G06N

COMPUTER SYSTEMS BASED ON SPECIFIC COMPUTATIONAL MODELS

Definition statement

This subclass/group covers:

Computing systems where the computation is not based on a traditional mathematical model of computer

G06N 3/00

Computer systems based on biological models (analogue computers simulating functional aspects of living beings G06G7/60)

Definition statement

This subclass/group covers:

Computing systems where the computation is based on biological models (brains, intelligence, consciousness, genetic reproduction) or is using physical material of biological origin (biomolecules, DNA, biological neurons, etc.) to perform the computation. The computation can be digital, analogue or chemical in nature.

References relevant to classification in this group

This subclass/group does not cover:

Memories based on biological material	G11C 13/02
Bioinformatics	G06F 19/10
Analogue computers simulating functional aspects of living beings	G06G 7/60
Artificial Intelligence	G06N 5/00
Fuzzy logic	G06N 7/02
Probabilistic systems	G06N 7/005
Learning systems in general	G06N 99/005

Special rules of classification within this group

Classify in this main group or its subgroups only if the invention concerns the development of a computer (DNA and proteins biomaterials as such, should be classified in chemistry).

Synonyms and Keywords

In patent documents the following expressions/words "biocomputers", "biological computers", "nanocomputers", "neural networks" and "artificial life" are often used as synonyms.

G06N 3/002

[N: Biomolecular computers, i.e. using biomolecules, proteins, cells (using DNA G06N3/123; using neurons G06N3/061)]

Definition statement

This subclass/group covers:

Computers using actual physical material of biochemical origin or material as used in carbon-based living systems, i.e. biomolecules, proteins, cells or other biochemicals to perform computation.

References relevant to classification in this group

This subclass/group does not cover:

Using real biological neurons integrated on chips	G06N 3/061
Using DNA	G06N 3/123
Computation based on Inorganic chemicals	G06N 99/007

Synonyms and Keywords

In patent documents the following expressions/words "biocomputers", "wetware", "biochemical computers", "biochips" and "living computers" are often used as synonyms.

G06N 3/004

[N: Artificial life, i.e. computers simulating life]

Definition statement

This subclass/group covers:

Creation of synthetic life forms that are based on models of or are inspired by carbon-based life forms but are actually implemented on/or controlled by standard silicon-based computers.

References relevant to classification in this group

This subclass/group does not cover:

Biological life forms that are created involving biological genetic engineering. e.g. clones	C12N 15/00

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Alife	Artificial life

Synonyms and Keywords

In patent documents the following expressions/words "Alife", "artificial life", synthetic life" and "virtual creatures " are often used as synonyms.

G06N 3/006

[N: based on simulated virtual individual or collective life forms , e.g. single "avatar", social simulations, virtual worlds (computer games A63F13/00; medical simulations G06F19/00; information retrieval G06F17/30873; image processing G06T; telecommunication protocols H04L29/06034)]

Definition statement

This subclass/group covers:

Software simulations on standard silicon-based digital computers of systems exhibiting behaviour normally ascribed to life forms.

References relevant to classification in this group

This subclass/group does not cover:

Computer games	A63F 13/00
Image processing for animations	G06T 13/00
Medical simulations	G06F 19/00M
Computer Aided Design	G06F 17/50
Information retrieval	G06F 17/30873
Telecommunications for virtual worlds	H04L 29/06034
Collaborative systems - Groupware	G06Q 10/00

Synonyms and Keywords

In patent documents the following expressions/words "metaverse", "virtual reality", "virtual world", "virtual society" and "social simulations" are often used as synonyms.

G06N 3/008

[N: based on physical entities controlled by simulated intelligence so as to replicate intelligent life forms, e.g. robots replicating pets or humans in their appearance or behavior (toys or dolls A63H3/00; industrial robot control G05B19/00, B25J9/00; artificial neural networks G06N3/00; rule based artificial intelligence G06N5/00)]

Definition statement

This subclass/group covers:

Physical computer controlled mechanical devices emulating/simulating existing biological life forms mainly implemented as physical robots in the form of animals (pets) or humans (humanoids or androids). These robots can be standalone or work in groups (e.g. Robocup team of robotic football players).

