covers:

- Query processing using user-defined meta-data / annotations to the data, whereas the user-provided metadata is added to the database.
- Manual classification of data contents for query processing.

G06F 16/24575

Definition statement

This place covers:

Using the context of a user or client application as query criteria; context can be diverse, e.g. user's mood or location.

G06F 16/24578

Definition statement

This place covers:

Sorted output of query results in order of relevance; can use weights, etc., to specify relevance. Using this relevance for ranking and cut-off of results after returning the top-N hits.

G06F 16/2458

Special rules of classification

Similarity queries for structured data could be classified in this group or for example in [G06F 16/24558](#) (binary matching operations, if the document concerns the implementation of the similarity matching); for sorted result output by relevance, see [G06F 16/24578](#).

G06F 16/2462

Definition statement

This place covers:

Approximate query processing which is based on sampling, models or statistical techniques and creates fast, but imprecise answers to queries such as:

- Queries for the generation of statistics about the database, e.g. attribute value distributions.
- Database sampling.

G06F 16/2465

Definition statement

This place covers:

Specific support for data mining such as database operators for that purpose or optimisations.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Clustering and classification in relational databases	G06F 16/285
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G06F 16/2468

Definition statement

This place covers:

Query processing based on fuzzy functions or imprecise query predicates. Text related search predicates (using phonetic searches, etc.) should be further classified in the specific text class for this aspect.

G06F 16/2471

Definition statement

This place covers:

- Mapping of queries for distribution transparency.
- Optimizing the execution order of the plan fragments (subqueries) which need to be executed at the various sites.

G06F 16/2474

Definition statement

This place covers:

- Querying sequence data, such as time sequences like, for example, stock price sequences, which typically supports operations such as aggregations or window queries on the sequence data.
- Implementation techniques such as indexing and optimisation therefor.
- Querying versioned data.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Processing data streams	G06F 16/24568
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G06F 16/2477

Definition statement

This place covers:

Querying

- Specifically adapted to deal with temporal data such as T-SQL or bitemporal models;
- Referring to points in absolute time such as timestamps.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Use of timestamps for internal purposes such as concurrency control	G06F 16/2322
Documents where time or date attributes are treated as ordinary attributes without specific support	G06F 16/24
Time sequences which refer to a relative sequence of points in time	G06F 16/2474

G06F 16/248

Definition statement

This place covers:

- Display of the results of a query, e.g. in tabular form, with interface to modify display formats.

- Complex visualisations such as displaying results on a geographical map.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Browsing techniques (e.g. navigating in database)	G06F 16/26
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Special rules of classification

Generating/modifying the layout of business reports etc. is not classified in [G06F 16/00](#).

G06F 16/25

Definition statement

This place covers:

Interfaces between systems involving at least a database supporting ad-hoc interaction, systematic integration or some type of co-operation.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Organised distribution or systematic replication of data between databases or database systems	G06F 16/27
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G06F 16/252

Definition statement

This place covers:

Solutions specific for the interfaces between clients and a database system.

G06F 16/254

Definition statement

This place covers:

Details for implementation of data workflows transferring data from a plurality of databases into a common data store, in particular, the Extract, Transform, Load (ETL) operations to create and maintain data warehouses.

G06F 16/256

Definition statement

This place covers:

Systems providing a data abstraction layer on top of a set of heterogeneous database systems to convey the concept of a single virtual database to the end users or client systems.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Distributed queries	G06F 16/2471
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G06F 16/258

Definition statement

This place covers:

- Specific details of exchanging data between database systems involving a conversion of the data.
- Export and import operations involving some conversion.

G06F 16/26**Definition statement**

This place covers:

- Visualisation of data sets from a database in order to allow a user to discover interesting data properties without formulating an explicit query.
- Using the meta data (schema information) for visualisation of attribute values.
- Browsing a database including navigating between data items.
- Adaptation of the browsing process to the specifics of a database, e.g. displaying database schema information for browsing.

Examples:

- Organising large (structured) data sets by grouping to make them conveniently accessible on a small display device.
- Visualising structured data such as: interactions between customers and merchants and interactions associated with a time value, e.g. hits per hour on a web server.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Query formulation aspects	G06F 16/242
Query result display	G06F 16/248

G06F 16/27**Definition statement**

This place covers:

Systems that distribute or replicate data between themselves; descriptions of architectures thereof; details in relevant subgroups.

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G06F 16/273

Definition statement

This place covers:

Implementation details of asynchronous replication and in particular for reconciliation procedures.

G06F 16/275

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Concurrency control for distributed databases	G06F 16/2308
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G06F 16/278

Definition statement

This place covers:

Implementation details for data partitioning between databases that fully or partially distributed the data between themselves.

G06F 16/28

Definition statement

This place covers:

Implementation details of specialised database models which are not already covered by subgroups [G06F 16/21](#) - [G06F 16/27](#).

Special rules of classification

In general, double classification in at least one of the functional subgroups [G06F 16/21](#) - [G06F 16/27](#) and one of the subgroups of [G06F 16/28](#) should be considered.

G06F 16/282

Definition statement

This place covers:

Implementation details of supporting the storage and management of hierarchical data.

G06F 16/283

Definition statement

This place covers:

Assembly or functionality of multi-dimensional databases or data warehouses [MDDB].

Special rules of classification

Double classification with regard to subgroups [G06F 16/22](#), [G06F 16/24](#), and [G06F 16/26](#) should be considered.

G06F 16/284

Definition statement

This place covers:

Implementation details specific to relational databases not - covered by any of the subgroups [G06F 16/21](#) - [G06F 16/27](#).

G06F 16/285

Definition statement

This place covers:

Clustering or classification of structured data. Classes / clusters may already exist or can be created during the classification / clustering process. Documents disclosing class / cluster management of classification or clustering systems also can be found in this group.

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References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Clustering or classifying textual data	G06F 16/35
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G06F 16/287**Definition statement***This place covers:*

- Cluster or class visualization or browsing.
- Graphical presentation of clusters or classes as result of a clustering or classification process. Additional data can be displayed with the clusters or classes. Typically, when a mouse pointer is brought over them, additional data about the clusters is displayed (interactive cluster display device).

References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Visualisation or browsing of textual data	G06F 16/358
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G06F 16/288**Definition statement***This place covers:*

Implementation details specific to entity-relationship models not covered by any of the subgroups [G06F 16/21](#)- [G06F 16/27](#).

Special rules of classification

In general, double classification in at least one of the functional subgroups [G06F 16/21](#)- [G06F 16/27](#) and subgroup [G06F 16/288](#) should be considered.

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G06F 16/289**Definition statement***This place covers:*

- Implementation details specific to object-oriented databases not covered by any of the subgroups [G06F 16/21](#)- [G06F 16/27](#).
- Hybrid Object-Relational database models.

Special rules of classification

In general, double classification in at least one of the functional subgroups [G06F 16/21](#)- [G06F 16/27](#) and subgroup [G06F 16/289](#) should be considered.

G06F 16/29**Definition statement***This place covers:*

Data structures and retrieval of geographical or spatial information, e.g. digital maps.

References***Informative references***

Attention is drawn to the following places, which may be of interest for search:

Location-dependent Web search services	G06F 16/9537
Geographical navigation systems, route searching	G01C 21/20
Retrieval, searching and output of Points of Interest (POI) information	G01C 21/3679
Instruments for geographical navigation	G01C 21/00
Three dimensional geographic models	G06T 17/05

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G06F 16/30**Definition statement***This place covers:*

Retrieval of unstructured or raw text data in databases and/or employing metadata of the text type for retrieving other information, possibly of a different type.

