

Index

A

adaptive quantized variational filter (AQVF) 238-244
 Adaptive Rood Pattern Search (ARPS) 106-107, 109, 113
 address event image sensors (AER) 15
 Address Processor (AP) 302, 310
 Ad Hoc Wireless Sensor Network 203
 Advanced Video Coding (AVC) 125, 129, 131-132
 ambient assistive living (AAL) 14, 17
 analysis of variance (ANOVA) 26
 analytical modeling 143-144
 Application Bit Rate (ABR) 126
 Artifact 202, 335-336, 339

B

background adapting 16, 251, 253
 backoff algorithms 10, 133-139, 143
 backoff inter frame space (BIFS) 140
 Base Station (BS) 2-3, 5, 7, 10, 12, 22, 26, 31, 59-61, 67, 72-74, 80, 86, 95-99, 276-277, 280, 282, 286-287, 293-294, 345-350
 Bayes Decision Rule 331, 339
 Bayesian inference 13, 162, 224-225, 243, 245
 binary exponential backoff (BEB) based algorithm 10, 133, 135-140, 143-145, 147-150, 156-158
 binary sensor networks (BSN) 226, 246-247
 binary variational filtering (BVF) 227, 238-239, 241-246
 biorthogonal filters 61, 64-65, 71-72, 75, 81, 83, 85-86
 Bit Error Rate (BER) 125
 Blob 15, 165, 173, 333, 339
 Block-Adaptive Wyner-Ziv coding (BAWZC) 51, 56
 Broadband and Wireless Networking (BWN) 275, 292

C

Carrier Sense Multiple Access/Collision Avoidance (CSMA/CA) 134-135, 139, 156-157
 center-surround (CS) process 6-7, 22-24, 38, 129, 132, 303, 315-316
 central processing unit (CPU) 61-62, 170, 238, 264, 275, 280, 285, 319, 322, 327-328
 channel coding 41-45, 58
 closed-circuit television (CCTV) 252
 close-minus-open (CMO) operation 315, 317-318
 Coiflet wavelet (CW) 61, 71, 90
 compressive sampling (CS) 6-8, 21-24, 28, 33, 37-38, 129, 131-132, 223, 303, 315-316, 336
 concentrator node 273
 Constant Bit Rate (CBR) 126
 Contention Window (CW) 135-136, 138, 140-142, 144-147, 149-151, 157
 Contextual Information (CI) 31, 115, 209-219
 Core Ontology for MultiMedia (COMM) 212, 220, 290
 cover-media 342, 344-346, 349, 356
 cyclic redundancy check (CRC) 49, 222, 355-356

D

Daubechies wavelet (DW) 61, 70-71, 75-78, 81, 83-84, 86
 Decomposition Level 59, 61-62, 67, 69, 72, 74, 76, 90, 93
 depth direction 256, 258-259
 Diamond Search (DS) 106-107, 109, 115
 Difference of Gaussian (DOG) 164-166
 Digital Djurpark project 326, 330
 Digital Signal Processing/Processor (DSP) 93, 120, 295, 327-328
 digital zoo 16, 325-326, 337
 discrete cosine transform (DCT) 5-6, 22, 25-26, 34, 45-48, 60, 90, 124

discrete Fourier transform (DFT) 27-29, 32-33
 discrete wavelet transform (DWT) 5, 7, 60-65, 67,
 70, 72-73, 89-90, 163, 304-306, 313-317, 319
 distributed image compression (DIC) 6-7, 19, 93
 Distributed Information Fusion (DIF) 199, 203-206,
 212-213, 215, 218
 Distributed Source Coding (DSC) 19, 41-42, 49,
 54-55, 57-58, 97-99, 128, 291
 distributed video coding (DVC) 4, 6-8, 18, 40-41,
 45-46, 48-58, 129, 131-132
 Double Increment Double Decrement (DIDD) 136-
 138
 Dynamic Backoff Algorithms 135

E

Embedding Capacity 346, 349, 356
 end device (ED) 280, 282-284, 286, 289, 292
 energy efficiency 2-5, 7, 10, 13, 17, 21-23, 93, 133-
 134, 137-139, 141, 143, 149-151, 153-156
 Energy Minimization 60, 93, 130-131
 Entropy 5, 42, 62, 89-90, 226, 344, 346, 349-350,
 353, 356
 Execution and Memory Access (EXMEM) 310
 Execution (EX) 96, 133, 227, 297, 299-300, 306,
 310-312, 319
 Exponential Increase Exponential Decrease (EIED)
 136-138, 157
 Extended Secure Aggregation for Wireless Sensor
 Networks (ESAWN) 342

