CPC COOPERATIVE PATENT CLASSIFICATION

G PHYSICS
(NOTES omitted)

<u>INSTRUMENTS</u>

G06 COMPUTING; CALCULATING OR COUNTING
(NOTES omitted)

G06V IMAGE OR VIDEO RECOGNITION OR UNDERSTANDING

<u>NOTES</u>

1. This subclass <u>covers</u>:
   - methods or arrangements for pattern recognition or machine learning specially adapted for images or video.
2. In this subclass, the following terms or expressions are used with the meaning indicated:
   - "pattern recognition" means detection, categorisation, authentication and identification of patterns for explanatory purposes or to derive a certain meaning in images or video, by acquiring, preprocessing or extracting distinctive features and matching, clustering or classifying these features or representations thereof;
   - "feature extraction" means deriving descriptive or quantitative measures from images or video;
   - "clustering" means grouping or separating patterns according to their closeness or dissimilarity;
   - "classification" means the identification of an object/feature as belonging to a class of objects/features by assigning of a label.
3. In this subclass, subject matter classified in groups G06V 20/00 - G06V 40/00 is also classified in groups G06V 10/10 or G06V 10/20 respectively, if recognition relies on specific processing at the stages of acquisition or preprocessing.

10/00	**Arrangements for image or video recognition or understanding** (character recognition in images or video G06V 30/10)
10/10	. Image acquisition (document image scanning and transmission H04N 1/00; control of digital cameras H04N 23/60)
10/12	. . Details of acquisition arrangements; Constructional details thereof
10/14	. . . Optical characteristics of the device performing the acquisition or on the illumination arrangements
10/141	. . . . Control of illumination
10/143	. . . . Sensing or illuminating at different wavelengths
10/145	. . . . Illumination specially adapted for pattern recognition, e.g. using gratings
10/147	. . . . Details of sensors, e.g. sensor lenses (fingerprint or palmprint sensors G06V 40/13; vascular sensors G06V 40/145; eye sensors G06V 40/19)
10/16	. . {using multiple overlapping images; Image stitching}
10/17	. . {using hand-held instruments}
10/19	. . {by sensing codes defining pattern positions}
10/20	. Image preprocessing
10/22	. . by selection of a specific region containing or referencing a pattern; Locating or processing of specific regions to guide the detection or recognition
10/225	. . . {based on a marking or identifier characterising the area}
10/23	. . . {based on positionally close patterns or neighbourhood relationships}
10/235	. . . {based on user input or interaction}

10/24	. . Aligning, centring, orientation detection or correction of the image
10/242	. . . {by image rotation, e.g. by 90 degrees}
10/243	. . . {by compensating for image skew or non-uniform image deformations}
10/245	. . . {by locating a pattern; Special marks for positioning}
10/247	. . . {by affine transforms, e.g. correction due to perspective effects; Quadrilaterals, e.g. trapezoids}
10/248	. . . {by interactive preprocessing or interactive shape modelling, e.g. feature points assigned by a user}
10/25	. . Determination of region of interest [ROI] or a volume of interest [VOI]
10/255	. . {Detecting or recognising potential candidate objects based on visual cues, e.g. shapes}
10/26	. . Segmentation of patterns in the image field; Cutting or merging of image elements to establish the pattern region, e.g. clustering-based techniques; Detection of occlusion
10/267	. . . {by performing operations on regions, e.g. growing, shrinking or watersheds}
10/273	. . . {removing elements interfering with the pattern to be recognised}
10/28	. . Quantising the image, e.g. histogram thresholding for discrimination between background and foreground patterns
10/30	. . Noise filtering
10/32	. . Normalisation of the pattern dimensions
10/34	. . Smoothing or thinning of the pattern; Morphological operations; Skeletonisation