References relevant to classification in this group

This subclass/group does not cover:

Control of industrial robots	G05B 19/00

Toys or dolls	A63H 3/00, A63H 11/00
Industrial robots or mechanical grippers	B25J 19/00

Special rules of classification within this group

This subgroup does not contain purely mechanical devices, there should always be some computer involved.

It should act, or at least have as function to look like an animal or a human.

Synonyms and Keywords

In patent documents the following expressions/words "humanoid", "android", "robot" and "robot pet " are often used as synonyms.

G06N 3/02

using neural network models (for adaptive control G05B13/00; for image pattern matching G06K9/00; for image data processing G06T1/20; for phonetic pattern matching G10L15/16)[N0004] [C0606]

Definition statement

This subclass/group covers:

Computation simulating or emulating the functioning of biological brains mainly implemented in non-biological material, i.e. electronics or optical material. It can be in digital electronic or analogue electronic or biological technology.

References relevant to classification in this group

This subclass/group does not cover:

Control systems using neural networks	G05B 13/02
Pattern recognition using neural networks	G06K 9/00
Speech recognition	G10L 15/16
Image processing	G06T 1/20

Special rules of classification within this group

Applications of whatever sort just using neural networks with no description of the neural network itself are to be classified in the relevant application field only.

Documents specifying an architecture and a learning method should be classified in the respective subgroups of G06N 3/04 and G06N 3/08.

Synonyms and Keywords

In patent documents the following expressions/words "neural network", "neuronal network", "neuromimetic network", "artificial brain" and "perceptron" are often used as synonyms.

G06N 3/04

Architectures, e.g. interconnection topology

Definition statement

This subclass/group covers:

The specific architecture or layout of the neural network, how the neurons are interconnected. For the different architectures see the titles of the different subgroups.

Specific technologies for realizing these architectures are classified in G06N 3/06, learning methods in the subgroups of G06N 3/08 and for the physical realization in the subgroups of G06N 3/06.

Synonyms and Keywords

In patent documents the following expressions/words "architecture", "topology", "layout"and "interconnection pattern" are often used as synonyms.

G06N 3/0409

[N: Adaptive Resonance Theory [ART] networks]

Definition statement

This subclass/group covers:

Adaptive Resonance Theory (ART).

Adaptive Resonance Theory was a short live method of neural networks developed by Grossberg and Carpenter. This subgroup contains only

documents on ART by Grossberg and Carpenter (obsolete technology).

G06N 3/0418

[N: using chaos or fractal principles]

Definition statement

This subclass/group covers:

Neural networks using some form of chaos or fractal technology or methods

References relevant to classification in this group

This subclass/group does not cover:

Chaos models per se	G06N 7/08

Synonyms and Keywords

In patent documents the following expressions/words "fractal transform function", "fractal growth", "chaotic neural network" and "Mandelbrot" are often used as synonyms.

G06N 3/0427

[N: in combination with an expert system]

Definition statement

This subclass/group covers:

Combinations of neural network technology and expert system technology.

Contains documents where expert systems and neural networks work together on the same level and also where expert systems are used to construct or control a neural network.

References relevant to classification in this group

This subclass/group does not cover:

Experts systems; Artificial intelligence per se	G06N 5/04

Synonyms and Keywords

In patent documents the following expressions/words "rule-based neural network" and "knowledge-based neural network" are often used as synonyms.

G06N 3/0436

[N: in combination with fuzzy logic]

Definition statement

This subclass/group covers:

Combinations of neural network technology and fuzzy logic system technology.

Contains documents where fuzzy logic and neural networks work together on the same level and also where fuzzy logic systems are used to construct or control a neural network

References relevant to classification in this group

This subclass/group does not cover:

Fuzzy logic per se	G06N 7/02

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

ANFIS	Adaptive Neuro-Fuzzy Inference Systems

Synonyms and Keywords

In patent documents the following expressions/words "ANFIS" and "neuro-fuzzy interference system" are often used as synonyms.

