LINGUISTICS
Translation machine
Having particular Input/Output device
Based on phrase, clause, or idiom
For partial translation
Punctuation
Storage or retrieval of data
Multilingual or national language support
Natural language
Dictionary building, modification, or prioritization

SPEECH SIGNAL PROCESSING
Psychoacoustic
For storage or transmission
Neural network
Transformation
Orthogonal functions
Frequency
Specialized information
Pitch
Voiced or unvoiced
Formant
Silence decision
Time
Pulse code modulation (PCM)
Zero crossing
Voiced or unvoiced
Silence decision
Correlation function
Autocorrelation
Cross-correlation
Linear prediction
Analysis by synthesis
Pattern matching vocoders
Vector quantization
Excitation patterns
Normalizing
Gain control
Noise
Pretransmission
Post-transmission
Adaptive bit allocation
Quantization
Recognition
Neural network
Detect speech in noise
Normalizing
Speech to image
Specialized equations or comparisons
Correlation
Distance
Similarity
Probability
Dynamic time warping
Viterbi trellis
Creating patterns for matching
Update patterns
Clustering
Voice recognition
Preliminary matching
Endpoint detection
Subportions
Specialized models
Markov
Hidden Markov Model (HMM) (EPO)
Training of HMM (EPO)
With insufficient amount of training data, e.g., state sharing, tying, deleted interpolation (EPO)
Duration modeling in HMM, e.g., semi HMM, segmental models, transition probabilities (EPO)
Hidden Markov (HM) network (EPO)
State emission probability (EPO)
Continuous density, e.g., Gaussian distribution, Laplace (EPO)
Discrete density, e.g., Vector Quantization preprocessor, look up tables (EPO)
Natural language
Synthesis
Neural network
Image to speech
Vocal tract model
Linear prediction
Excitation
Interpolation
E-SUBCLASSES

The following subclasses beginning with the letter E are E-subclasses. Each E-subclass corresponds in scope to a classification in a foreign classification system, for example, the European Classification system (ECLA). The foreign classification equivalent to an E-subclass is identified in the subclass definition. In addition to US documents classified in E-subclasses by US examiners, documents are regularly classified in E-subclasses according to the classification practices of any foreign Offices identified in parentheses at the end of the title. For example, "(EPO)" at the end of a title indicates both European and US patent documents, as classified by the EPO, are regularly added to the subclass. E-subclasses may contain subject matter outside the scope of this class. Consult their definitions, or the documents themselves to clarify or interpret titles.

E17.001 SPEAKER IDENTIFICATION OR VERIFICATION (EPO)