10/36	. .	Applying a local operator, i.e. means to operate on image points situated in the vicinity of a given point; Non-linear local filtering operations, e.g. median filtering
10/40	.	Extraction of image or video features
10/42	. .	Global feature extraction by analysis of the whole pattern, e.g. using frequency domain transformations or autocorrelation
10/421	. . .	{by analysing segments intersecting the pattern}
10/422	. . .	for representing the structure of the pattern or shape of an object therefor
10/424	. . . .	Syntactic representation, e.g. by using alphabets or grammars
10/426	. . . .	Graphical representations
10/431	. . .	{Frequency domain transformation; Autocorrelation}
10/435	. . .	{Computation of moments}
10/44	. .	Local feature extraction by analysis of parts of the pattern, e.g. by detecting edges, contours, loops, corners, strokes or intersections; Connectivity analysis, e.g. of connected components
10/443	. . .	{by matching or filtering}
10/446	. . . .	{using Haar-like filters, e.g. using integral image techniques}
10/449	. . . .	{Biologically inspired filters, e.g. difference of Gaussians [DoG] or Gabor filters}
10/451	. . . . .	{with interaction between the filter responses, e.g. cortical complex cells}
10/454	. . . . . .	{Integrating the filters into a hierarchical structure, e.g. convolutional neural networks [CNN]}
10/457	. . .	{by analysing connectivity, e.g. edge linking, connected component analysis or slices}
10/46	. .	Descriptors for shape, contour or point-related descriptors, e.g. scale invariant feature transform [SIFT] or bags of words [BoW]; Salient regional features (colour feature extraction G06V 10/56)
10/462	. . .	{Salient features, e.g. scale invariant feature transforms [SIFT]}
10/464	. . . .	{using a plurality of salient features, e.g. bag-of-words [BoW] representations}
10/467	. . .	{Encoded features or binary features, e.g. local binary patterns [LBP]}
10/469	. . .	{Contour-based spatial representations, e.g. vector-coding}
10/471	. . . .	{using approximation functions}
10/473	. . . .	{using gradient analysis}
10/476	. . . .	{using statistical shape modelling, e.g. point distribution models}
10/478	. . .	{Contour-based spectral representations or scale-space representations, e.g. by Fourier analysis, wavelet analysis or curvature scale-space [CSS]}
10/48	. .	by mapping characteristic values of the pattern into a parameter space, e.g. Hough transformation
10/50	. .	by performing operations within image blocks; by using histograms, e.g. histogram of oriented gradients [HoG]; by summing image-intensity values; Projection analysis
10/507	. . .	{Summing image-intensity values; Histogram projection analysis}
10/513	. .	{Sparse representations}
10/52	. .	Scale-space analysis, e.g. wavelet analysis (multi-scale boundary representations G06V 10/42)
10/54	. .	relating to texture
10/56	. .	relating to colour
10/58	. .	relating to hyperspectral data
10/60	. .	relating to illumination properties, e.g. using a reflectance or lighting model
10/62	. .	relating to a temporal dimension, e.g. time-based feature extraction; Pattern tracking
10/70	.	using pattern recognition or machine learning (optical pattern recognition or electronic computations therefor G06V 10/88)
10/72	. .	Data preparation, e.g. statistical preprocessing of image or video features
10/74	. .	Image or video pattern matching; Proximity measures in feature spaces
10/75	. . .	Organisation of the matching processes, e.g. simultaneous or sequential comparisons of image or video features; Coarse-fine approaches, e.g. multi-scale approaches; using context analysis; Selection of dictionaries
10/751	. . . .	{Comparing pixel values or logical combinations thereof, or feature values having positional relevance, e.g. template matching}
10/7515	. . . . .	{Shifting the patterns to accommodate for positional errors}
10/752	. . . .	{Contour matching}
10/753	. . . .	{Transform-based matching, e.g. Hough transform}
10/754	. . . .	{involving a deformation of the sample pattern or of the reference pattern; Elastic matching}
10/755	. . . .	{Deformable models or variational models, e.g. snakes or active contours}
10/7553	. . . . .	{based on shape, e.g. active shape models [ASM]}
10/7557	. . . . .	{based on appearance, e.g. active appearance models [AAM]}
10/757	. . . .	{Matching configurations of points or features}
10/758	. . . .	{Involving statistics of pixels or of feature values, e.g. histogram matching}
10/759	. . . .	{Region-based matching}
10/76	. . . .	{based on eigen-space representations, e.g. from pose or different illumination conditions; Shape manifolds}
10/761	. . .	{Proximity, similarity or dissimilarity measures}
10/762	. .	using clustering, e.g. of similar faces in social networks
10/7625	. . .	{Hierarchical techniques, i.e. dividing or merging patterns to obtain a tree-like representation; Dendograms}
10/763	. . .	{Non-hierarchical techniques, e.g. based on statistics of modelling distributions}
10/7635	. . .	{based on graphs, e.g. graph cuts or spectral clustering}
10/764	. .	using classification, e.g. of video objects
10/765	. . .	{using rules for classification or partitioning the feature space}
10/766	. .	using regression, e.g. by projecting features on hyperplanes

