

| | | | |
|-----|--|-----|---|
| 100 | APPLICATIONS | 134 | ...Blood cells |
| 101 | .Mail processing | 135 | .Reading paper currency |
| 102 | ..ZIP code | 136 | .Reading coins |
| 103 | .Target tracking or detecting | 137 | .Reading bank checks (e.g., documents bearing E-13B type characters) |
| 104 | .Vehicle or traffic control (e.g., auto, bus, or train) | 138 | ..Reading monetary amount |
| 105 | ..License plate | 139 | ..Reading MICR data |
| 106 | .Range or distance measuring | 140 | ...Including an optical imager or reader |
| 107 | .Motion or velocity measuring | 141 | .Manufacturing or product inspection |
| 108 | .Surface texture or roughness measuring | 142 | ..Bottle inspection |
| 109 | .Seismic or geological sample measuring | 143 | ..Inspection of packaged consumer goods |
| 110 | .Animal, plant, or food inspection | 144 | ..Mask inspection (e.g., semiconductor photomask) |
| 111 | .Textiles or clothing | 145 | ..Inspection of semiconductor device or printed circuit board |
| 112 | .Document or print quality inspection (e.g., newspaper, photographs, etc.) | 146 | ...Measuring external leads |
| 113 | .Reading maps, graphs, drawings, or schematics | 147 | ...Inspecting printed circuit boards |
| 114 | .Reading aids for the visually impaired | 148 | ...At plural magnifications or resolutions |
| 115 | .Personnel identification (e.g., biometrics) | 149 | ...Fault or defect detection |
| 116 | ..Using a combination of features (e.g., signature and fingerprint) | 150 |Faulty soldering |
| 117 | ..Using a characteristic of the eye | 151 | ...Alignment, registration, or position determination |
| 118 | ..Using a facial characteristic | 152 | ..Tool, workpiece, or mechanical component inspection |
| 119 | ..Using a signature | 153 | .Robotics |
| 120 | ...Sensing pressure together with speed or acceleration | 154 | .3-D or stereo imaging analysis |
| 121 | ...Sensing pressure only | 155 | LEARNING SYSTEMS |
| 122 | ...Sensing speed or acceleration only | 156 | .Neural networks |
| 123 | ...Sensing geometrical properties | 157 | ..Network learning techniques (e.g., back propagation) |
| 124 | ..Using a fingerprint | 158 | ..Network structures |
| 125 | ...Extracting minutia such as ridge endings and bifurcations | 159 | .Trainable classifiers or pattern recognizers (e.g., adaline, perceptron) |
| 126 | ...With a guiding mechanism for positioning finger | 160 | ..Generating a standard by statistical analysis |
| 127 | ...With a prism | 161 | ..Alphanumerics |
| 128 | .Biomedical applications | 162 | COLOR IMAGE PROCESSING |
| 129 | ..DNA or RNA pattern reading | 163 | .Drop-out color in image (i.e., color to be removed) |
| 130 | ..Producing difference image (e.g., angiography) | 164 | .Image segmentation using color |
| 131 | ..Tomography (e.g., CAT scanner) | 165 | .Pattern recognition or classification using color |
| 132 | ..X-ray film analysis (e.g., radiography) | 166 | .Compression of color images |
| 133 | ..Cell analysis, classification, or counting | 167 | .Color correction |
| | | 168 | HISTOGRAM PROCESSING |

| | | | |
|-----|--|-----|---|
| 169 | .With a gray-level transformation (e.g., uniform density transformation) | 199 | ...Pattern boundary and edge measurements |
| 170 | .With pattern recognition or classification | 200 | ...Measurements made on alphanumeric characters |
| 171 | .For segmenting an image | 201 | ...Point features (e.g., spatial coordinate descriptors) |
| 172 | .For setting a threshold | 202 | ...Linear stroke analysis (e.g., limited to straight lines) |
| 173 | IMAGE SEGMENTATION | 203 | ...Shape and form analysis |
| 174 | .Using projections (i.e., shadow or profile of characters) | 204 | ...Topological properties (e.g., number of holes in a pattern, connectivity, etc.) |
| 175 | .Separating document regions using preprinted guides or markings | 205 | ...Local neighborhood operations (e.g., 3x3 kernel, window, or matrix operator) |
| 176 | .Distinguishing text from other regions | 206 | ..Global features (e.g., measurements on image as a whole, such as area, projections, etc.) |
| 177 | .Segmenting individual characters or words | 207 | ..Waveform analysis |
| 178 | ..Separating touching or overlapping characters | 208 | ...With a tapped delay line |
| 179 | ..Segmenting hand-printed characters | 209 | .Template matching (e.g., specific devices that determine the best match) |
| 180 | .Region labeling (e.g., page description language) | 210 | ..Spatial filtering (e.g., holography) |
| 181 | PATTERN RECOGNITION | 211 | ...With electrically controlled light modulator or filter |
| 182 | .Limited to specially coded, human-readable characters | 212 | ..Nonholographic optical mask or transparency |
| 183 | ..Characters formed entirely of parallel bars (e.g., CMC-7) | 213 | ...Using both positive and negative masks or transparencies |
| 184 | ..With separate timing or alignment marks | 214 | ...With a display |
| 185 | .Ideographic characters (e.g., Japanese or Chinese) | 215 | ..Using dynamic programming or elastic templates (e.g., warping) |
| 186 | .Unconstrained handwriting (e.g., cursive) | 216 | ..At multiple image orientations or positions |
| 187 | .On-line recognition of handwritten characters | 217 | ..Electronic template |
| 188 | ..Writing on ordinary surface (i.e., electronics are in pen) | 218 | ...Comparator |
| 189 | ..With a display | 219 | ...Determining both similarities and differences |
| 190 | .Feature extraction | 220 | ...Calculating weighted similarity or difference (e.g., dont-care areas) |
| 191 | ..Multispectral features (e.g., frequency, phase) | 221 | ...Counting difference pixels |
| 192 | ..Feature counting | 222 |Using an Exclusive-OR gate |
| 193 | ...Counting intersections of scanning lines with pattern | 223 | ...Resistor matrix |
| 194 | ...Counting individual pixels or pixel patterns | 224 | .Classification |
| 195 | ..Local or regional features | 225 | ..Cluster analysis |
| 196 | ...Slice codes | 226 | ..Sequential decision process (e.g., decision tree structure) |
| 197 | ...Directional codes and vectors (e.g., Freeman chains, compasslike codes) | | |
| 198 |Extracted from alphanumeric characters | | |