References***Limiting references****This place does not cover:*

Document management systems	G06F 16/93
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Informative references*Attention is drawn to the following places, which may be of interest for search:*

Image retrieval using shape and object relationship, including layout-based retrieval of text documents	G06F 16/5854
Retrieval from the World Wide Web, e.g. using search engines	G06F 16/95
Text processing, parsing and translation of natural language	G06F 40/40 - G06F 40/58

G06F 16/31**Definition statement***This place covers:*

- Details about the creation or structure of an index.
- Updating or maintenance of indexes.

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G06F 16/313

Definition statement

This place covers:

- Extraction of strings from a text for indexing purposes.
- Identification or extraction of important information (special words, regions, relations between words in the text, etc.) from text content using mathematical calculations or dictionaries. The weight value indicating the importance of the information may be attached to it.

Facets:

- Automatically extracting information for annotating a document;
- A text is stemmed, stop words are removed and the remaining words are weighted according to their frequency of occurrence;
- Segmentation and topic identification of texts. Weight values may be used to express semantics;
- Extracting relevant information for indexing from natural language texts by parsing the text into components and extracting elements of information from the respective components;
- Transforming unstructured text into structured data (using criterion-value pairs, e.g. model, year, colour as criteria for text relating to automobiles); expansion of indexing terms, e.g. with synonyms or spelling variants.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Extraction or weighting of terms for query translation	G06F 16/3334
Extraction or weighting of terms for text summarization	G06F 16/345

G06F 16/316

Definition statement

This place covers:

Creation or structuring of a physical index storing the information to be indexed together with a physical location.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Indexing structures for structured data	G06F 16/2228
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G06F 16/319

Special rules of classification

Inverted lists often are used to index terms in a database. When these terms consist of text, these documents should be classified here and not in the [G06F 16/22](#) (Database / building index) groups.

G06F 16/322

Definition statement

This place covers:

Documents disclosing hierarchical indexes.

Facets: Character strings in a text are stored hierarchically as keywords in an index file.

G06F 16/325

Definition statement

This place covers:

Implementation details of hash tables used for indexing textual documents.

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G06F 16/328**Definition statement***This place covers:*

Documents focussing on the automatic or manual management of an already existing index. This only comprises the organisation and not the modification or updating of index entries.

Facets:

- Compression of a text index
- Using a GUI to manage an index

G06F 16/3322**Definition statement***This place covers:*

- Query formulation based on system suggestions, e.g. by using keywords, categories, etc. The user can decide whether to make use of these suggestions or not.
- Using (parts of) previous queries as suggestions for new queries.
- Using pre-stored categories for making system suggestions.

References***Limiting references****This place does not cover:*

Query reformulation based on results of preceding query	G06F 16/3325
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Informative references*Attention is drawn to the following places, which may be of interest for search:*

Dialogues to establish an executable query	G06F 16/3329
Automatic query expansion with no user interaction	G06F 16/3338

Reuse of stored results of previous queries	G06F 16/3349
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G06F 16/3323**Definition statement**

This place covers:

Interactive interfaces for formulating queries using a category hierarchy.

References***Informative references***

Attention is drawn to the following places, which may be of interest for search:

(Categorized) browsing without generating a query	G06F 16/34
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G06F 16/3326**Definition statement**

This place covers:

The user informing the system about the relevance (or non-relevance) of (some of) the results. This relevance information is used in reformulating the query.

Facets:

- Explicit feedback by the user.
- Evaluating implicit feedback, e.g. click through data.
- Pseudo-feedback (where no real relevance feedback from the user is received but the top-ranking documents are considered as being highly relevant).

G06F 16/3328**Definition statement**

This place covers:

Iterative refinement or modification of the query formulation based on a graphical display of the results.

Facets: Limiting the next query to certain documents by graphically selecting these documents in the result set (e.g. using a rectangle or lasso tool).

Example:

Text content: Making a standard keyword query and presenting the results in a 2D map by building feature vectors, mapping each information item to a point in the 2D map based on similarity. Choosing a query area in the 2D map, displaying the items belonging to the query area

G06F 16/3329

Definition statement

This place covers:

- A dialogue between the system and the user to establish an executable query.
- Also natural language question-answering systems wherein prefabricated answers are retrieved.

Relationships with other classification places

Q&A systems constructing an answer by mining knowledge from e.g. a text corpus are covered by [G06N 5/00](#).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Character input using prediction techniques	G06F 3/0237
Suggesting modifications to executable queries	G06F 16/3325

G06F 16/3331

Definition statement

This place covers:

General aspects of processing queries.

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G06F 16/3332

Definition statement

This place covers:

Pre-processing the query to make it (more) suitable for query execution; it is typically done internally with no user interaction.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Modification of queries with user interaction	G06F 16/332
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G06F 16/3334

Definition statement

This place covers:

Identifying or extracting important information (for the purpose of querying) from an input (query) text or a query.

Facets:

- Identifying keywords in a text (e.g. an SMS), a query is generated therefrom for retrieving a set of images illustrating the text.
- Identifying (spoken) keywords in a phone conversation used for querying a knowledge base.
- A user inputs a plurality of search terms, e.g. by copy and paste from a text. The system extracts the search terms that occur infrequently in the set of documents.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Feature extraction for indexing purposes	G06F 16/313
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G06F 16/3335

Definition statement

This place covers:

Basic pre-processing steps like eliminating words useless for purposes of retrieval (stop word elimination) and reducing variants of the same root word to a common stem (stemming).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Lexical analysis	G06F 8/425
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G06F 16/3337

Definition statement

This place covers:

- Translating queries in the native language of the user (e.g. Chinese) to the query language of the respective search engine (e.g. English).
- Translating English queries into Spanish equivalent for querying a Spanish index.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Language translation	G06F 40/40
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G06F 16/3338

Definition statement

This place covers:

Automatically adding query terms to a given query/automatically reformulating the query.

Facets:

- Query expansion/reformulation based on semantic information stored in thesauri and/or ontologies; use of synonyms/hypernyms/hyponyms for query expansion/reformulation.
- Concept-based querying of a document database.
- Expanding a query using different spelling variants of query terms.
- A set of text documents is queried not only using the most recent user query but also using keywords extracted from the queries received since the last switch of query topic was detected.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Query expansion by the user based on system suggestions	G06F 16/3322
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G06F 16/334

Definition statement

This place covers:

Methods used to calculate the degree of similarity between two entities (typically documents) or an entity and a query. These methods normally are used to rank query results. In the parent group, documents are kept which do not focus on how the calculation is done.

Facets:

Degree-of-similarity score is somehow calculated and reorganized into heap form to select highest score.

References

Limiting references

This place does not cover:

Query execution based on matching of textual data against a user profile	G06F 16/335
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G06F 16/3341

Definition statement

This place covers:

Similarity calculated or estimated with boolean or extended boolean models.

G06F 16/3343

Definition statement

This place covers:

Matching phoneme lattices of a query with phonemes of information annotated to the information to be retrieved.

G06F 16/3344

Definition statement

This place covers:

Similarity that is estimated based on the semantic meaning of the query and the semantic meaning of every sentence in a document collection. For this purpose, the relation and associated sense of different parts of sentences (sub sentences, words or suffixes) to each other are analyzed.

In some documents, the term "natural language query" that is often used for queries which are not really natural language based but a simple enumeration of query words connected by a logical AND (e.g. Google queries).

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Facets:

Similarity that is calculated by creating and using a graph for every sentence where words are nodes and the relationship of the words is represented as links between the nodes.

Relationships with other classification places

Q&A systems constructing an answer by mining knowledge from a text corpus: [G06N 5/00](#)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Q&A systems matching natural language queries to prefabricated answers	G06F 16/3329
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[G06F 16/3346](#)

Definition statement

This place covers:

Ranking that is done on the probability that a retrieved document really comprises what the user is looking for. The sum of the probability that the document is important and the probability that the document is not important has to be one.