10/768	. . {using context analysis, e.g. recognition aided by known co-occurring patterns}
10/77	. . Processing image or video features in feature spaces; using data integration or data reduction, e.g. principal component analysis [PCA] or independent component analysis [ICA] or self-organising maps [SOM]; Blind source separation
10/771	. . . Feature selection, e.g. selecting representative features from a multi-dimensional feature space
10/7715	. . . {Feature extraction, e.g. by transforming the feature space, e.g. multi-dimensional scaling [MDS]; Mappings, e.g. subspace methods}
10/772	. . . Determining representative reference patterns, e.g. averaging or distorting patterns; Generating dictionaries
10/774	. . . Generating sets of training patterns; Bootstrap methods, e.g. bagging or boosting
10/7747	. . . . {Organisation of the process, e.g. bagging or boosting}
10/7753	. . . . {Incorporation of unlabelled data, e.g. multiple instance learning [MIL]}
10/776	. . . Validation; Performance evaluation
10/778	. . . Active pattern-learning, e.g. online learning of image or video features
10/7784	. . . . {based on feedback from supervisors}
10/7788	. . . . . {the supervisor being a human, e.g. interactive learning with a human teacher}
10/7792	. . . . . {the supervisor being an automated module, e.g. "intelligent oracle"}
10/7796	. . . . {based on specific statistical tests}
10/80	. . . Fusion, i.e. combining data from various sources at the sensor level, preprocessing level, feature extraction level or classification level (multimodal speaker identification or verification G10L 17/10)
10/803	. . . . {of input or preprocessed data}
10/806	. . . . {of extracted features}
10/809	. . . . {of classification results, e.g. where the classifiers operate on the same input data}
10/811	. . . . . {the classifiers operating on different input data, e.g. multi-modal recognition}
10/814	. . . . {using belief theory, e.g. Dempster-Shafer}
10/817	. . . . {by voting}
10/82	. . using neural networks
10/84	. . using probabilistic graphical models from image or video features, e.g. Markov models or Bayesian networks
10/85	. . . {Markov-related models; Markov random fields}
10/86	. . using syntactic or structural representations of the image or video pattern, e.g. symbolic string recognition; using graph matching
10/87	. . {using selection of the recognition techniques, e.g. of a classifier in a multiple classifier system}
10/88	. Image or video recognition using optical means, e.g. reference filters, holographic masks, frequency domain filters or spatial domain filters
10/89	. . {using frequency domain filters, e.g. Fourier masks implemented on spatial light modulators}
10/893	. . . {characterised by the kind of filter}
10/895	. . . . {the filter being related to phase processing, e.g. phase-only filters}
10/898	. . . . {combination of filters, e.g. phase-only filters}

10/92	. . {using spatial domain filters, e.g. joint transform correlators}
10/94	. Hardware or software architectures specially adapted for image or video understanding
10/945	. . {User interactive design; Environments; Toolboxes}
10/95	. . {structured as a network, e.g. client-server architectures}
10/955	. . {using specific electronic processors}
10/96	. Management of image or video recognition tasks
10/98	. Detection or correction of errors, e.g. by rescanning the pattern or by human intervention; Evaluation of the quality of the acquired patterns
10/987	. . {with the intervention of an operator}
10/993	. . {Evaluation of the quality of the acquired pattern}
20/00	**Scenes; Scene-specific elements** (control of digital cameras H04N 23/60)

NOTE

In this group, the following term is used with the meaning indicated:
- "scene" is a visual representation of the world or of some elements of it, as captured by a sensor or generated by a computer.

20/05	. Underwater scenes
20/10	. Terrestrial scenes (scenes under surveillance with static cameras G06V 20/52; scenes perceived from the exterior of a vehicle G06V 20/56; scenes perceived from the interior of a vehicle G06V 20/59)
20/13	. . Satellite images
20/17	. . taken from planes or by drones
20/176	. . {Urban or other man-made structures}
20/182	. . {Network patterns, e.g. roads or rivers}
20/188	. . {Vegetation}
20/194	. . {using hyperspectral data, i.e. more or other wavelengths than RGB}
20/20	. in augmented reality scenes
20/30	. in albums, collections or shared content, e.g. social network photos or video
20/35	. {Categorising the entire scene, e.g. birthday party or wedding scene}
20/36	. . {Indoor scenes}
20/38	. . {Outdoor scenes}
20/39	. . . {Urban scenes}
20/40	. in video content (extracting overlay text G06V 20/62; video retrieval G06F 16/70; processing of video elementary streams in video servers H04N 21/234; processing of video elementary streams in video clients H04N 21/44)
20/41	. . {Higher-level, semantic clustering, classification or understanding of video scenes, e.g. detection, labelling or Markovian modelling of sport events or news items (segmenting video sequences G06V 20/49)}
20/42	. . . {of sport video content}
20/43	. . . {of news video content}
20/44	. . {Event detection}
20/46	. . {Extracting features or characteristics from the video content, e.g. video fingerprints, representative shots or key frames}
20/47	. . . {Detecting features for summarising video content}