G06N 3/0445

[N: Feedback networks, e.g. hopfield nets, associative networks]

Definition statement

This subclass/group covers:

Neural networks involving connections from the output of a neural network to

the inputs of the same neural network.

Synonyms and Keywords

In patent documents the following expressions/words "feedback", "Hopfield nets" and "associative networks" are often used as synonyms.

G06N 3/0454

N: using a combination of multiple neural nets]

Definition statement

This subclass/group covers:

Architecture of multiple neural networks can be connected in a parallel or in a series fashion. They can cooperate on the same level or one neural network can control other neural network.

Parallel neural networks can also be used for fault tolerance when connecting to a voting system.

Several neural networks can also be trained in a different ways or with different training examples and then combined in parallel in order to increase the reliability or accuracy.

Synonyms and Keywords

In patent documents the following expressions/words "multiple neural networks", "parallel neural networks", "hierarchical neural networks" and "ensemble neural networks" are often used as synonyms.

G06N 3/0463

[N: Neocognitrons]

Definition statement

This subclass/group covers:

Neocognitrons are an unique and specific architecture of neural network charaterized by its name.

The neocognitron is a hierarchical multilayered neural network and is a natural extension of cascading models.

In the neocognitron, multiple types of cells such as S-cells and C-cells are used to perform recognition task.

Contains only documents if the type of neural network is specifically called neocognitron.

G06N 3/0472

[N: using probabilistic elements, e.g. p-rams, stochastic processors]

Definition statement

This subclass/group covers:

This group covers

Neural networks having as special feature that the neurons individually or the weights or the architecture as a whole has a probabilistic or statistical aspect.

References relevant to classification in this group

This subclass/group does not cover:

Neural network in combination with fuzzy logic	G06N 3/0436
Non-neural Probabilistic networks	G06N 7/005
Chaotic determination of the weights	G06N 3/0418

Informative references

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

Probabilistic functions not exclusively used for neural networks	G07N 7/00P

Synonyms and Keywords

In patent documents the following expressions/words "probabilistic neural network", "statistical neuron function", "p-RAM" and "probabilistic RAM" are often used as synonyms.

G06N 3/0481

[N: Non-linear activation functions, e.g. sigmoids, thresholds]

Definition statement

This subclass/group covers:

All aspects of non-linear activation functions used in neurons, e.g. sigmoids, simple stepwise threshold functions, approximated sigmoid functions

Only aspects of the non-linear activation function.

Synonyms and Keywords

In patent documents the following expressions/words "sigmoid", "non-linear activation function", "non-linear transfer function" and "approximated activation functions" are often used as synonyms.

G06N 3/049

[N: Temporal neural nets, e.g. delay elements, oscillating neurons, pulsed inputs]

Definition statement

This subclass/group covers:

Neurons or neural networks having a temporal aspect e.g. spiking neurons or neural networks where the time-like dynamics are a specific aspect of the invention

This can be in digital but often in analogue technology.

These neurons are meant to be a more realistic simulation of real biological neurons

Synonyms and Keywords

In patent documents the following expressions/words "spiking", "timelike", "temporal" and "dynamical" are often used as synonyms.

G06N 3/06

Physical realisation, i.e. hardware implementation of neural networks, neurons or parts of neurons

Definition statement

This subclass/group covers:

The technology used to physically construct the neurons or neural network : digital electronics, analog electronics, biochemical elements, optical elements

Special rules of classification within this group

This head subgroups should contain no documents, all documents should fall in one of its lower subgroups

Synonyms and Keywords

In patent documents the following expressions/words "hardware", "technology", "implementation" and "physical" are often used as synonyms.

G06N 3/061

[N: using biological neurons, e.g. biological neurons connected to an integrated circuit]

Definition statement

This subclass/group covers:

Using real biological neurons from a living being implemented on a substrate. These neurons can be externally activated and read-out. The interconnections can be fixed or the can be allowed to grow and evolve.

References relevant to classification in this group

This subclass/group does not cover:

Biomolecular computers	G06N 3/002

Synonyms and Keywords

In patent documents the following expressions/words "neurochip", "biochip" and "wetware" are often used as synonyms.