Facets:

Two content vectors are given; the probability that the first content vector is relevant to the second content vector is estimated using distributions of words.

[G06F 16/3347](#)

Definition statement

This place covers:

Documents that are represented as content vectors in a vector space. Relevance of a query result is calculated by operations done in vector space.

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Facets:

- Feature vector of a document is created comprising content vector, size of the font, date of publication and name of author.
- Document vectors that are formed from word vectors and compared to a query vector.

Relationships with other classification places

Feature vectors representing web pages including content vectors of the page should be double classified here and in the corresponding web group in [G06F 16/95](#).

G06F 16/3349

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Use of previous queries for suggesting formulations of new queries	G06F 16/3322
Reformulation of queries based on results of previous queries	G06F 16/3325

G06F 16/335

Definition statement

This place covers:

Filtering or routing of textual data based on additional information (user profiles, preferences, etc.). The "user profile" could just as well be a learned set of abstract rules or an explicit query provided by the user.

Facets: Composing personalized online newspapers based on user interests.

References

Limiting references

This place does not cover:

Filtering based on user profile in web context	G06F 16/9535, G06F 16/9536
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G06F 16/337

Definition statement

This place covers:

Generation of the user profiles, either automatically or manually, and/or learning of the user preferences.

Facets: Different user profiles are analysed and compared to expand the profile of an individual user.

G06F 16/338

Definition statement

This place covers:

- Highlighting of search terms in the result set of a query.
- Visualizing the relevance of the query results showing the respective contribution of the individual query terms.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Presentation or visualization of query results integrated with query re-formulation	G06F 16/3328
Browsing or Visualization without relation to a query, e.g. simply visualizing a document or document space	G06F 16/34

Clustered display of query results	G06F 16/358
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G06F 16/34**Definition statement**

This place covers:

Mechanisms using non-textual data (e.g. graphical data) for the visualization of collections of text documents, single text documents and concepts of text documents. These mechanisms can be used for document browsing.

Facets:

- Highlighting important sentences in a text document.
- Creating a table of contents of a text document that can be used for browsing (eBook).
- A calendar-based user interface for date-based browsing of electronically stored documents.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Document space visualization for the purpose of query formulation	G06F 16/3323
Visualization of query results	G06F 16/338
Visualization of clusters	G06F 16/358
Document space presentation for browsing in web context	G06F 16/954

G06F 16/345**Definition statement**

This place covers:

Summarization of text content for presenting to a human user. Normally, important text fragments are extracted and presented to the user.

Facets:

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- Summarization of text based on users focus.
- Summarization of a collection of related documents.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Extracting text features for indexing purposes	G06F 16/313
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G06F 16/35

Definition statement

This place covers:

Automatic content-based text classification and clustering. Management of classes or clusters (GUI or machine based) overviews of different content based clustering or classification methodologies.

Facets: A GUI based system to create / modify the names of classes in an existing classification tree.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Manual classification of textual data	G06F 16/38
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G06F 16/353

Definition statement

This place covers:

Classification or clustering into predefined classes or clusters. The existing classes or clusters may not be changed.

Documents that also should be classified in this group if they do not tell whether classes are created, modified or predefined.

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Facets:

- Books are classified by their genre.
- Patent documents are classified into a patent classification scheme.
- A system that reclassifies all documents in a classification tree because the class definitions were changed.

G06F 16/355

Definition statement

This place covers:

Creation or modification of classes or clusters during the clustering or classification process.

Facets:

- Groups which become too big are divided by the system.
- If a document does not fit in any existing group and a new group is created for it.
- Clusters of words of a text are allocated.

G06F 16/358

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Visualization of documents or document spaces without clustering	G06F 16/34
Visualization of query results, including e.g. in ranked clusters	G06F 16/338

G06F 16/36

Definition statement

This place covers:

Creation (NOT THE USE) of structures that help in understanding the semantics of words.

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G06F 16/367

Definition statement

This place covers:

Creation of Ontologies (concept/term networks, graphs, trees, etc.).

G06F 16/374

Definition statement

This place covers:

Creation of thesauri (dictionaries, synonym lists).

G06F 16/38

Definition statement

This place covers:

Techniques for usage of metadata for text retrieval. The metadata can be human generated or machine made and may be extracted out of text content.

Facets:

- Manual classification systems (such as patent classification schemes) should be classified in this group.
- All kinds of metadata, e.g. citations, barcodes, keywords, etc.
- Also generation of metadata.
- Keywords extracted and stored as additional data.
- Searching a document in a library using descriptive information, e.g. author, document state, archiving status, etc.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Layout-based retrieval of text documents	G06F 16/5854
Extraction of Metadata for indexing purposes	G06F 16/313

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G06F 16/381**References*****Limiting references****This place does not cover:*

Retrieval of web documents by barcodes etc., e.g. encoding the URL	G06F 16/9554
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Informative references*Attention is drawn to the following places, which may be of interest for search:*

Document management	G06F 16/93
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G06F 16/382**Definition statement***This place covers:*

Retrieval of documents where the bibliographic data (metadata) is a citation to other document or documents.

Facets:

- CiteSeer, where documents cited/citing can be retrieved following the citation chain.

References***Limiting references****This place does not cover:*

Hypermedia, including creation/management of hyperlinks	G06F 16/94
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Informative references*Attention is drawn to the following places, which may be of interest for search:*

Details of hyperlinks in HTML documents	G06F 16/9558
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G06F 16/40**Definition statement***This place covers:*

- Retrieval of media data incorporating multiple media types, e.g. slideshows comprising image and additional audio data.
- Retrieval of media data where the retrieval algorithm is suitable for various media types.
- Automatic creation of multi-media presentations or documents as a result of a query, e.g. slide-shows, multimedia playlists, multimedia albums comprising various media types such as images, text, audio clips, video clips, etc.
- Adaptation of multimedia formats, e.g. selection of multimedia formats based on the capabilities of a client.
- Generation of multimedia documents.
- Multimedia databases index structures and management thereof.

References**Limiting references***This place does not cover:*

Retrieval of image data	G06F 16/50
Retrieval of audio data	G06F 16/60
Retrieval of video data	G06F 16/70

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Informative references*Attention is drawn to the following places, which may be of interest for search:*

Editing or indexing of data stored based on relative movement between record carrier and transducer	G11B 27/00
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Glossary of terms*In this place, the following terms or expressions are used with the meaning indicated:*

Media type	The expression media type encompasses image data, audio data, video data and text data
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G06F 16/41**Definition statement***This place covers:*

Specific indexing aspects, data structures or storage structures for multimedia data.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Indexing specially adapted for contents retrieved by relative movement between record carrier and transducer	G11B 27/10
Indexing by using information signals detectable on the record carrier and recorded by the same method as the main recording	G11B 27/28

G06F 16/43**Definition statement***This place covers:*

Processing details of multimedia retrieval requests.

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References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Programed access in sequence to addressed parts of tracks of operating discs	G11B 27/105
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G06F 16/432**References*****Informative references****Attention is drawn to the following places, which may be of interest for search:*

Interaction techniques for graphical user interfaces	G06F 3/048
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G06F 16/433**Definition statement***This place covers:*

Query formulation using a piece of audio data as retrieval argument, such as a selected audio file, music, which is currently playing, speech input, or environmental noises.

References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Details of audio retrieval	G06F 16/60
Electroponic musical instruments	G10H
Speech recognition	G10L 15/00
Speaker recognition	G10L 17/00

General determination or detection of speech characteristics	G10L 25/00
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G06F 16/434

Definition statement

This place covers:

Query formulation using a piece of image data such as a selected image file, a photograph, which currently is captured by the camera of the user, a document, a barcode or scanned text.