F

Fast Collision Resolution (FCR) 136-138, 157
 Feature Vector 162, 164, 167, 285, 289-290, 331,
 339
 field of view (FOV) 2-4, 7, 66, 98, 177, 195, 218,
 254-256, 265, 278
 Field Programmable Gate Array (FPGA) technology
 16, 293-297, 319, 321-323
 filter length (FL) 59, 61, 64, 67, 70, 72, 74-78, 80-
 87, 89-90, 93, 222, 305, 355
 Finite State Machine (FSM) 282-283, 285
 Fisher Information (FI) matrix 31, 33, 236, 292
 Fixed Tree topology 347
 Four Step Search (4SS) 106, 109
 frequency domain 23-25, 27-29, 32-34, 37, 107,
 304
 front face 256, 258, 268
 Fusion Node (FN) 201

G

Gaussian noise 227, 229
 General State Evolution Model (GSEM) 229-231,
 244
 General Tracking Layer (GTL) 213-216, 218
 Global Positioning System (GPS) 286-288, 335-336

H

Haar wavelet (HW) 21-23, 29-32, 35, 37, 61, 70-71,
 81
 hash based approach 46
 Heterogeneous Lightweight SensorNet for Trusted
 Visual Computing (HoLiSTiC) 341
 High Level Information Fusion (HLIF) 198-199,
 203, 206-209, 212-215, 217, 219
 Histogram of oriented gradient (HOG) 164-165,
 175
 homography 12, 162-163, 168, 176-184, 187-191,
 193, 195
 Horizontal topology 347-348
 Human Visual System (HVS) 23, 26, 70, 123, 164,
 302-303

I

identification-friend-foe- neutral (IFFN) systems
 199
 image projection 251
 image sensors 1-2, 4, 15, 18-19, 22, 268
 improved backoff (IB) algorithm 10, 133, 136-153,
 156-157, 255
 Independent Source Coding (ISC) 98-99
 Information Fusion (IF) 13, 55, 197-204, 206-209,
 211-213, 218-223, 245, 297, 299, 308, 311-312
 Information-Sharing Strategy (ISS) 203-204, 206,
 219
 Information Theory 7, 37-38, 40-41, 55, 57, 115,
 226-227, 354, 356
 In-Network Distributed Processing 128, 132
 Input/Output Element (IOE) 7, 48, 51, 62, 65, 99-
 100, 130, 135, 189, 199-201, 207, 217, 219,
 253, 275, 281-282, 291, 295, 299, 303-306,
 308-315, 317
 Instruction Decode (ID) 115, 127, 297, 299, 309-
 312, 333
 Instruction Fetch (IF) 198-204, 206-209, 211-212,
 218-219, 223, 297, 299, 308, 311-312
 Instruction Set Architecture (ISA) 277
 Intelligent Transport Systems (ITS) 16, 273, 291-
 292

Index

Interactors 334, 339
Interest Points (IP) 118-119, 130, 162, 164-174, 264

J

JPEG compression 266, 277
just-sampling 260, 267

K

Karush-Kuhn-Tucker (KKT) 31
known camera matrix 185
Kullback-Leibler (KL) divergence 230, 232, 238

L

Laplacian distribution parameter 47
lapped biorthogonal transform (LBT) 5
Large Diamond Search Pattern (LDSP) 106
line sensor 16, 251-262, 264-269, 273, 276-280, 283-288, 290, 292
log-barrier algorithm 24-25, 33, 37
Logic Array Block (LAB) 295
Logic Unit (ALU) 299, 310
Lossless Compression 42, 69, 90, 123-124, 132, 244
Lossy Compression 69, 90, 123-124, 132

M

MAC protocol 10, 133-135, 139-141, 145, 150, 156-157, 276
mean absolute difference (MAD) 49, 105
Mean Square Difference (MSD) 105
mean square errors (MSE) 26, 44, 52
Medium Access Control (MAC) 10, 133-136, 139-141, 145, 148, 150-153, 156-157, 276, 285
Memory Access (MEM) 297, 299, 306, 310, 318
Microprocessor without Interlocked Pipeline Stage (MIPS) 293-295, 297-300, 304, 306-309, 313-319, 321-323
minimal energy reconstruction 33-34
mixture of Gaussians (MOG) 11, 100-101
mobile ad hoc network (MANET) 202-203
Model-World Metaphor 339
motion compensation interpolation (MCI) 49
multibank memory 301-302, 306, 308-313, 317-318
Multidisciplinary University Research Initiative (MURI) 220
Multimedia Wireless Sensor Network (MWSN) 118, 272-273, 275, 290, 292
Multiple Increase Linear Decrease (MILD) 136-138

mutual information 224, 226-227, 233-234, 245-246, 344, 356

N

network coding 130-132
Networked Sensor Tapestry (NeST) 341, 354
Network Node 2-3
Newton method 31, 33
New TSS 106
Normalized Cross-Correlation Function (NCCF) 105
Nyquist-Shannon theory 23