G06N 3/063

Using electronic means

Definition statement

This subclass/group covers:

Neurons or interconnections implemented in dedicated digital electronics.

Although the title specifies "electronics", due to the child group G06N 3/0635 this subgroup is limited to digital electronics.

References relevant to classification in this group

This subclass/group does not cover:

Neurons implemented using standard electronic digital computers	G06N 3/10

Neurons implemented using analog electronics	G06N 3/0635

Synonyms and Keywords

In patent documents the following expressions/words "electronic neuron", "digital", "numeric", "neuromorphic" and "synaptronic" are often used as synonyms.

G06N 3/0635

[N: using analogue means]

Definition statement

This subclass/group covers:

Neurons or interconnections implemented in dedicated analog electronics.

References relevant to classification in this group

This subclass/group does not cover:

Analog electronic computers in general	G06G 7/00

Synonyms and Keywords

In patent documents the following expressions/words "analogue" and "analog" are often used as synonyms.

G06N 3/067

using optical means

Definition statement

This subclass/group covers:

Neurons or interconnections implemented in dedicated optical components..

References relevant to classification in this group

This subclass/group does not cover:

Optical computers in general	G06E 1/00 G06E 3/00

G06N 3/0675

[N: using electro-optical, acousto-optical or opto-electronic means]

Definition statement

This subclass/group covers:

Neurons or neural networks using electro-optical, acousto-optical or opto-electronic components.

References relevant to classification in this group

This subclass/group does not cover:

Hybrid optical computers in general	G06E 3/00

Synonyms and Keywords

In patent documents the following expressions/words "electro-optical", "acousto-optical" and "opto-electronic" are often used as synonyms.

G06N 3/08

Learning methods

Definition statement

This subclass/group covers:

Means and methods of training or learning the neural networks. For specific training methods or algorithms see the different subgroups.

Synonyms and Keywords

In patent documents the following expressions/words "training or learning neural network", "evolving or adapting neural network" and "optimizing neural network" are often used as synonyms.

G06N 3/082

[N: Modifying the architecture, e.g. adding or deleting nodes or connections, pruning]

Definition statement

This subclass/group covers:

During the learning or training process of the neural network not only are the weights of the synapses changed but also is the architecture of the neural network changed. This can involve adding/deleting neurons or adding/deleting connections. between the neurons.

When during the training process it becomes clear that the size/capacity of the neural network is not sufficient, additional neurons or connections can be added to the network after which the training can resume. When it is found that certain neurons are not used or have no influence, they can be removed (pruning).

G06N 3/084

[N: Back-propagation]

Definition statement

This subclass/group covers:

Training method whereby on the synapses of the neurons are adapted depending on the difference between the actual output of the neural network and the wanted output. This difference is used to adapt the weights of the synapses with an mathematical method that back-propagates form the higher layers to the lower layers of the neural network. Mainly used in multilayer neural networks. This implies a form of supervised learning.

Synonyms and Keywords

In patent documents the following expressions/words "backprop" and "backpropagation" are often used as synonyms.

G06N 3/086

[N: using evolutionary programming, e.g. genetic algorithms]

Definition statement

This subclass/group covers:

The use of genetic algorithms for creating through a process of reproduction, mutation and fitness function an optimally functioning neural network using evoluationary techniques such as evolutionary programming, genetic algorithms, genetic programming, evolution startegies, etc.

References relevant to classification in this group

This subclass/group does not cover:

Genetic algorithms as such	G06N 3/126

Synonyms and Keywords

In patent documents the following expressions/words "evolutionary", "Darwinistic", "genetic algorithm", "evolutionary programming", "genetic programming" and "evolution strategies" are often used as synonyms.

G06N 3/088

[N: Non-supervised learning, e.g. competitive learning]

Definition statement

This subclass/group covers:

Learning without direct supervision from unlabelled data. Neural networks are created and then it is observed how they function in the real world, as a result of the global functioning is the neural network further adapted. No sets of training input pairs are necessary.