G06F 16/435

Definition statement

This place covers:

Wherein the retrieval is taking further parameters into account, such as user or group profile data for filtering the search space or the results.

G06F 16/436

Definition statement

This place covers:

Using biological or physiological metrics obtainable by monitoring the human body (e.g. heartbeat, pulse, body temperature, brain waves) or biometric techniques (e.g. fingerprint, iris or retina, face, voice or gait recognition) in formulation or personalisation of queries.

G06F 16/437

Definition statement

This place covers:

Techniques for modelling the changing interest of a user over time including manual, semi-automatic or automatic initialisation of user profiles, their maintenance and modification by monitoring the user's history of content selection, his history of interaction with the selected content, the management of the shared profile of a group of users, e.g. profile splitting or stereotyping.

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G06F 16/438

Definition statement

This place covers:

Where invention information is present in the visual or acoustic presentation of the query results to the user.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Menu, index or table of content presentation of record carriers	G11B 27/32 , G11B 27/34
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G06F 16/4387

Definition statement

This place covers:

Methods or interfaces to create, modify or manage multimedia playlists.

G06F 16/4393

Definition statement

This place covers:

Multimedia presentations of query results, e.g. slideshow presentations, photo albums enriched with multimedia content, e-books with multimedia content, etc.

G06F 16/44

Definition statement

This group covers:

Wherein a visual metaphor is provided for supporting the search process of the user, and wherein the retrieval is performed through arbitrary or guided browsing.

G06F 16/444

Definition statement

This place covers:

Using graphical representations of geographical, urban or virtual space, e.g. 2D or 3D maps, city plans, virtual spaces, as a paradigm for browsing representations of multimedia objects.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Interaction with 3D GUI environments in general	G06F 3/04815
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G06F 16/447

Definition statement

This place covers:

Using graphical representations of time, e.g. timelines, calendars, diaries, as a paradigm for browsing representations of multimedia objects.

G06F 16/45

Definition statement

This place covers:

Automatic content-based multimedia document classification and clustering. Management of classes or clusters (GUI or machine based), overviews of different content-based clustering or classification methodologies.

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G06F 16/48**Definition statement***This place covers:*

Retrieval or indexing of multimedia data using metadata.

Note: Group [G06F 16/48](#) concerns the use of metadata not derived from the multimedia content, or manually generated information, such as bibliographic information (e.g. title, composer, etc.), usage information, user ratings, tags etc.

These data may be generated by automatic annotation of multimedia data, generation from existing data sources, e.g. data mining, collaborative annotation, creation of semantic ontologies, tagging.

G06F 16/483**Definition statement***This place covers:*

Retrieval or indexing of multimedia data using metadata that automatically is derived from the multimedia content.

Informative references*Attention is drawn to the following places, which may be of interest for search:*

Query formulation using audio data	G06F 16/433
Query formulation using image data	G06F 16/434

G06F 16/487**Definition statement***This place covers:*

Where the feature used for retrieval or indexing is any kind of absolute, relative or fuzzy representation of location, e.g. GPS coordinates, postal address, rooms of a building, user's car.

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G06F 16/489**Definition statement***This place covers:*

Where the feature used for retrieval or indexing is of any kind absolute, relative or fuzzy representation of time, e.g. hour, date, time of the day, season of the year, rush hour, sunset or holiday.

G06F 16/50**Definition statement***This place covers:*

Systems and methods (1) for retrieving digital still images in databases or (2) related to how metadata of the image type is used to retrieve other information, possibly of a different type.

References***Informative references***

Attention is drawn to the following places, which may be of interest for search:

Retrieval of multimedia data	G06F 16/40
Pattern recognition; low-level feature extraction per se	G06K 9/00
Image analysis, e.g. from bitmapped to non-bitmapped	G06T 7/00
ICT specially adapted for handling medical images, e.g. DICOM, HL7 or PACS	G16H 30/00
Digital picture intermediate information storage	H04N 1/21

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G06F 16/51

Definition statement

This place covers:

- Data structures for images or image database organisation.
- Aspects of accessing the images in the database to deal with bandwidth problems on the network or the computer, typically using caching or image interleaving.
- Specific indexing aspects.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Indexing specially adapted for contents retrieved by relative movement between record carrier and transducer	G11B 27/10
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G06F 16/53

Definition statement

This place covers:

Processing details of still image retrieval requests.

G06F 16/532

Definition statement

This place covers:

Wherein the contribution is in specific query formulation aspects, in particular graphical user interface supporting the user in specifying a graphical query.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Interaction techniques for graphical user interfaces	G06F 3/048
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G06F 16/535

Definition statement

This place covers:

Wherein the retrieval is taking further parameters into account, such as user or group profile data for filtering the search space or the results.

G06F 16/538

Definition statement

This place covers:

Presentation of the query results to the user.

G06F 16/54

Definition statement

This group covers:

Wherein a visual metaphor is provided for supporting the search process of the user, and wherein the retrieval is performed through arbitrary or guided browsing.

G06F 16/55

Definition statement

This place covers:

Automatic image classification and clustering. Management of classes or clusters (GUI or machine based), overviews of different content-based clustering or classification methodologies.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Methods or arrangements for recognising patterns	G06K 9/00
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G06F 16/56

Definition statement

This place covers:

Vectorial images, which are typically used in CAD oriented databases.

Images also can be retrieved according to colours, shapes, etc. but the data structures are completely different as are the techniques of indexing/querying.

G06F 16/58

Definition statement

This place covers:

Indexing and retrieval of still image data using metadata.

G06F 16/583

Definition statement

This place covers:

Image databases relying on feature information (previously indexed or obtained on-the-fly) derived from the image data by automatic image analysis.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Pattern recognition	G06K 9/00
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G06F 16/5838

Definition statement

This group covers:

Where the information extracted by analysis is related to colours present in the image, e.g. histograms.

G06F 16/5846

Definition statement

This group covers:

Text extracted from the still images, in opposition to text added from external sources or inputs, for retrieval.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Optical Character Recognition (OCR) techniques	G06K 9/00
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G06F 16/5854

Definition statement

This group covers:

Using recognized shapes or spatial relationships between objects/blocks of the images for retrieval.

G06F 16/5862

Definition statement

This group covers:

Using texture descriptors for the retrieval.

G06F 16/5866

Definition statement

This group covers:

Wherein the metadata used for retrieval has been generated manually, for example, human labels, tags, keywords, comments or manually entered time and location data (as opposed to automatically obtained time or GPS provided data).

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G06F 16/587**Definition statement***This group covers:*

Where the feature used for retrieval or indexing is any kind of absolute, relative or fuzzy representation of location, e.g. GPS coordinates, postal address, rooms of a building, user's car.

G06F 16/60**Definition statement***This place covers:*

Retrieval of audio data from audio databases, e.g. retrieval of songs, by using content features or bibliographical data associated with the audio data.

References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Retrieval of general multimedia	G06F 16/40
Retrieval of video data	G06F 16/70
Electrophonic musical instruments	G10H
Speech recognition	G10L 15/00
Speaker recognition	G10L 17/00
General determination or detection of speech characteristics	G10L 25/00
Editing or indexing of data stored based on relative movement between record carrier and transducer	G11B 27/00

G06F 16/61

Definition statement

This place covers:

Specific indexing aspects, data structures and storage structures for audio data.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Indexing specially adapted for contents retrieved by relative movement between record carrier and transducer g	G11B 27/10
Table of contents on a record carrier	G11B 27/327

G06F 16/63

Definition statement

This place covers:

Processing details of audio retrieval requests

G06F 16/632

Definition statement

This place covers:

Wherein the contribution is in specific query formulation aspects supporting the user in inputting a query.