20/48	. .	{Matching video sequences}
20/49	. .	{Segmenting video sequences, i.e. computational techniques such as parsing or cutting the sequence, low-level clustering or determining units such as shots or scenes}
20/50	.	Context or environment of the image
20/52	. .	Surveillance or monitoring of activities, e.g. for recognising suspicious objects (recognising microscopic objects G06V 20/69)
20/53	. . .	{Recognition of crowd images, e.g. recognition of crowd congestion}
20/54	. . .	of traffic, e.g. cars on the road, trains or boats
20/56	. .	exterior to a vehicle by using sensors mounted on the vehicle
20/58	. . .	Recognition of moving objects or obstacles, e.g. vehicles or pedestrians; Recognition of traffic objects, e.g. traffic signs, traffic lights or roads
20/582	. . . .	{of traffic signs}
20/584	. . . .	{of vehicle lights or traffic lights}
20/586	. . . .	{of parking space}
20/588	. . .	{Recognition of the road, e.g. of lane markings; Recognition of the vehicle driving pattern in relation to the road}
20/59	. .	inside of a vehicle, e.g. relating to seat occupancy, driver state or inner lighting conditions
20/593	. . .	{Recognising seat occupancy}
20/597	. . .	{Recognising the driver's state or behaviour, e.g. attention or drowsiness}
20/60	.	Type of objects
20/62	. .	Text, e.g. of license plates, overlay texts or captions on TV images
20/625	. . .	{License plates}
20/63	. . .	{Scene text, e.g. street names}
20/635	. . .	{Overlay text, e.g. embedded captions in a TV program}
20/64	. .	Three-dimensional objects
20/647	. . .	{by matching two-dimensional images to three-dimensional objects}
20/653	. . .	{by matching three-dimensional models, e.g. conformal mapping of Riemann surfaces}
20/66	. .	Trinkets, e.g. shirt buttons or jewellery items (recognising microscopic objects G06V 20/69)
20/68	. .	Food, e.g. fruit or vegetables
20/69	. .	Microscopic objects, e.g. biological cells or cellular parts
20/693	. . .	{Acquisition}
20/695	. . .	{Preprocessing, e.g. image segmentation}
20/698	. . .	{Matching; Classification}
20/70	.	Labelling scene content, e.g. deriving syntactic or semantic representations
20/80	.	Recognising image objects characterised by unique random patterns
20/90	.	Identifying an image sensor based on its output data
20/95	.	{Pattern authentication; Markers therefor; Forgery detection}

30/00		**Character recognition; Recognising digital ink; Document-oriented image-based pattern recognition** (scanning, transmission or reproduction of documents or the like H04N 1/00)

NOTE

This group covers recognition of characters or digital ink, where the characters or the digital ink can include representations in three dimensions, e.g. as written by performing gestures in the air.

30/10	.	Character recognition
30/12	. .	Detection or correction of errors, e.g. by rescanning the pattern
30/127	. . .	{with the intervention of an operator}
30/133	. . .	{Evaluation of quality of the acquired characters}
30/14	. .	Image acquisition
30/141	. . .	{using multiple overlapping images; Image stitching}
30/142	. . .	using hand-held instruments; Constructional details of the instruments
30/1423	. . . .	{the instrument generating sequences of position coordinates corresponding to handwriting (preprocessing or recognising digital ink G06V 30/32)}
30/1426	. . . .	{by sensing position defining codes on a support}
30/1429	. . .	{Identifying or ignoring parts by sensing at different wavelengths}
30/1431	. . .	{Illumination control}
30/1434	. . .	{Special illumination such as grating, reflections or deflections, e.g. for characters with relief}
30/1437	. . .	{Sensor details, e.g. position, configuration or special lenses (G06V 30/1429 takes precedence)}
30/144	. . .	using a slot moved over the image; using discrete sensing elements at predetermined points; using automatic curve following means
30/1444	. . .	{Selective acquisition, locating or processing of specific regions, e.g. highlighted text, fiducial marks or predetermined fields}
30/1448	. . . .	{based on markings or identifiers characterising the document or the area}
30/1452	. . . .	{based on positionally close symbols, e.g. amount sign or URL-specific characters}
30/1456	. . . .	{based on user interactions}
30/146	. . .	Aligning or centring of the image pick-up or image-field
30/1463	. . . .	{Orientation detection or correction, e.g. rotation of multiples of 90 degrees}
30/1465	. . . .	{by locating a pattern (G06V 30/1475 takes precedence; centring within a document with a marking G06V 30/1448)}
30/1468	. . . . .	{Special marks for positioning}
30/147	. . . .	{Determination of region of interest}
30/1473	. . . .	{Recognising objects as potential recognition candidates based on visual cues, e.g. shapes}
30/1475	. . . .	{Inclination or skew detection or correction of characters or of image to be recognised}
30/1478	. . . . .	{of characters or characters lines}
30/148	. . .	Segmentation of character regions