Synonyms and Keywords

In patent documents the following expressions/words "non-supervised neural network" and "unsupervised neural network" are often used as synonyms.

G06N 3/10

Simulation on general purpose computers

Definition statement

This subclass/group covers:

Neural networks not implemented in specific special purpose electronics but simulated by a program on a standard general purpose digital computer

References relevant to classification in this group

This subclass/group does not cover:

Computer simulations in general	G06F 17/50

Synonyms and Keywords

In patent documents the following expressions/words "purely-software neural network", "neural network program" and "simulation of neural networks" are often used as synonyms.

G06N 3/105

[N: Shells for specifying net layout]

Definition statement

This subclass/group covers:

Specific software for specifying or creating neural networks to be simulated on a general purpose digital computer. Specific graphical user interfaces for this application.

References relevant to classification in this group

This subclass/group does not cover:

General graphical user interfaces	G06F 3/048
Program for computer aided design	G06F 17/50

G06N 3/12

using genetic models

Definition statement

This subclass/group covers:

Computation based on the principles of biological genetic processing (mutation, recombination, reproduction, selection of the fittest).

References relevant to classification in this group

This subclass/group does not cover:

Genetic algorithms for training neural networks	G06N 3/086

Synonyms and Keywords

In patent documents the following expressions/words "evolutionary prgramming", "darwinistic programming", "evolutionary programming", "genetic programming", and "evolution strategies" are often used as synonyms.

G06N 3/123

[N: DNA computers, i.e. information processing using biological DNA]

Definition statement

This subclass/group covers:

Using actual biological DNA molecules in test tubes. The problem is transcribed onto real DNA, biological reproduction, crossover, mutation is performed. The fitness is tested, the best scoring DNA molecules are selected and used for further iterative processing until the optimally performing DNA molecule is retrieved and the information on this DNA molecule is read out and transcribed back to a readable result.

References relevant to classification in this group

This subclass/group does not cover:

Biological genetic engineering in general	C12N 15/00
Computer memory using DNA	G11C 13/02

Synonyms and Keywords

In patent documents the following expressions/words "DNA computer" and "DNA chips" are often used as synonyms.

G06N 3/126

[N: Genetic algorithms, i.e. information processing using digital simulations of the genetic system]

Definition statement

This subclass/group covers:

Software simulations using the principles of mutation, crossover as exhibited in real biological genetic systems in the reproduction of biological cells or living beings e.g. humans.

This process involves the creation of a number of possible solutions, testing the different solutions (fitness), selecting the best performing ones, starting from these create a new set of possible solutions using reproduction and mutation, and reiterate through this process until an optimal or sufficiently performing solution is found.

References relevant to classification in this group

This subclass/group does not cover:

Genetic algorithms used in training of neural networks	G06N 3/086

Synonyms and Keywords

In patent documents the following expressions/words "evolutionary programming", "Darwinistic programming", "genetic programming" and "evolution strategies" are often used as synonyms.

G06N 5/00

Computer systems utilizing knowledge based models

Definition statement

This subclass/group covers:

Computer Systems utilising a knowledge base or creating a knowledge base

References relevant to classification in this group

This subclass/group does not cover:

Databases and information retrieval	G06F 17/30

Special rules of classification within this group

Knowledge representation formalisms are classified in G06N 5/02.

Use of knowledge base for reasoning is classified in G06N 5/04.

Systems presenting a mixture of representation and reasoning are classified uniquely in G06N 5/04.

Synonyms and Keywords

In patent documents the following expressions/words "knowledge base", "knowledge model", and "reasoning model" are often used as synonyms.

G06N 5/003

[N: Dynamic search techniques, heuristics, branch-and-bound (G06F9/44L3B, G06N5/046 take precedence; for optimisation G06Q10/00B; for game playing G06F19/00B)]

Definition statement

This subclass/group covers:

Systems using knowledge empirically, Heuristics. Systems based on empirical models are normally used when classic methods fail to find an exact solution in a short time

References relevant to classification in this group

This subclass/group does not cover:

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

use of these techniques for optimization	G06F 17/10
use of these techniques in computer games	A63F 13/00
use of these techniques in medical simulations	G06F 19/00M

Synonyms and Keywords

In patent documents the following expressions/words "dynamic search", "adaptive search", "branch and bound", "contraint solver","constraint optimization" and "empirical optimization" are often used as synonyms.