G06F 16/634

Definition statement

This place covers:

Formulation of the query predicate as an existing/example audio content, e.g. query by humming, or using a recorded piece of audio data as example.

G06F 16/635

Definition statement

This place covers:

- Filtering rules.
- Retrieval personalisation.
- Generation, learning, modification and use of user profiles.
- Monitoring of user activities for profile generation (in particular generation and use of reproduction/playback histories/logs).
- Relevance feedback.

G06F 16/636

Definition statement

This place covers:

Using biological or physiological metrics obtainable by monitoring the human body (e.g. heartbeat, pulse, body temperature, brain waves) or biometric techniques (e.g. fingerprint, iris or retina, face, voice or gait recognition) in formulation or personalisation of audio queries.

G06F 16/637

Definition statement

This place covers:

Techniques for modelling the changing taste of a user over time including manual, semi-automatic or automatic initialisation of user profiles, their maintenance and modification by monitoring the user's history of audio content selection, his history of interaction with the selected content, the management of the shared profile of a group of users, e.g. profile splitting or stereotyping.

G06F 16/638

Definition statement

This place covers:

Visual or acoustic presentation of the query results to the user.

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References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Menu, index or table of content presentation of record carriers	G11B 27/32, G11B 27/34
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G06F 16/639**Definition statement***This place covers:*

Methods presenting the results of query for audio data in form of a list which defines an order between the audio data used during the replay of the audio data, e.g. methods or interfaces to create, modify and manage audio playlists.

G06F 16/64**Definition statement***This place covers:*

Browsing, e.g. a list or a collection/database of song titles or images or icons representing audio data. Such lists or sets of audio data representations may be the results of a querying operation. However, the contribution is the browsing method.

References***Limiting references****This place does not cover:*

The generation of the list or set of audio data	G06F 16/638
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Informative references*Attention is drawn to the following places, which may be of interest for search:*

Trick modes	G11B 27/005
Browsing through audio recorded on operating discs	G11B 27/105

G06F 16/65**Definition statement***This place covers:*

Automatic audio classification and clustering. Management of classes or clusters (GUI or machine based), overviews of different content-based clustering or classification methodologies.

Informative references*Attention is drawn to the following places, which may be of interest for search:*

Methods or arrangements for recognising patterns	G06K 9/00
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G06F 16/68**Definition statement***This place covers:*

Indexing and retrieval of audio data using metadata.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Metadata derived by content-analysis	G06F 16/683
Programmed access in sequence to addressed parts of tracks of operating discs	G11B 27/105

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G06F 16/683**Definition statement***This place covers:*

Retrieval and/or indexing methods using features derived from the audio content. This subgroup covers the mere use of audio content features in the context of audio data retrieval. This metadata comprises, for example, descriptors, fingerprints, signatures, MEP-cestral coefficients, musical score, tempo.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Analysis and extraction of content specific audio features	G10H
Audio watermarking, e.g. by inserting fingerprints	G10L 19/018
Determination or detection of speech characteristics	G10L 25/00
Indexing by using information signals detectable on the record carrier and recorded by the same method as the main recording	G11B 27/28

G06F 16/685**Definition statement***This place covers:*

Text data used to retrieve audio content, e.g. text derived from speech or music, phonetic transcript, music scores (sheet music), etc.

References**Limiting references***This place does not cover:*

Speech recognition	G10L 15/00
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G06F 16/686

Definition statement

This place covers:

Where the retrieval and/or indexing method uses manually generated information, e.g. data created by humans and added to the audio data at a post-production phase by manual annotation/tagging, e.g. title, song writer, interpret, users' tags, comments or annotations etc.

G06F 16/687

Definition statement

This group covers:

Where the feature used for retrieval or indexing is any kind of absolute, relative or fuzzy representation of location, e.g. GPS coordinates, postal address, rooms of a building, user's car.

G06F 16/70

Definition statement

This place covers:

- Video retrieval using content features.
- Video retrieval using bibliographical data.
- Details or video query formulation and video query processing.
- Browsing videos and the internal structure of videos.
- Presenting video query results.
- Video database index structures and management thereof.

Video data model used in this group: the structure of this group relies on the following data model of video. Video content is the originally produced data comprising:

- The visual data (video frames).
- Accompanying audio track(s).
- Original textual content (typically subtitles, which can be coded and stored/transmitted either in binary/visual format or in textual format). Whatever data is added to video later, e.g. at a post-production phase, is referred to as bibliographical data or metadata.

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References***Application-oriented references***

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Video data retrieval specially adapted for selective content distribution, e.g. interactive television or video on demand [VOD]	H04N 21/00
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Retrieval of multimedia	G06F 16/40
Image retrieval	G06F 16/50
Audio retrieval	G06F 16/60
Recognising patterns	G06K 9/00
Image analysis	G06T 7/00
Editing or indexing of data stored based on relative movement between record carrier and transducer, e.g. video data	G11B 27/00
Source coding or decoding of digital video signal	H04N 19/00

G06F 16/71**Definition statement**

This place covers:

Specific indexing aspects, data structures or storage structures for video data.

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References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Indexing specially adapted for contents retrieved by relative movement between record carrier and transducer	G11B 27/10
Table of contents on a record carrier	G11B 27/327

G06F 16/73**Definition statement***This place covers:*

Processing details of video retrieval requests.

G06F 16/732**Definition statement***This place covers:*

Query formulation and processing for the retrieval of video data.

G06F 16/7328**Definition statement***This place covers:*

Formulation of the query predicate as an existing/example of video content, e.g. a video sequence or its excerpt/clip; typically a content-based descriptor computed from said example content during query processing; if there is contribution in the usage of a particular content feature or metadata, this should be classified under a relevant [G06F 16/78](#) subgroup, respectively; if there is a contribution in a particular content feature extraction, characterisation or analysis, this should be classified under the relevant [G06K 9/00](#) or [G06T 7/00](#) subgroup(s).

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References***Limiting references****This place does not cover:*

Graphical querying	G06F 16/7335
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G06F 16/7335**Definition statement***This place covers:*

Graphical user interfaces [GUIs] for specifying graphical query predicates interactively (a mere selection of an example video sequence as a query predicate shall be classified in [G06F 16/7328](#)). These GUIs may for example allow a specification of sought-for regions, to sketch a desired scene, a trajectory, or to designate a person, a face or an object as query predicate.

References***Limiting references****This place does not cover:*

End-user interface involving hot spots associated with the video	H04N 21/4725
End-user interface for selecting a Region of Interest	H04N 21/4728

Informative references*Attention is drawn to the following places, which may be of interest for search:*

Query by an example video sequence	G06F 16/7328
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G06F 16/7343**Definition statement***This place covers:*

Query formulation using a specific query language or format of the query, e.g. SQL variants adapted for video or specific formats for expressing query parameters.