E17.002 Recognition of special voice characteristics, e.g., for use in a lie detector; recognition of animal voices, etc. (EPO)
E17.003 Systems using speaker recognizers (EPO)
E17.004 Details (EPO)
E17.005 Preprocessing operations, e.g., segment selection, etc., pattern representation or modeling, e.g., based on linear discriminant analysis (LDA), principal components, etc.; feature selection or extraction (EPO)
E17.006 Training, model building, enrollment (EPO)
E17.007 Decision making techniques, pattern matching strategies (EPO)
E17.008 Use of particular distance or distortion metric between probe pattern and reference templates (EPO)
E17.009 Multimodal systems, i.e., based on the integration of multiple recognition engines or experts fusion (EPO)
E17.01 Score normalization (EPO)
E17.011 Use of phonemic categorization or speech recognition prior to speaker recognition or verification (EPO)
E17.012 Hidden Markov Models (HMMs) (EPO)
E17.013 Artificial neural networks, connectionist approaches (EPO)
E17.014 Pattern transformations and operations aimed at increasing system robustness, e.g., against channel noise, different working conditions, etc. (EPO)
E17.015 Interactive procedures, man-machine interface (EPO)
E17.016 User prompted to utter a password or predefined text (EPO)
E15.001 SPEECH RECOGNITION (EPO)
E15.002 Assessment or evaluation of speech recognition systems (EPO)
E15.003 Language recognition (EPO)
E15.004 Feature extraction for speech recognition; selection of recognition unit (EPO)
E15.005 Segmentation or word limit detection (EPO)
E15.006 Word boundary detection (EPO)
E15.007 Creation of reference templates; training of speech recognition systems, e.g., adaption to the characteristics of the speaker’s voice, etc. (EPO)
E15.008 Training (EPO)
E15.009 Adaptation (EPO)
E15.01 In the frequency domain (EPO)
E15.011 To speaker (EPO)
E15.012 Supervised, i.e., under machine guidance (EPO)
E15.013 Unsupervised (EPO)
E15.014 Speech classification or search (EPO)
E15.015 Using distance or distortion measures between unknown speech and reference templates (EPO)
E15.016 Using dynamic programming techniques, e.g., Dynamic Time Warping (DTW), etc. (EPO)
E15.017 Using artificial neural networks (EPO)
E15.018 Using natural language modeling (EPO)
E15.019 Using context dependencies, e.g., language models, etc. (EPO)
E15.02 Phonemic context, e.g., pronunciation rules, phonotactical constraints, phoneme n-grams, etc. (EPO)
E15.021 Grammatical context, e.g., disambiguation of the recognition hypotheses based on word sequence rules, etc. (EPO)
E15.022 Formal grammars, e.g., finite state automata, context free grammars, word networks, etc. (EPO)
E15.023 Probabilistic grammars, e.g., word n-grams, etc. (EPO)
E15.024 Semantic context, e.g., disambiguation of the recognition hypotheses based on word meaning, etc. (EPO)
E15.025 Using prosody or stress (EPO)
E15.026 Parsing for meaning understanding (EPO)
E15.027 Using statistical models, e.g., Hidden Markov Models (HMMs), etc. (EPO)
E15.028 Hidden Markov Models (HMMs) (EPO)
E15.029 Training of Hidden Markov Models (HMMs) (EPO)
E15.03 With insufficient amount of training data, e.g., state sharing, tying, deleted interpolation, etc. (EPO)
E15.031 Duration modeling in Hidden Markov Models (HMMs), e.g., semi-HMM, segmental models, transition probabilities, etc. (EPO)
E15.032 Hidden Markov Models (HMMs) network (EPO)
E15.033 State emission probabilities (EPO)
E15.034 Continuous densities, e.g., Gaussian distribution, Laplace, etc. (EPO)
E15.035 Discrete densities, e.g., Vector Quantization preprocessor, look-up tables, etc. (EPO)
E15.036 Neural Network (NN) as output probability estimator, e.g., hybrid HMM/NN, etc. (EPO)
E15.037 Non-hidden Markov Model (EPO)
E15.038 Recognition networks (EPO)
E15.039 Speech recognition techniques for robustness in adverse environments, e.g., in noise, of stress induced speech, etc. (EPO)
E15.04 Procedures used during a speech recognition process, e.g., man-machine dialogue, etc. (EPO)
E15.041 Speech recognition using nonacoustical features, e.g., position of the lips, etc. (EPO)
E15.042 Using position of the lips, movement of the lips, or face analysis (EPO)
E15.043 Speech to text systems (EPO)
E15.044 Speech recognition depending on application context, e.g., in a computer, etc. (EPO)
E15.045 ..Systems using speech recognizers (EPO)
E15.046 .Constructional details of speech recognition systems (EPO)
E15.047 ..Distributed recognition, e.g., in client-server systems for mobile phones or network applications, etc. (EPO)
E15.048 ..Memory allocation or algorithm optimization to reduce hardware requirements (EPO)
E15.049 ..Multiple recognizers used in sequence or in parallel; corresponding voting or score combination systems (EPO)
E15.05 ..Recognizers for parallel processing (EPO)