G06N 5/006

[N: Automatic theorem proving]

Definition statement

This subclass/group covers:

Automatic theorem proving; constraint satisfaction; probability consistency check in a decision problem

References relevant to classification in this group

This subclass/group does not cover:

Logics and formalisms for knowledge representation	G06N 5/02

Synonyms and Keywords

In patent documents the following expressions/words "logical consistency", "verification", "automatic proving", "determination of provability","formula checker" and "formula converter" are often used as synonyms.

G06N 5/02

Knowledge representation [N: (G06N5/04) takes precedence]

Definition statement

This subclass/group covers:

Knowledge based systems defined by the specific knowledge representation formalisms, knowledge engineering, knowledge acquisition and extraction, update of knowledge base, maintenance.

References relevant to classification in this group

This subclass/group does not cover:

indexing and retrieval	G06F 17/30

Special rules of classification within this group

When the application deals both with reasoning and representation, the reasoning takes precedence (G06N 5/04).

When the knowledge also involves learning, also classify in G06N 99/005.

Synonyms and Keywords

In patent documents the following expressions/words "formalisation of a problem", "formalism for knowledge representation", "expressivity", "semantics of a formalism","elicitation of knowledge action", "rules, ontologies, frames, logics", "description logic", "semantic web", "declarative" and "formula converter" are often used as synonyms.

G06N 5/027

[N: Frames]

Definition statement

This subclass/group covers:

Knowledge systems using frames as knowledge representation including

attributes and slots

Special rules of classification within this group

Rule systems for specific applications are classified in the field of application, unless the invention is still about the rules formalism and/ or extraction and maintenance process itself.

Synonyms and Keywords

In patent documents the following expressions/words rules extraction", "elcitation", "knowledge discovery", "rules engine","rules maintenance", "rules consistency" and "rules priority" are often used as synonyms.

G06N 5/04

Inference methods or devices

Definition statement

This subclass/group covers:

Symbolic inference methods and devices. Programs with symbolic reasoning capabilities using knowledge. inference systems

References relevant to classification in this group

This subclass/group does not cover:

adaptive control	G05B 13/00

Special rules of classification within this group

When the application deals both with reasoning and representation, reasoning takes precedence (G06N 5/04).

When Machine Learning involved, also classify in G06N 99/005.

Synonyms and Keywords

In patent documents the following expressions/words "inference", "reasoning", "expert system", "instantiation, explanation, recommendation","aid to diagnosis", "pattern matching", "case-based reasoning", "deduction", "analogy","abnormal condition detection" and "problem solving,planning" are often used as synonyms.

G06N 5/041

[N: Abduction]

Definition statement

This subclass/group covers:

Kind of logical inference that refers to the process of arriving at an explanatory hypothesis.

Abduction is about the most probable explanation for a fact given the sufficient premises

Informative references

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

Empirical guesses or heuristics	G06N 5/003

Synonyms and Keywords

In patent documents the following expressions/words "hypothetical reasoning", "explanatory hypothesis", "disambiguation","reasonable guess" and "most possible explanation" are often used as synonyms.

G06N 5/042

[N: Backward inferencing]

Definition statement

This subclass/group covers:

An inference mechanism that works backwards from the conclusion

References relevant to classification in this subclass/group

This subclass/group does not cover:

This subclass/group does not cover:

Automatic theorem proving	G06N 5/006

Special rules of classification within this group

Game-theory based applications are classified in their field of application when possible.

Synonyms and Keywords

In patent documents the following expressions/words "backwards chaining, backwards reasoning, backwards induction", "retrograde analysis", "goal, hypothesis, goal driven", "conclusion, premises", "consequent, antecedent", "game theory", "modus ponens" and "depth-first strategy" are often used as synonyms.