G06F 16/735**Definition statement***This place covers:*

- Filtering rules.
- Retrieval personalisation.
- Generation, learning, modification and use of user profiles.
- Monitoring of user activities for profile generation (in particular generation and use of reproduction/playback histories/logs).
- Relevance feedback.
- Playlist-based retrieval and playlist generation.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Recommending movies involving learning viewer preferences	H04N 21/251 , H04N 21/466
Creating a personalised video channel	H04N 21/2668 , H04N 21/458
Monitoring the number of times a movie has been viewed	H04N 21/44204
Monitoring of user selections, e.g. selection of programs	H04N 21/44222

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G06F 16/738**Definition statement***This place covers:*

Presentation of query results, in particular visual presentation methods/interfaces.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Presentation in form of a video summary	G06F 16/739
Browsing a video collection	G06F 16/743
Two dimensional image generation	G06T 11/00

G06F 16/739**Definition statement***This place covers:*

- Video summarisation, also called video abstraction, which produces a shorter and/or more condensed version of the original video. For example, video skimming produces a shorter video sequence at the output, typically comprising a subset of key frames extracted from the original video or a subset of excerpts / sub-sequences of the original video.
- Composite still images (2-D or 3-D), called, for example, a video mosaic, storyboard, video poster or "movie bar", typically comprising re-sized key-frames extracted from the original video, arranged into the still image like in a comic book or like stones in a mosaic.
- Video sequences comprising artificial (synthesized) frames, e.g. with an artificial (synthesized) view not existing in any of the single frames of the original video, with a stitched panorama showing a broader view and/or more motion than any single original frame or with a view having overlaid multiple instances of the same moving object.

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References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Two dimensional image generation	G06T 11/00
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G06F 16/74**Definition statement***This place covers:*

- Browsing a plurality of video files/sequences in a video collection/database.
- Browsing the internal structure of a single video sequence.
- Systems and methods for hyperlinking in hypervideo.

References***Limiting references****This place does not cover:*

End-user interface for requesting or interacting with video content, e.g. video on demand interface or electronic program guides	H04N 21/472
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Informative references*Attention is drawn to the following places, which may be of interest for search:*

Indicating arrangements in the context of indexing and addressing recorded information	G11B 27/34
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G06F 16/743

Definition statement

This place covers:

Browsing a plurality of video files/sequences in a video collection/database, e.g. using thumbnails, (moving) icons, cover art, etc.

G06F 16/745

Definition statement

This place covers:

Browsing the internal structure of a single video sequence, e.g. browsing by jumping between shots, scenes, objects or events in the content of the sequence.

G06F 16/748

Definition statement

This place covers:

- Systems and methods for hyperlinking in hypervideo.
- Computed links, including dynamically determined anchor and targets of links.
- Management of annotations linked to other documents.

References

Limiting references

This place does not cover:

Linking data to content, e.g. by linking an URL to a video object in the context of video distribution systems	H04N 21/858
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G06F 16/75

Definition statement

This place covers:

Automatic video classification and clustering. Management of classes or clusters (GUI or machine based), overviews of different content-based clustering or classification methodologies.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Methods or arrangements for recognising patterns	G06K 9/00
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G06F 16/78

Definition statement

This place covers:

Indexing and retrieval of video data using metadata

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Use of information derived by content analysis	G06F 16/783
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G06F 16/783

Definition statement

This place covers:

- Retrieval and/or indexing methods using features derived from the video content.
- Retrieval using video signatures/fingerprints based on statistical/probabilistic methods or hashing algorithms.

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References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Recognising video content	G06K 9/00711
Extraction of features or characteristics for pattern recognition of the image	G06K 9/46

G06F 16/7834**Definition statement***This place covers:*

Using features of the audio track of the video content, e.g. where query predicate(s) are in audio format (e.g. query-by-speech, query-by-music) or where retrieval or indexing uses low-level audio features (e.g. using magnitude/energy analysis, using speaker recognition methods).

References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Contents oriented musical parameter indexing, e.g. tempo	G10H
Speech recognition	G10L 15/00
Speaker recognition	G10L 17/00
General determination or detection of speech characteristics	G10L 25/00

G06F 16/7837**Definition statement***This place covers:*

Where the feature used for retrieval or indexing is a detected or recognised object.

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References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Methods for image acquisition of a pattern to be recognized involving target detection	G06K 9/3241
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G06F 16/784**Definition statement***This place covers:*

Where the features used for retrieval or indexing are detected or recognised people, e.g. faces.

References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Face recognition	G06K 9/00221
Human body recognition	G06K 9/00369
Speaker recognition	G10L 17/00

G06F 16/7844**Definition statement***This place covers:*

Retrieval of video data by using metadata automatically derived from the content such as:

- Textual content (part (3) of the video content according to the video data model - see note of [G06F 16/70](#)), e.g. the original subtitles (closed captions) transmitted in textual-format as part of the video stream or

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- Extracted text from the video frames or from binary visually-coded subtitles (closed captions) or
- Text derived from speech or music, phonetic transcript, music scores (sheet music), etc.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Extraction of overlay text	G06K 9/3266
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G06F 16/7847

Definition statement

This place covers:

- Usage of low-level visual features extracted from the video content for video indexing and retrieval.
- Examples of descriptors range from a single value or a histogram of a particular low-level feature to a complex/statistical descriptor based on one or more features, e.g. video signature/fingerprint.
- Usage of particular low-level visual features should be classified in one or more of the subgroups.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Recognising video content	G06K 9/00711
Methods for preprocessing an image in order to extract features of a pattern to be recognized	G06K 9/46
Image processing in general	G06T

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G06F 16/785**Definition statement***This place covers:*

Using colour or luminescence as the low-level visual feature for querying.

References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Colour analysis on image data	G06T 7/90
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G06F 16/7854**Definition statement***This place covers:*

Using detected shapes as the low-level visual feature(s) for querying, e.g. based on a detected sketched shape drawn by the user.

References***Limiting references****This place does not cover:*

Using objects detected or recognised in the video content	G06F 16/7837
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Informative references*Attention is drawn to the following places, which may be of interest for search:*

Segmentation or edge detection on image data	G06T 7/10
Analysis of geometric attributes	G06T 7/60

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G06F 16/7857

Definition statement

This place covers:

Using texture as the low-level visual feature.

References

Limiting references

This place does not cover:

Using objects detected or recognised in the video content	G06F 16/7837
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Texture analysis on image data	G06T 7/41 , G06T 7/49
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G06F 16/786

Definition statement

This place covers:

Using a motion feature, e.g. motion vector(s), as the low-level visual feature.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Motion analysis	G06T 7/20
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G06F 16/7864

Definition statement

This place covers:

Using features of a specific domain transform as the low-level visual features, e.g. wavelet or Discrete+ Cosine Transform (DCT) transform coefficients; this approach is often referred to as retrieval or indexing "in compressed domain".

G06F 16/7867

Definition statement

This place covers:

Retrieval and/or indexing methods using information not-derived from the video content, e.g. data created by humans and added to video at a post-production phase by manual annotation/tagging, e.g. title, author, director, actors' names, users' tags, comments, annotations, usage information, user ratings etc.

G06F 16/787

Definition statement

This group covers:

Retrieval or indexing where the features used are any kind of absolute, relative or fuzzy representations of location, e.g. GPS coordinates, postal address, rooms of a building, user's car.

G06F 16/80

Definition statement

This place covers:

Semi-structured data, which is a form of structured data that does not conform with the formal structure of data models associated with relational databases or other forms of data tables, but nonetheless contains tags or other markers to separate semantic elements and enforce hierarchies of records and fields within the data.

References

Limiting references

This place does not cover:

Content-based retrieval of web data	G06F 16/95
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Web site document structures and storage, e.g. HTML extensions	G06F 16/986
Use of codes for handling textual entities	G06F 40/12

G06F 16/81**Definition statement**

This place covers:

Creation or maintenance of an index comprising tag (structure) and content information that is used to retrieve information in semi-structured documents.

G06F 16/83**Definition statement**

This place covers:

Assembly, generation and maintenance of semi-structured (xml) databases as well as operations performed on semi-structured (xml) databases. Querying of said databases is also encompassed (XQuery etc.).

G06F 16/832

Definition statement

This place covers:

Example:

- Comparative analysis of XML query languages; graphical XML query language.