30/15	. . . .	{Cutting or merging image elements, e.g. region growing, watershed or clustering-based techniques}
30/153	. . . .	{using recognition of characters or words}
30/155	. . . .	{Removing patterns interfering with the pattern to be recognised, such as ruled lines or underlines}
30/158	. . . .	{using character size, text spacings or pitch estimation}
30/16	. .	Image preprocessing
30/1607	. . .	{Correcting image deformation, e.g. trapezoidal deformation caused by perspective}
30/1613	. . .	{Interactive preprocessing or shape modelling, e.g. assignment of feature points by a user}
30/162	. . .	Quantising the image signal
30/164	. . .	Noise filtering
30/166	. . .	Normalisation of pattern dimensions
30/168	. . .	Smoothing or thinning of the pattern; Skeletonisation
30/18	. .	Extraction of features or characteristics of the image
30/1801	. . .	{Detecting partial patterns, e.g. edges or contours, or configurations, e.g. loops, corners, strokes or intersections (extracting features by contour coding G06V 30/182)}
30/18019	. . . .	{by matching or filtering}
30/18029	. . . . .	{filtering with Haar-like subimages, e.g. computation thereof with the integral image technique}
30/18038	. . . . .	{Biologically-inspired filters, e.g. difference of Gaussians [DoG], Gabor filters}
30/18048	. . . . . .	{with interaction between the responses of different filters, e.g. cortical complex cells}
30/18057	. . . .	{Integrating the filters into a hierarchical structure, e.g. convolutional neural networks [CNN]}
30/18067	. . . .	{by mapping characteristic values of the pattern into a parameter space, e.g. Hough transformation}
30/18076	. . . .	{by analysing connectivity, e.g. edge linking, connected component analysis or slices}
30/18086	. . .	{by performing operations within image blocks or by using histograms}
30/18095	. . . .	{Summing image-intensity values; Projection and histogram analysis}
30/18105	. . .	{related to colour}
30/18114	. . .	{involving specific hyperspectral computations of features}
30/18124	. . .	{related to illumination properties, e.g. according to a reflectance or lighting model}
30/18133	. . .	{regional/local feature not essentially salient, e.g. local binary pattern}
30/18143	. . .	{Extracting features based on salient regional features, e.g. scale invariant feature transform [SIFT] keypoints}
30/18152	. . . .	{Extracting features based on a plurality of salient regional features, e.g. "bag of words"}
30/18162	. . .	{related to a structural representation of the pattern}
30/18171	. . . .	{Syntactic representation, e.g. using a grammatical approach}
30/18181	. . . .	{Graphical representation, e.g. directed attributed graph}
30/1819	. . .	{sparse representations}
30/182	. . .	by coding the contour of the pattern
30/1823	. . . .	{using vector-coding}
30/1826	. . . .	{analysing the spectrum of the contour, e.g. Fourier expansion}
30/1829	. . . .	{using an approximation function}
30/1831	. . . .	{using gradient analysis}
30/1834	. . . .	{using statistical shape modelling, e.g. point distribution model}
30/1837	. . . .	{using wavelet analysis}
30/184	. . .	by analysing segments intersecting the pattern
30/186	. . .	by deriving mathematical or geometrical properties from the whole image
30/187	. . . .	{Frequency domain transformation; Autocorrelation}
30/188	. . . .	{Computation of moments}
30/189	. . . .	{Scale-space domain transformation, e.g. with wavelet analysis}
30/19	. .	Recognition using electronic means
30/19007	. . .	{Matching; Proximity measures}
30/19013	. . . .	{Comparing pixel values or logical combinations thereof, or feature values having positional relevance, e.g. template matching (specially adapted for image segmentation G06T 7/10; specially adapted for the analysis of motion G06T 7/20; specially adapted for image alignment G06T 7/30; specially adapted for the calculation of depth from stereo images G06T 7/50; specially adapted for position determination G06T 7/70)}
30/1902	. . . . .	{Shifting or otherwise transforming the patterns to accommodate for positional errors}
30/19027	. . . . . .	{Matching of contours}
30/19033	. . . .	{by mapping curve parameters onto an accumulator array, e.g. generalised Hough Transform}
30/1904	. . . . . .	{involving a deformation of the sample or reference pattern; Elastic matching}
30/19047	. . . .	{based on a local optimisation criterion, e.g. "snakes", i.e. active contour models of the pattern to be recognised}
30/19053	. . . .	{based on shape statistics, e.g. active shape models of the pattern to be recognised}
30/1906	. . . .	{based also on statistics of image patches, e.g. active appearance models of the pattern to be recognised}
30/19067	. . . . . .	{Matching configurations of points or features, e.g. constellation matching}
30/19073	. . . .	{Comparing statistics of pixel or of feature values, e.g. histogram matching}
30/1908	. . . .	{Region based matching}
30/19087	. . . .	{based on parametric eigenspace representations, e.g. eigenspace representations using pose or illumination parameters; Shape manifold}
30/19093	. . . .	{Proximity measures, i.e. similarity or distance measures}