G06N 5/043

[N: Distributed expert systems, blackboards]

Definition statement

This subclass/group covers:

Expert system implemented in distributed programming units or multiple interacting intelligent autonomous components for example multi-agents systems.

Synonyms and Keywords

In patent documents the following expressions/words "multi-agents", "cognitive agent", "autonomous", "decentralization", "self-steering", "software agents" and "swarm" are often used as synonyms.

G06N 5/045

[N: Explanation of inference steps]

Definition statement

This subclass/group covers:

Inference system that provides explanations of the inferences to the user in the context of diagnostic or decision support

References relevant to classification in this group

This subclass/group does not cover:

adaptive control	G05B 13/00

Synonyms and Keywords

In patent documents the following expressions/words "explanation", "decision", "diagnostic", "fault", "abnormal" and "alarm" are often used as synonyms.

G06N 5/046

[N: Forward inferencing, production systems]

Definition statement

This subclass/group covers:

Inference system that starts with the available data and makes inferences to derive more data. the inferences are performed forwards towards a goal by repetitive application of the modus ponens.

Synonyms and Keywords

In patent documents the following expressions/words "modus ponens", "interations", "if-then clause", "data driven" and "Rete algorithm" are often used as synonyms.

G06N 5/048

[N: Fuzzy inferencing]

Definition statement

This subclass/group covers:

Exact inputs are transformed in fuzzy inputs with membership functions. the fuzzified inputs are processed in a fuzzy inference machine with fuzzy if-then rules. Depending on the degree of membership, several rules are fired in parallel. The consequents of each rule are aggregated into fuzzy outputs which are or not de-fuzzified.

References relevant to classification in this group

This subclass/group does not cover:

tuning of fuzzy parameters	G06N 7/02

Synonyms and Keywords

In patent documents the following expressions/words "membership function", "fuzzification, fuzzy rules, fuzzy expert system", "parallel rules evaluation" and "degree of membership" are often used as synonyms.

G06N 7/00

Computer systems based on specific mathematical models

Definition statement

This subclass/group covers:

Computer systems based on mathematical models that cannot be classified in their application field.

References relevant to classification in this subclass/group

This subclass/group does not cover:

This subclass/group does not cover:

Neural networks	G06N 3/00
Optimization, complex mathematical functions	G06F 17/10

Special rules of classification within this group

When other types of Machine Learning are involved, also classify in G06N 99/005.

Synonyms and Keywords

In patent documents the following expressions/words "probabilities", "statistics", "stochastic", "chaos", "non-linear function", "fuzzy logic", "formalism", "applied mathematics" and "systems simulation" are often used as synonyms.

G06N 7/005

[N: Probabilistic networks]

Definition statement

This subclass/group covers:

Inference system representing the probability dependencies between causes and effects in a directed acyclic graph model in which the inferences are modelled as the propagation of probabilities.

References relevant to classification in this subclass/group

This subclass/group does not cover:

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

When the Bayesian network is only named because it is used in an application field, it must be classified in its field of application

game playing	A63F 13/00
bioinformatics	G06F 19/00
documents classification and information retrieval	G06F 17/30
pattern recognition	G06K 9/00
speech recognition	G10L 15/00

Special rules of classification within this group

Learning of unknown parameters of the network to be classified also in G06N 99/005.

Synonyms and Keywords

In patent documents the following expressions/words "Bayesian network", "Bayes network", "belief network", "directed acyclic graphical model", "beliefs propagation", "random variables", "conditional dependencies", "probability function", "probability nodes", "probability function", "generalized Bayesian networks", "influence diagrams", "probability density function" and "Bayes theorem" are often used as synonyms.

G06N 7/02

using fuzzy logic (G06N3/00, G06N5/00 take precedence; for adaptive control G05B13/00)

Definition statement

This subclass/group covers:

Computer systems based on fuzzy logic

References relevant to classification in this subclass/group

This subclass/group does not cover:

Adaptive control	G05B 13/00
Neural networks in combination with fuzzy logics	G06N 3/0436

Special rules of classification within this group

When the fuzzy logic is only named as used for an application field, it must be classified in the application field.

