Index

2D discrete Fourier transform, 25
2D paired transform, 319
2D tensor transform, 317
α-rooting, 24, 28
α-rooting image enhancement, 40, 42, 49
α-rooting method, 37

A
active contour algorithms, 85
adaptive threshold, 132
adaptive thresholding, 136
anatomical and functional imaging, 79, 82
arithmetical rays, 300, 311
AutoScan, 174

B
back-projection, 298
basis paired functions, 46
benign masses, 270
biophysical target, 81, 82
box-counting method, 275

C
cancer, 79
cancer diagnosis, 229
cancer localization, 237
capsule endoscopy (CE), 149
Cartesian lattice, 299
characteristic function, 31, 47
circular convolution, 40
clustering, 83
colonic polyps, 1, 9, 11
compactness, 276
complex wavelet transform (CWT), 213, 217
computed tomography (CT), 24, 80, 295
computer-aided detection or diagnosis (CAD), 4, 5, 12, 14, 230
computer-aided skin cancer diagnostic system, 174
contrast entropy, 24
control points, 320
convex hull, 153
convolution equations, 327
convolution filtering, 298
cosine transform, 301
CT colonography (CTC), 2
cyclic group, 31, 301

d
decryption, 65
delta symbol, 36
dermoscopy, 174
digital pathology, 236
direction image, 34, 47, 49, 60, 304
discrete cosine transform (DCT), 63
discrete Fourier transform (DFT), 301
discrete wavelet transform (DWT), 188
distance histogram, 133, 137
Index

E
encryption, 65
energy, 37, 53
enhancement measure, 37
extreme point, 155

F
fan-beam geometry, 295
feature extraction, 184
feature model, 174
feature selection, 174, 176
fluorescence in situ hybridization (FISH), 24
Fourier descriptors, 278
Fourier filtering, 298
Fourier slice theorem, 297
Fourier transform, 24
fractal, 273
fractal dimension, 270
fractional concavity, 276
fuzzy C-means (FCM) algorithm, 83

G
generators, 33, 39, 43
gometrical rays, 301, 309, 313, 327
gland segmentation, 241
Gleason grade maps, 237
Gleason grading, 231
graphics processing unit (GPU), 144

H
Hadamard transform, 301
Hartley transform, 301
Hausdorff dimension, 274
high-level concept, 184
high-level feature, 174
histological and textural features, 235
histology image segmentation, 238
histopathology image analysis, 235
histopathology images, 231
human visual system (HVS), 101, 115

I
image compression, 24, 61, 64
image cryptography, 24
image denoising, 301
image elements (IEs), 299
image enhancement, 24, 301
image reconstruction, 298, 326, 330
image signals, 26
impulse response, 43
iterative reconstruction, 298

K
kth series image, 53

L
level set approach, 86
line integral, 299, 308
linear programming boosting (LPBoost), 196
log-α-rooting, 24
low-level feature, 184

M
machine learning, 196, 247
magnetic resonance (MR), 79
magnetic resonance imaging (MRI), 24, 297
magnitude, 42
malignant tumor, 270
mammogram calcification detection, 212, 220
mammogram enhancement, 100, 101
mammography, 270
measure of enhancement, 29
medical imaging, 230
melanoma, 173
method of mapping, 72
MIASYS, 82
multifractal feature extraction, 214, 219
multimodality imaging, 79, 82
multiple-kernel learning (MKL), 196
multitask learning, 196

N
Nevoscope, 182
nonlinear unsharp masking (NLUM), 102, 106
nuclear segmentation, 240

O
optical imagining, 174

P
paired functions, 319
paired representation, 26, 304
paired splitting-signals, 55
paired transform, 42, 44, 46, 301, 327
parallel scanning, 298
parallel-beam geometry, 295
pattern recognition, 247
positron emission tomography (PET), 80
principle of superposition, 37, 53, 304
prostate cancer, 230
prostate cancer staging, 232

Q
quantitative measure, 26

R
radiotherapy, 80
Radon filtering, 298
Radon transform, 30
ray sums, 299
redirected image, 73
reduced convex hull (RCH), 153
region of interest (ROI), 182
region of interest identification, 184
resolution, 57
resolution map, 56
ruler method, 275

S
scale-invariant feature transform (SIFT), 188
series image, 56
series linear transformation, 57
shape factors, 276
skin lesion detection, 133
skin of a convex hull, 154
snake algorithms, 85
soft convex hull, 153
splitting-signals, 26, 33, 34, 40, 43, 301
support vector machine (SVM), 150, 212, 220
suspicious regions, 100, 113

telepathology, 255
tensor transform, 26, 34, 44, 301, 302, 304, 307
thresholding, 83
Toeplitz matrix, 311, 325
tomograms, 295
transferring the geometry, 305

U
ultrasound, 79
unsharp masking, 24, 28, 42

W
wavelet scaling, 39
wavelet thresholding, 39
wavelet transform, 24
weighted $\alpha$-rooting, 28

Y
YUV color space, 134, 136, 141, 143