30/191	. . .	{Design or setup of recognition systems or techniques; Extraction of features in feature space; Clustering techniques; Blind source separation}
30/19107	. . . .	{Clustering techniques}
30/19113	. . . .	{Selection of pattern recognition techniques, e.g. of classifiers in a multi-classifier system}
30/1912	. . . .	{Selecting the most significant subset of features (G06V 30/19127 takes precedence)}
30/19127	. . . .	{Extracting features by transforming the feature space, e.g. multidimensional scaling; Mappings, e.g. subspace methods}
30/19133	. . . .	{Interactive pattern learning with a human teacher}
30/1914	. . . .	{Determining representative reference patterns, e.g. averaging or distorting patterns; Generating dictionaries, e.g. user dictionaries}
30/19147	. . . .	{Obtaining sets of training patterns; Bootstrap methods, e.g. bagging or boosting}
30/19153	. . . .	{using rules for classification or partitioning the feature space}
30/1916	. . . .	{Validation; Performance evaluation}
30/19167	. . . .	{Active pattern learning}
30/19173	. . . .	{Classification techniques}
30/1918	. . . .	{Fusion techniques, i.e. combining data from various sources, e.g. sensor fusion}
30/19187	. . . .	{Graphical models, e.g. Bayesian networks or Markov models}
30/19193	. . .	{Statistical pre-processing, e.g. techniques for normalisation or restoring missing data}
30/192	. . .	using simultaneous comparisons or correlations of the image signals with a plurality of references
30/194	. . .	References adjustable by an adaptive method, e.g. learning
30/195	. . . .	{using a resistor matrix}
30/196	. . .	using sequential comparisons of the image signals with a plurality of references
30/198	. . . .	the selection of the next reference depending on the result of the preceding comparison
30/1983	. . . .	{Syntactic or structural pattern recognition, e.g. symbolic string recognition}
30/1985	. . . . .	{Syntactic analysis, e.g. using a grammatical approach (syntactic image representation G06V 30/18171)}
30/1988	. . . . .	{Graph matching (graphical image representation G06V 30/18181)}
30/199	. .	Arrangements for recognition using optical reference masks, e.g. holographic masks
30/20	. .	Combination of acquisition, preprocessing or recognition functions
30/22	. .	characterised by the type of writing
30/222	. . .	of characters separated by spaces
30/224	. . .	of printed characters having additional code marks or containing code marks
30/2247	. . . .	{Characters composed of bars, e.g. CMC-7}
30/2253	. . . .	{Recognition of characters printed with magnetic ink (G06V 30/2247 takes precedence)}
30/226	. . .	of cursive writing
30/2264	. . . .	{using word shape}
30/2268	. . . .	{using stroke segmentation}