G06F 16/835

Definition statement

This place covers:

Examples:

- Implementing an XML query language.
- Query processing in Xyleme - a native XML DBMS.
- Implementing an XML query language.

G06F 16/8358

Definition statement

This place covers:

- Translation of a query into internal representation.
- Translation of XML specific query language into SQL as internal representation.

G06F 16/8365

Definition statement

This place covers:

Example:

- XML query (XQuery) optimization and normalization.

G06F 16/8373

Definition statement

This place covers:

Execution of one or more (already generated and optimized) query execution plan(s).

Examples:

- Pipelined query execution of a ranking operator for XQuery.
- Intra-document indices to improve XQuery processing over XML streams.

G06F 16/84

Definition statement

This place covers:

Mapping or conversion of semi-structured documents to other structures.

G06F 16/86

Definition statement

This place covers:

Mapping of semi-structured documents to databases (relational, object oriented, etc.).

G06F 16/88

Definition statement

This place covers:

Normalisation or conversion of semi-structured documents into another semi-structured scheme.

References**Limiting references**

This place does not cover:

Conversion for visualization in web browsing	G06F 16/9577
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G06F 16/90**Definition statement**

This place covers:

- Retrieval of information, wherein the retrieval method is not related to any particular type of data, in particular if no specific data type is indicated or implied by the context of the document at all, or an explicit hint is given that the disclosed mechanism can be used for retrieval of arbitrary data types.
- Retrieval from the web.

G06F 16/901**Definition statement**

This place covers:

Details about data structures for storage and indexing of generic data, independent of its type.

Limiting references

This place does not cover:

Storage and indexing structures for retrieval from the Web	G06F 16/951
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Storage and indexing structures for databases wherein the data type of the retrieved information can be identified as structured	G06F 16/22
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G06F 16/9014**Definition statement***This place covers:*

Retrieval of data by calculating a storage address, for example in a table, file or main memory from a given key, or converting somehow this key to that storage address; for example using a hashing function to map an information key to the address where that information is stored.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Accessing data in main memory systems with address translation involving hashing techniques	G06F 12/1018
Routing in networks, hashing functions for network address lookup	H04L 45/00

G06F 16/9024**Definition statement***This place covers:*

Systems, methods for managing data structures such as data graphs, linked lists, being specifically adapted for accessing of index data accessible in a chained manner, e.g. including some form of pointers from one index record to one or more other index records.

References**Limiting references***This place does not cover:*

Trees	G06F 16/9027
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G06F 16/9027**Definition statement**

This place covers:

- Details of implementation in memory of the tree structures, compact representations.
- Techniques to re-balance trees after updates (e.g. insertions or deletions).
- Extensions to basic tree structures to offer alternative navigation paths through the trees.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Management of index trees for structured data stores	G06F 16/2246
Management of index trees for unstructured text data	G06F 16/322

G06F 16/903**References****Limiting references**

This place does not cover:

Querying for retrieval from the web	G06F 16/953
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G06F 16/90324**Definition statement**

This place covers:

- While inputting a query, the system predicts the most probable next query words and displays a list for the user to choose from using the mouse.

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G06F 16/90339**Definition statement***This place covers:*

- Use of Content Addressable (CAM) or Parallel Associative Memories (PAM) to match search arguments with a large number of elements in parallel.
- Architecture making use of CAM units for speeding up retrieval.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Internal architecture of CAM, PAM	G11C 15/00
Use of CAM for routing and flow control of packets in data switching networks	H04L 45/00 , H04L 47/10

Glossary of terms*In this place, the following terms or expressions are used with the meaning indicated:*

CAM	Content Addressable Memory
PAM	Parallel Associative Memory

G06F 16/90344**Definition statement***This place covers:*

Retrieval of data by using string matching, e.g. using finite state machines or genetic algorithms.

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References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Orthographic correction	G06F 40/232
Sequence comparison in bioinformatics	G16B 30/00
String matching used for packet routing in packet switching systems	H04L 45/00

G06F 16/90348**Definition statement***This place covers:*

Searching dictionaries or (alpha-numerically) ordered lists; includes taking advantage on the ordering for binary or simple sequential access.

References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Sequence comparison in bioinformatics	G16B 30/00
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G06F 16/904**Definition statement***This place covers:*

- Navigating/Browsing a set of generic items (consumer products, homes, wallpaper patterns) using operations like "more of this" and "less of that".
- 3D-based approach of browsing through data items corresponding to files or folders.

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Limiting references*This place does not cover:*

For navigating the web	G06F 16/954
Browsing optimisation for the web	G06F 16/957

G06F 16/907**Special rules of classification**

Documents describing retrieval of arbitrary data types based on a specific type of metadata in addition may be classified in the group corresponding to the data type used for the retrieval, depending on the level of disclosed details concerning the data type used for retrieval.

G06F 16/93**Definition statement***This place covers:*

- Organisation of collections of digital documents (scanned, OCRred, semi-structured or unstructured representation) in document library databases.
- Retrieval of digital representations of documents.
- Techniques for associating physical paper documents with their digital representation as stored in a database, e.g. by attaching barcodes to documents.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Retrieval of image data	G06F 16/50
Retrieval of unstructured textual data	G06F 16/30
Retrieval of semi-structured data	G06F 16/80

G06F 16/94**Definition statement**

This place covers:

- Systems and methods for hyperlinking in documents.
- Computed links, including dynamically determined anchor and targets of links.
- Management of annotations linked to other documents.

References**Limiting references**

This place does not cover:

Hyperlinking	G06F 40/134
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Navigation in hyperlinked Web environments	G06F 16/954
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G06F 16/95**Definition statement**

This place covers:

- Systems and methods for browsing and retrieving information on the web.
- Aspects in subgroups that deal with search engines specifics (e.g. crawling, indexing, search personalisation), web navigation, web site management (e.g. content collection, organisation and management of web sites, publication of same) and browsing optimisations (e.g. for quicker access or adequate visualisation).

Relationships with other classification places

Close relationship with [H04L 29/08](#) and [H04L 67/00](#), especially due to particulars in OSI model's level 7: application layer.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Web site advertisement	G06Q 30/00
Network protocol aspects	H04L 29/06 , H04L 29/08 , H04L 67/00
Routing of packets, address resolution in data networks	H04L 29/12009
Internet protocol	H04L 29/06095

G06F 16/951

Definition statement

This place covers:

- Systems and methods for collecting, organising or managing indexation of information originating from more than one data source in order to support keyword based searching.
- Web retrieval techniques dealing specifically with the nature of the web:
- Heterogeneity of data, users and devices.
- Large number of documents and users.
- Lack of detailed knowledge about the data sources.
- Specific web retrieval techniques such as:
- Crawling techniques to discover/navigate sites and document hyperlinks.
- Meta-search engines:
- Remote systems interactions for web retrieval purposes, e.g. distributed and remote indexing of web content.
- Handling documents in different languages.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Text content indexation	G06F 16/31
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Special rules of classification

Local, keyword-based search engines should be classified in the appropriate subgroups according to the retrieved type of data; for example, if dealing with: unstructured text, see [G06F 16/30](#).

[G06F 16/9535](#)

Definition statement

This place covers:

- Techniques to select the information conveyed to the user during his retrieval session, usually in complement to an explicit user query request.
- Personalisation of queries and/or of returned results.

Facets which include:

- Censoring by filtering documents (e.g. by keyword or objectionable images).
- Using inclusive/exclusive lists of sites/pages to define viewable content.
- Sharing user profile knowledge or identifying common interests to identify relevant information.
- Systems using a single user profile to filter information or enhance query.
- Aggregation of information (personalised online newspapers).
- User navigation monitoring to identify user interests and consequent query refinement.