Synonyms and Keywords

In patent documents the following expressions/words "fuzzy logic" and "tuning parameters" are often used as synonyms.

G06N 7/04

Physical realisation

Definition statement

This subclass/group covers:

Physical realizations of computer systems based on mathematical models

References relevant to classification in this subclass/group

This subclass/group does not cover:

This subclass/group does not cover:

Neural Networks implementation	G06N 3/06
Neural networks in combination with fuzzy logics	G06N 3/0436

Synonyms and Keywords

In patent documents the following expressions/words "analogue" and "implementation" are often used as synonyms.

G06N 7/06

Simulation on general purpose computers

Definition statement

This subclass/group covers:

Fuzzy systems simulated on general purpose computers

References relevant to classification in this subclass/group

This subclass/group does not cover:

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

Simulation in game playing	A63F 13/00
Computer aided design (CAD)	G06F 17/50
Computer aided chemistry components design	G06F 19/00D
Computer simulation of physical phenomena	H04L 29/00
Telecom applications using simulation	G10L 15/00
Simulation for the purpose of Optimisation	G06Q 10/00

G06N 7/08

using chaos models or non-linear system models

Definition statement

This subclass/group covers:

Computer-based systems using chaos or non-linear models

References relevant to classification in this subclass/group

This subclass/group does not cover:

This subclass/group does not cover:

Neural networks with fractal growth	G06N 3/0418

Special rules of classification within this group

Field of application takes precedence (e.g. physical phenomena, or electronics)

Synonyms and Keywords

In patent documents the following expressions/words "chaos theory", "non-linear", "stochastic" and "fractal" are often used as synonyms.

G06N 99/00

Subject matter not provided for in other groups of this subclass

Definition statement

This subclass/group covers:

Subject-matter falling under G06N that is not defined in G06N 1/00, G06N 3/00, G06N 5/00 or G06N 7/00.

This main group should not contain documents. When a new computing technology comes up a new subgroup entry should be created for this new subject.

References relevant to classification in this subclass/group

This subclass/group does not cover:

G06N 1/00, G06N 3/00, G06N 5/00 or G06N 7/00.

G06N 99/002

[N: Quantum computers, i.e. information processing by using quantum superposition, coherence, decoherence, entanglement, nonlocality, teleportation]

Definition statement

This subclass/group covers:

Computation is performed by a combination of atomic or subatomic particles where the interactions are no longer described by macroscopic physics but by the theory of quantum mechanics.

References relevant to classification in this group

This subclass/group does not cover:

Quantum cryptography	H04L 9/0883
Devices using superconductivity	H01L 39/00
Nanotechnology	B82Y 10/00

Fabrication of quantum structures	H01L 29/122

Synonyms and Keywords

In patent documents the following expressions/words "quantum computer", "qubit", "quantum bit", "superconducting bits", "Josephson junction" and "SQUID" are often used as synonyms.

G06N 99/005

[N: Learning machines, i.e. computer in which a programme is changed according to experience gained by the machine itself during a complete run (neural networks G06N3/02; knowledge based models G06N5; fuzzy logic systems G06N7/02; adaptive control systems G05B13/00)]

Relationship between large subject matter areas

General methods or mechanisms for training or learning or adapting a computer not provided for in the previous methods

This subgroups is the last place to put computers involving learning, adaptation or training. ALL other places take priority.

References relevant to classification in this group

This subclass/group does not cover:

Neural networks learning	G06N 3/08
Rule-based learning	G06N 5/02
Adaptive Control systems	G05B 13/02
Pattern recognition involving leaning	G06K 9/00
Speech recognition involving learning	G10L 15/16
Image processing involving learning	G06T 1/20

G06N 99/007

[N: Molecular computers, i.e. using inorganic molecules

(using biomolecules G06N3/002)]

Definition statement

This subclass/group covers:

Systems where the computational elements are implemented on the molecular level using inorganic molecules e.g. molecular switches.

References relevant to classification in this group

This subclass/group does not cover:

Computing based on bio molecules	G06N 3/002
Computing using atoms or subatomic particles	G06N 99/002