E19.001 SPEECH OR AUDIO SIGNAL ANALYSIS-SYNTHESIS TECHNIQUES FOR REDUNDANCY REDUCTION, E.G., IN VOCODERS, ETC.; CODING OR DECODING OF SPEECH OR AUDIO SIGNALS; COMPRESSION OR EXPANSION OF SPEECH OR AUDIO SIGNALS, E.G., SOURCE-FILTER MODELS, PSYCHOACOUSTIC ANALYSIS, ETC. (EPO)
E19.002 .Perceptual measures for quality assessment (EPO)
E19.003 .Correction of errors induced by the transmission channel, if related to the coding (EPO)
E19.004 .Lossless audio signal coding; perfect reconstruction of coded audio signal by transmission of coding error (EPO)
E19.005 .Multichannel audio signal coding and decoding, i.e., using interchannel correlation to reduce redundancies, e.g., joint-stereo, intensity-coding, matrixing, etc. (EPO)
E19.006 .Comfort noise, silence coding (EPO)
E19.007 .Speech coding using phonetic or linguistical decoding of the source; reconstruction using text-to-speech synthesis (EPO)
E19.008 .Systems using vocoders (EPO)

E19.01 .Using spectral analysis, e.g., transform vocoders, subband vocoders, perceptual audio coders, psychoacoustically based lossy encoding, etc., e.g., MPEG audio, Dolby AC-3, etc. (EPO)
E19.011 ..Blocking, i.e., grouping of samples in time, choice of analysis window, overlap factor (EPO)
E19.012 ..Detection of transients and attacks for time/frequency resolution switching (EPO)
E19.013 ..Noise substitution, i.e., substituting nontonal spectral components by noisy source (EPO)
E19.014 ..Spectral prediction for pre-echo prevention; temporal noise shaping (TNS), e.g., in MPEG2 or MPEG4, etc. (EPO)
E19.015 ..Quantization or dequantization of spectral components (EPO)
E19.016 ..Scalar quantization (EPO)
E19.017 ..Vector quantization, e.g., Twin-VQ audio, etc. (EPO)
E19.018 ..Using subband decomposition (EPO)
E19.019 ..Subband vocoders (EPO)
E19.02 ..Using orthogonal transformation (EPO)
E19.021 ..Using wavelet decomposition (EPO)
E19.022 .Dynamic bit allocation (EPO)
E19.023 ..Using predictive techniques; codecs based on source-filter modelization (EPO)
E19.024 ..Determination or coding of the spectral characteristics, e.g., of the short-term prediction coefficients, etc. (EPO)
E19.025 ..Line spectrum pair (LSP) vocoders (EPO)
E19.026 ..Determination or coding of the excitation function; determination or coding of the long-term prediction characteristics (EPO)
E19.027 ..Determination or coding of an excitation gain (EPO)
E19.028 ..Using mixed excitation model, e.g., MELP, MBE, Split band LPC, HVXC, etc. (EPO)
E19.029 ...Long-term prediction, i.e., removing periodical redundancies, e.g., adaptive codebook, pitch predictor, etc. (EPO)
E19.03 ...Using sinusoidal excitation model (EPO)
E19.031 ...Using prototype waveform decomposition or waveform interpolative coders (PWI) (EPO)
E19.032 ...Determination or coding of a multipulse excitation (EPO)
E19.033 ...Algebraic codebook; sparse pulse excitation (EPO)
E19.034 ...Regular pulse excitation (EPO)
E19.035 ...Determination or coding of a code excitation; code excited linear prediction (CELP) vocoders (EPO)
E19.036 ...Pitch excitation, e.g., PSI-CELP (pitch synchronous innovation CELP), etc. (EPO)
E19.037 ...Residual excited linear prediction (RELP) (EPO)
E19.038 ...Vector sum excited linear prediction (VSELP) (EPO)
E19.039 ...Details of speech and audio coders (EPO)
E19.04 ...Vocoder architecture (EPO)
E19.041 ...Vocoders using multiple modes (EPO)
E19.042 ...Using sound class specific coding, hybrid encoders, object-based coding (EPO)