| | | | |
|-----|---|-----|--|
| 227 | ...With a multilevel classifier | 263 | ..Highpass filter (i.e., for sharpening or enhancing details) |
| 228 | ..Statistical decision process | | |
| 229 | .Context analysis or word recognition (e.g., character string) | 264 | ..Lowpass filter (i.e., for blurring or smoothing) |
| 230 | ..Trigrams or digrams | 265 | ..Recursive filter |
| 231 | ..Checking spelling for recognition | 266 | .Edge or contour enhancement |
| 232 | IMAGE COMPRESSION OR CODING | 267 | ..Minimize discontinuities in dot-matrix image data (i.e., connecting or merging the dots) |
| 233 | .Including details of decompression | | |
| 234 | .Parallel coding architecture | 268 | ..Minimize discontinuities at boundaries of image blocks (i.e., reducing blocking effects or effects of wrap-around) |
| 235 | .Substantial processing of image in compressed form | | |
| 236 | .Interframe coding (e.g., difference or motion detection) | 269 | ..Minimize jaggedness in edges (e.g., anti-aliasing) |
| 237 | .Gray level to binary coding | 270 | .Variable threshold, gain, or slice level |
| 238 | .Predictive coding | 271 | ..Based on the results of a count |
| 239 | .Adaptive coding (i.e., changes based upon history, activity, busyness, etc.) | 272 | ..Based on a local average, mean, or median |
| 240 | .Pyramid, hierarchy, or tree structure | 273 | ..Based on peak levels |
| 241 | .Polygonal approximation | 274 | .Intensity, brightness, contrast, or shading correction |
| 242 | .Contour or chain coding (e.g., Bezier) | 275 | .Artifact removal or suppression (e.g., distortion correction) |
| 243 | .Shape, icon, or feature-based compression | 276 | IMAGE TRANSFORMATION OR PREPROCESSING |
| 244 | .Lossless compression | | |
| 245 | ..Run-length coding | 277 | .Transforming each dimension separately |
| 246 | ..Huffman or variable-length coding | 278 | .Correlation |
| 247 | ..Arithmetic coding | 279 | .Convolution |
| 248 | .Transform coding | 280 | .Fourier transform |
| 249 | ..Fractal | 281 | .Walsh, Hough, or Hadamard transform |
| 250 | ..Discrete cosine or sine transform | 282 | .Selecting a portion of an image |
| 251 | .Quantization | 283 | ..Using a mask |
| 252 | ..Error diffusion or dispersion | 284 | .Combining image portions (e.g., portions of oversized documents) |
| 253 | ..Vector quantization | | |
| 254 | IMAGE ENHANCEMENT OR RESTORATION | 285 | .Mapping 2-D image onto a 3-D surface |
| 255 | .Focus measuring or adjusting (e.g., deblurring) | 286 | .Measuring image properties (e.g., length, width, or area) |
| 256 | .Object boundary expansion or contraction | 287 | ..Detecting alignment marks |
| 257 | ..Dilation or erosion (e.g., opening or closing) | 288 | ..Determining center of gravity or moment |
| 258 | ..Line thinning or thickening | 289 | ..Determining amount an image is rotated or skewed |
| 259 | ..Skeletonizing | 290 | ...Where the image is a character, word, or text |
| 260 | .Image filter | 291 | ..Determining the position of an object |
| 261 | ..Adaptive filter | | |
| 262 | ..Median filter | | |

292 ...Where the object is a
character, word, or text

293 .Changing the image coordinates

294 ..Registering or aligning
multiple images to one another

295 ..To position or translate an
image

296 ..To rotate an image

297 ...Rotation of image is limited
to 90 degrees, 180 degrees, or
270 degrees

298 ..To change the scale or size of
an image

299 ...Raising or lowering the image
resolution (e.g., subpixel
accuracy)

300 ...Interpolation

301 ...Where the image is an
alphanumeric character

302 .Multilayered image
transformations

303 ..Pipeline processing

304 ..Parallel processing

305 .Image storage or retrieval

306 ..Using identification indicia on
document

307 .General purpose image processor

308 ..Morphological operations (i.e.,
local neighborhood operations)

309 **EDITING, ERROR CHECKING, OR
CORRECTION (E.G.,
POSTRECOGNITION PROCESSING)**

310 .Correcting alphanumeric
recognition errors

311 .Including operator interaction

312 **IMAGE SENSING**

313 .Hand-held

314 ..Sensing mechanism in stylus

315 ..Sensing mechanism in platen

316 .Curve tracer

317 .Sensor control (e.g., OCR sheet
controls copier or fax)

318 .Multiple scanning

319 ..Prescanning

320 .Magnetic

321 .Optical (e.g., OCR)

322 ..Single spot

323 ..Single line

324 ..Full retina

325 **MISCELLANEOUS**

FOREIGN ART COLLECTIONSFOR 000 **CLASS-RELATED FOREIGN DOCUMENTS**