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References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Filtering pages containing malware, virus or phishing attempts	G06F 21/56 , H04L 29/06551
Recommendation not directed at the retrieval of documents, but rather to items for sale, or "friends" (e.g. social matchmaking)	G06Q
Personalisation for targeted marketing or advertisement	G06Q 30/00
When censoring comprises modifying the content	G06F 16/9577

[G06F 16/9537](#)**Definition statement***This place covers:*

- Methods and systems where the client accessing a web site conveys somehow localization or temporal information that is used then to personalise queries and/or results.
- Methods and systems where web content indexation involves localization information (spatial information).
- Integration of geographic (spatial) information in Web pages with other information.

References***Informative references****Attention is drawn to the following places, which may be of interest for search:*

Network protocols in which the network application is adapted for the location of the user terminal	H04L 29/08657
Messaging using geographical location information	H04L 51/20

Services or facilities specially adapted for wireless communication network making use of the locations of the users	H04W 4/02
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G06F 16/954

Definition statement

This place covers:

- Interactive ways to help the user in recognising desired information in web sites/web pages.
- Methods and systems to help an interactive navigation within the document space on the web, in a search narrowing approach, including providing suggestions of pages to visit which appear relevant to the user's search path.
- Methods and systems whereby visual cues typically are provided to show existing relationships among documents or to provide a document space visualisation.
- Passive browsing, guided tours, wherein a list of web pages to visit is prepared in advance or automatically devised.

Examples:

- Methods can be based on a classification or clustering approach to organise the documents.
- Categorised browsing, portals, virtual worlds' tours or visual networks of documents.
- Using a query to select a starting point for navigation, showing how the returned documents relate to each other.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Document hyperlinking per se, computed links	G06F 16/94
Returning a document set as a result of a query	G06F 16/951

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G06F 16/955

Definition statement

This place covers:

Cases where the user already has an identifier for the information he wants to retrieve. Typically, the identifier is a product code or a bookmark. The general idea is that the user does not have to blindly search for the information.

G06F 16/9554

Definition statement

This place covers:

- Use of a barcode reader (e.g. to read a UPC code or even a URL printed on a product) connected to a computer with a browser which fetches the relevant information on the Internet.
- Also systems wherein the user inputs the product code directly in a browser link field.

Facets:

- The code can be a direct URL or one that needs to be first resolved in an intermediary server.
- The code can further comprise commands or information used for personalising the search.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of bar codes and readers per se	G06K 19/00
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G06F 16/9558

Definition statement

This place covers:

- Details of hyperlinking in hypertext.

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- Computed links, including dynamically determined anchor and targets of links.
- Management of annotations linked to other hypertext.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Navigation in hyperlinked web environments	G06F 16/954
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G06F 16/9562

Definition statement

This place covers:

- Methods and systems whereby the browser bookmarks are used to reference, organise, classify and access information.
- Local or central bookmark storage, managed by an individual or an organisation.
- Related management functions such as: replace in bulk, share bookmarks, detect broken links, add comments for later reference, extract from files, enhance visual aspect (e.g. icons, colours for easier recognition), automatic extraction (from pages), classification, etc.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Bookmarks	Represent information already identified as relevant for the user; they are user oriented and they represent information of interest already identified.
Portals	Present a way for information yet to be discovered, and they are not specific to a user.

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G06F 16/9566**Definition statement***This place covers:*

- Variations of URLs in order to facilitate or simplify the access to the information (e.g. alias in non-Latin characters, tiny URLs).
- These URLs can refer to existing documents but also to virtual pages created at access-time or accessing transparently other links.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Address allocation to terminals or nodes connected to a network	H04L 29/12009
Use of aliases or nicknames in arrangement for managing network naming	H04L 29/12594
Addressing or naming in networks with short addresses	H04L 29/12943

G06F 16/957**Definition statement***This place covers:*

Optimisations in the browsing process concerned with faster or simpler access to information.

Improvements that enhance or simplify the understanding of data or the visualization of data on the user's device. These include among others:

- Identifying changes in pages or sections of pages.
- Combined printing of web documents; for example, several web pages forming a single document.
- Combined access to CD-ROM information with internet browsing.
- Using specific data viewers (e.g. Mime dependent).
- In general, improvements with the browsing process.

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References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Voice browsers, e.g. interpreting VoiceXML, for providing telephonic information services	H04M 3/4938
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G06F 16/9574**Definition statement***This place covers:*

- Ways to speed up access to information on the Internet, typically, via caching and/or prefetching.
- Content dissemination systems.
- Look-ahead (Web) caching.
- Caching static and/or all of portions of dynamic data.
- Caching or hoarding of Web content on local removable storage (CDs, DVDs, USB keys) for later browsing.

References**Informative references***Attention is drawn to the following places, which may be of interest for search:*

Accessing, addressing or allocating within memory systems and caches	G06F 12/08
Network arrangements for storing temporarily data at an intermediate stage, e.g. caching	H04L 29/08801

Special rules of classification

The type of caching referred to in this group usually occurs at an application level; it is content aware, meaning that the system has some knowledge about the data content and will decide what and how to cache it based on this content.

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This is opposed to system level caching, where the data content is transparent to the cache.

G06F 16/9577

Definition statement

This place covers:

- Methods and systems manipulating web page content (e.g. HTML) for the purpose of changing the presentation of a page, in order to enhance the comprehension or visual rendering of its content.
- Adapting content for providing support to devices with various displays (e.g. PDA small screen).
- Reorganizing or simplifying the page layout.
- Using user profiles or templates to create or change the page presentation.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Web page authoring	G06F 40/00
Manipulation for advertisement or marketing purposes	G06Q 30/00
Protocols for network applications adapted for terminals or networks with limited resources and for terminal portability	H04L 29/08108
Arrangements for conversion or adaptation of application content or format	H04L 29/08756
Message adaptation based on network or terminal capabilities	H04L 51/06

Special rules of classification

While the manipulation of navigation items in a Web page (e.g. hyperlinks) to simplify browsing (for example associating a visible numerical code to links on a page and allowing keying in the code instead of activating the link with a pointer device) pertains to this group, document navigation techniques themselves should be classified in [G06F 16/954](#).

May also include simple cases of document summarisation (priority to [G06F 16/30](#)) as long as the goal is page visualisation and not to be used for the purpose of document

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indexation. Typically uses an HTML parser (for parsing techniques used in software development see [G06F 8/427](#)). Format conversions not presentation dependent or related are classified in [G06F 16/1794](#).

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Distillation	Process of reducing the amount of information before delivery, in particular to eliminate information which cannot be rendered on the end device (colour on a black and white screen or downscaling of images in a Web page for a small screen)
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G06F 16/958

Definition statement

This place covers:

Organisation or management of web sites: how data is collected, stored and organised in a server, and how the information is published (e.g. dynamic web page servers) and made available or sent to users such as:

- Creation of site maps
- Registration of sites/pages in search engines
- Link organisation and maintenance
- Push channels, syndication and subscription systems
- Web CMS (Content Management Systems) repositories

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Web page authoring	G06F 40/00
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Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

ASP	Active Server Page: Microsoft Tool for dynamically serving Web pages
JSP	Java Server Page: Java tools for dynamically serving Web pages

G06F 16/972**Definition statement**

This place covers:

- Documents concerned with technologies to support the access to data in proprietary or legacy systems from the Internet.
- Systems and methods to translate, offline or on the fly, proprietary formats to the open standards of the Internet.
- Dynamic page creation from legacy system.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Tree transformation in markup documents, XSLT	G06F 40/154
File format conversion	G06F 16/1794

G06F 16/986**Definition statement**

This place covers:

- The way documents are represented and their structures are used.
- Extensions to or special uses of the HTML coding language.