E19.043 ...Mode decision, i.e., based on audio signal content versus external parameter (EPO)
E19.044 ...Variable rate or variable quality codecs, e.g., scalable representation encoding, etc. (EPO)
E19.045 ...Pre- or post-filtering (EPO)
E19.046 ...Pre-filtering, e.g., high frequency emphasis prior to encoding, etc. (EPO)
E19.047 ...Post-filtering, e.g., pitch enhancement, formant emphasis for decoder, etc. (EPO)
E19.048 ...Audio streaming, i.e., formatting and decoding of an encoded audio signal (EPO)
E19.049 ...Transcoding, i.e., converting between two coded representations avoiding cascaded coding-decoding (EPO)
E21.001 MODIFICATION OF AT LEAST ONE CHARACTERISTIC OF SPEECH WAVES (EPO)
E21.002 ...Speech enhancement, e.g., noise reduction, echo cancellation, etc. (EPO)
E21.003 ...Applications (EPO)
E21.004 ...Speech corrupted by noise (EPO)
E21.005 ...Periodic noise (EPO)
E21.006 ...The noise being separate speech (EPO)
E21.007 ...Speech corrupted by echo-reverberation (EPO)
E21.008 ...Speech corrupted by stress-Lombard effect (EPO)
E21.009 ...Enhancement of intelligibility of clean or coded speech (EPO)
E21.01 ...Enhancement of diverse speech (EPO)
E21.011 ...Bandwidth extension taking place at the receiving side, e.g., generation of low- or high-frequency components, regeneration of spectral holes, etc. (EPO)
E21.012 ...Separate reconstruction of interference and of speech signal (EPO)
E21.013 ...The interference being a separate speaker (EPO)
E21.014 ...Active noise canceling (EPO)
E21.015 ...Public address system (EPO)
E21.016 ...Suppression or repetition of time signal segments (EPO)
E21.017 ...Time compression or expansion (EPO)
E21.018 ...Suppression or repetition of time signal segments (EPO)
E21.019 ...Transformation of speech into a nonaudible representation, e.g., speech visualization, speech processing for tactile aids, etc. (EPO)
E21.02 ...Synchronization of speech with image or synthesis of the lips movement from speech, e.g., for "talking heads," etc. (EPO)
E11.001 MISCELLANEOUS ANALYSIS OR DETECTION OF SPEECH CHARACTERISTICS (EPO)
E11.002 General speech analysis without concrete application (EPO)
E11.003 Detection of presence or absence of speech signals (EPO)
E11.004 Voice/data decision (EPO)
E11.005 End point detection (EPO)
E11.006 Pitch determination of speech signals (EPO)
E11.007 Voiced-unvoiced decision (EPO)
E13.001 SPEECH SYNTHESIS; TEXT TO SPEECH SYSTEMS (EPO)
E13.002 Methods for producing synthetic speech; speech synthesizers (EPO)
E13.003 Concept-to-speech synthesizers; generation of natural phrases not from text but from machine-based concepts (EPO)
E13.004 Sound editing, manipulating voice of the synthesizer (EPO)
E13.005 Details of speech synthesis systems, e.g., synthesizer architecture, memory management, etc. (EPO)
E13.006 Architecture of speech synthesizers (EPO)
E13.007 Excitation (EPO)
E13.008 Systems using speech synthesizers (EPO)
E13.009 Elementary speech units used in speech synthesizers; concatenation rules (EPO)
E13.01 Concatenation (EPO)
E13.011 Text analysis, generation of parameters for speech synthesis out of text, e.g., grapheme to phoneme translation, prosody generation, stress, or intonation determination, etc. (EPO)
E13.012 Grapheme to phoneme, detection of language (EPO)
E13.013 Prosody rules derived from text (EPO)
E13.014 Stress or intonation (EPO)

FOREIGN ART COLLECTIONS

FOR 000 CLASS-RELATED FOREIGN DOCUMENTS

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