30/2272	. . . . .	{with lexical matching}
30/2276	. . . . .	{with probabilistic networks, e.g. hidden Markov models}
30/228	. . .	of three-dimensional handwriting, e.g. writing in the air
30/24	. .	characterised by the processing or recognition method (segmentation of character regions G06V 30/148)
30/242	. . .	Division of the character sequences into groups prior to recognition; Selection of dictionaries
30/244	. . .	using graphical properties, e.g. alphabet type or font
30/2445	. . . . .	{Alphabet recognition, e.g. Latin, Kanji or Katakana}
30/245	. . . . .	{Font recognition}
30/2455	. . . . .	{Discrimination between machine-print, hand-print and cursive writing}
30/246	. . . .	using linguistic properties, e.g. specific for English or German language
30/248	. . .	{involving plural approaches, e.g. verification by template match; Resolving confusion among similar patterns, e.g. "O" versus "Q" (G06V 30/242 takes precedence)}
30/2504	. . . .	{Coarse or fine approaches, e.g. resolution of ambiguities or multiscale approaches}
30/2528	. . . .	{Combination of methods, e.g. classifiers, working on the same input data}
30/2552	. . . .	{Combination of methods, e.g. classifiers, working on different input data, e.g. sensor fusion}
30/26	. .	Techniques for post-processing, e.g. correcting the recognition result
30/262	. . .	using context analysis, e.g. lexical, syntactic or semantic context
30/268	. . . .	{Lexical context}
30/274	. . . .	{Syntactic or semantic context, e.g. balancing}
30/28	. .	specially adapted to the type of the alphabet, e.g. Latin alphabet
30/287	. . .	{of Kanji, Hiragana or Katakana characters}
30/293	. . .	{of characters other than Kanji, Hiragana or Katakana}
30/30	. .	based on the type of data
30/302	. . .	Images containing characters for discriminating human versus automated computer access
30/304	. . .	Music notations
30/32	. .	Digital ink
30/333	. . .	{Preprocessing; Feature extraction}
30/347	. . . .	{Sampling; Contour coding; Stroke extraction}
30/36	. . .	{Matching; Classification}
30/373	. . . .	{using a special pattern or subpattern alphabet}
30/387	. . . .	{using human interaction, e.g. selection of the best displayed recognition candidate}
30/40	.	Document-oriented image-based pattern recognition
30/41	. .	Analysis of document content (recognition of printed characters based on code marks G06V 30/224)
30/412	. . .	Layout analysis of documents structured with printed lines or input boxes, e.g. business forms or tables
30/413	. . .	Classification of content, e.g. text, photographs or tables

30/414	. . .	Extracting the geometrical structure, e.g. layout tree; Block segmentation, e.g. bounding boxes for graphics or text
30/416	. . .	Extracting the logical structure, e.g. chapters, sections or page numbers; Identifying elements of the document, e.g. authors
30/418	. . .	Document matching, e.g. of document images
30/42	. .	based on the type of document
30/422	. . .	Technical drawings; Geographical maps
30/424	. . .	Postal images, e.g. labels or addresses on parcels or postal envelopes
30/43	. .	{Editing text-bitmaps, e.g. alignment, spacing; Semantic analysis of bitmaps of text without OCR}
40/00		**Recognition of biometric, human-related or animal-related patterns in image or video data**
40/10	.	Human or animal bodies, e.g. vehicle occupants or pedestrians; Body parts, e.g. hands
40/103	. .	{Static body considered as a whole, e.g. static pedestrian or occupant recognition}
40/107	. .	{Static hand or arm}
40/11	. . .	{Hand-related biometrics; Hand pose recognition}
40/113	. . .	{Recognition of static hand signs}
40/117	. . .	{Biometrics derived from hands}
40/12	. .	Fingerprints or palmprints
40/13	. . .	Sensors therefor
40/1306	. . . .	{non-optical, e.g. ultrasonic or capacitive sensing}
40/1312	. . . .	{direct reading, e.g. contactless acquisition}
40/1318	. . . .	{using electro-optical elements or layers, e.g. electroluminescent sensing}
40/1324	. . . .	{by using geometrical optics, e.g. using prisms (G06V 40/1312 takes precedence)}
40/1329	. . . .	{Protecting the fingerprint sensor against damage caused by the finger}
40/1335	. . .	{Combining adjacent partial images (e.g. slices) to create a composite input or reference pattern; Tracking a sweeping finger movement}
40/1341	. . .	{Sensing with light passing through the finger}
40/1347	. . .	{Preprocessing; Feature extraction}
40/1353	. . . .	{Extracting features related to minutiae or pores}
40/1359	. . . .	{Extracting features related to ridge properties; Determining the fingerprint type, e.g. whorl or loop}
40/1365	. . .	{Matching; Classification}
40/1371	. . . .	{Matching features related to minutiae or pores}
40/1376	. . . .	{Matching features related to ridge properties or fingerprint texture}
40/1382	. . .	{Detecting the live character of the finger, i.e. distinguishing from a fake or cadaver finger}
40/1388	. . . .	{using image processing}
40/1394	. . . .	{using acquisition arrangements}
40/14	. .	Vascular patterns
40/145	. . .	Sensors therefor
40/15	. .	{Biometric patterns based on physiological signals, e.g. heartbeat, blood flow}
40/155	. .	{use of biometric patterns for forensic purposes}
40/16	. .	Human faces, e.g. facial parts, sketches or expressions

40/161	. . .	{Detection; Localisation; Normalisation}
40/162	. . . .	{using pixel segmentation or colour matching}
40/164	. . . .	{using holistic features}
40/165	. . . .	{using facial parts and geometric relationships}
40/166	. . . .	{using acquisition arrangements}
40/167	. . . .	{using comparisons between temporally consecutive images}
40/168	. . .	{Feature extraction; Face representation}
40/169	. . . .	{Holistic features and representations, i.e. based on the facial image taken as a whole}
40/171	. . . .	{Local features and components; Facial parts (eye characteristics G06V 40/18); Occluding parts, e.g. glasses; Geometrical relationships}
40/172	. . .	{Classification, e.g. identification}
40/173	. . . .	{face re-identification, e.g. recognising unknown faces across different face tracks}
40/174	. . .	{Facial expression recognition}
40/175	. . . .	{Static expression}
40/176	. . . .	{Dynamic expression}
40/178	. . .	{estimating age from face image; using age information for improving recognition}
40/179	. . .	{metadata assisted face recognition}
40/18	. .	Eye characteristics, e.g. of the iris
40/19	. . .	Sensors therefor
40/193	. . .	{Preprocessing; Feature extraction}
40/197	. . .	{Matching; Classification}
40/20	.	Movements or behaviour, e.g. gesture recognition (recognition of facial expressions G06V 40/16)
40/23	. .	{Recognition of whole body movements, e.g. for sport training}
40/25	. . .	{Recognition of walking or running movements, e.g. gait recognition}
40/28	. .	{Recognition of hand or arm movements, e.g. recognition of deaf sign language (static hand signs G06V 40/113)}
40/30	.	Writer recognition; Reading and verifying signatures
40/33	. .	{based only on signature image, e.g. static signature recognition}
40/37	. .	{based only on signature signals such as velocity or pressure, e.g. dynamic signature recognition}
40/376	. . .	{Acquisition}
40/382	. . .	{Preprocessing; Feature extraction}
40/388	. . . .	{Sampling; Contour coding; Stroke extraction}
40/394	. . .	{Matching; Classification}
40/40	.	Spoof detection, e.g. liveness detection
40/45	. .	{Detection of the body part being alive}
40/50	.	Maintenance of biometric data or enrolment thereof
40/53	. .	{Measures to keep reference information secret, e.g. cancellable biometrics}
40/55	. .	{Performing matching on a personal external card, e.g. to avoid submitting reference information}
40/58	. .	{Solutions for unknown imposter distribution}
40/60	.	Static or dynamic means for assisting the user to position a body part for biometric acquisition
40/63	. .	{by static guides}
40/67	. .	{by interactive indications to the user}

40/70	.	Multimodal biometrics, e.g. combining information from different biometric modalities
2201/00		**Indexing scheme relating to image or video recognition or understanding**
2201/01	.	Solutions for problems related to non-uniform document background
2201/02	.	Recognising information on displays, dials, clocks
2201/03	.	Recognition of patterns in medical or anatomical images
2201/031	. .	of internal organs
2201/032	. .	of protuberances, polyps nodules, etc.
2201/033	. .	of skeletal patterns
2201/034	. .	of medical instruments
2201/04	.	Recognition of patterns in DNA microarrays
2201/05	.	Recognition of patterns representing particular kinds of hidden objects, e.g. weapons, explosives, drugs
2201/06	.	Recognition of objects for industrial automation
2201/07	.	Target detection
2201/08	.	Detecting or categorising vehicles
2201/09	.	Recognition of logos
2201/10	.	Recognition assisted with metadata
2201/11	.	Technique with transformation invariance effect
2201/12	.	Acquisition of 3D measurements of objects
2201/121	. .	using special illumination
2201/122	. .	Computational image acquisition in electron microscopy
2201/13	.	Type of disclosure document
2201/131	. .	Book
2201/132	. .	Book chapter
2201/133	. .	Survey article
2201/134	. .	Technical report or standard
2201/135	. .	Master, PhD or other thesis
2201/136	. .	Tutorial