O

Ontology 197-198, 206-208, 212-214, 216-223
overlapped-sampling 259-260

P

P2P Network 203
Packet Error Rate (PER) 125
particle filtering (PF) 162, 226, 232-233, 238, 246
passive infrared (PIR) sensors 4, 254
Peak Signal to Noise Ratio (PSNR) 59, 61, 73-78, 80-82, 86, 88-90, 93, 106-107, 109-113
perfect reconstruction 67-69, 72, 88
Phase-Only Correlation (POC) 9, 94, 107-113
POC-Guided Area Matching (PGAM) 108-109, 112-113
Predicted Cramér-Rao Bound (PCRB) 227, 236, 245
Predictive Video Encoding (PVE) 9, 94, 97, 104
preventative steganalysis 16, 340-346, 349, 353, 356
probability distribution function (PDF) 18-19, 26, 50, 122, 290, 321
Program Counter (PC) 144, 147, 238, 297, 299
Pulse Code Modulation (PCM) 122

Q

Quality of Service (QoS) 10, 116-117, 121, 125-128, 130-134
Quality Resolution 125, 132
quantized particle filter (QPF) 227, 238-240, 242-245
Quantized Proximity Observation Model 228, 238
quantized target tracking 224
quantized variational filtering (QVF) algorithm 224-227, 230, 232, 234-236, 238, 244-245

R

Radio Frequency (RF) 225, 280
 RAMOSAC 171
 Random Access Memory (RAM) 6, 170, 238, 276, 295, 311, 327-328
 Random Sample Consensus (RANSAC) algorithm 8, 17, 174
 Random Tree topology 347
 rate-compatible-punctured codes (RCPT) 48, 51
 real time clock (RTC) 14
 Recursive Running Average (RRA) 103
 Reduced Instruction Set Computing (RISC) 294, 322, 327
 Region-Based-Wyner-Ziv video codec 8, 40
 Regions of Interesting (ROI) 163
 Relay Tracking 162, 170, 172, 175
 Root Mean Square Error (RMSE) 237-239, 241-242, 245

S

Scalable Video Coding (SVC) 112, 115
 Scale-invariant feature transform (SIFT) 162, 164-166, 333
 Scene Understanding 198-199, 201
 second-order cone program (SOCP) 25, 33
 Sensor networks 1-2, 6, 14, 16-18, 21-22, 37-40, 54, 58-60, 66, 91-93, 114-120, 130-136, 138-140, 156-157, 163, 173, 177, 194, 197-199, 202-204, 219-222, 224, 226-227, 243, 245-247, 251-254, 273, 276, 280, 283, 290-293, 320-327, 329, 337-342, 345, 353-356
 sensor selection 224, 226, 233-234, 245
 short inter frame space (SIFS) 140, 144
 signal to noise ratio (SNR) 26, 61, 73, 112
 Simple and Efficient TSS (SETSS) 106, 109
 Slepian-Wolf Codec 45, 48-49
 Slepian-Wolf theorem 41-42
 Small Diamond Search Pattern (SDSP) 106
 Social Media 334-335, 339
 sparsity control 8, 21-23, 26-27, 29, 37
 speed-up robust features (SURF) 162, 164-168, 170-173, 175
 Stanford Wyner-Ziv coding architecture 8, 40
 Static Backoff Algorithms 135
 stationary blur 259, 271
 steganalysis 16, 340-346, 349, 353-356
 steganalyst 342-343, 353
 steganographic security 16, 340, 345, 347-349, 353-354

steganography 16, 340, 342-346, 349, 353, 355-356
 stego-media 342
 Structural SIMilarity index (SSIM) 59, 61, 73-76, 81, 90, 93
 Sum of Absolute Differences (SAD) 105-106, 108-109
 Sum of Squared Differences (SSD) 164
 surveillance 4-5, 12, 15-16, 18, 22, 38, 40, 53, 55, 94-95, 117, 119, 132, 167, 173-179, 184, 193-195, 198-199, 211-212, 220-221, 223, 251-252, 255, 266, 269, 272-273, 275-276, 290, 292, 303, 340-341, 345-346, 349-350, 354
 Symlet wavelet (SW) 42, 44, 46-47, 49, 51, 61, 70-71, 81, 83-84, 86-87, 90

T

target counting 251, 269
 temporal-perspective projection 257
 the synchronization effect 182-183
 third-generation surveillance applications 211
 Three Step Search (TSS) 106-107, 109
 trajectory based motion estimation 46
 transmission 2, 4-5, 7-8, 10, 12, 22-23, 35, 37, 43, 45, 51, 60, 66, 91-93, 95-98, 112-113, 116-118, 120-121, 123-130, 132, 134-137, 140-150, 160, 206, 225, 229, 235, 238, 251-254, 260, 264, 267-268, 276, 282, 291, 294, 339, 342, 347, 349-353
 two-dimensional (2D) image 16, 23-24, 26, 32, 37, 95-96, 104, 108, 113, 165, 185, 191-192, 204, 251-255, 261, 276, 280, 282, 290, 295, 300

U

Ubiquitous 18, 52, 55, 221, 270, 334, 339, 354-355
 uniform power for quantization (QVF-U) 227, 238, 240, 242, 245

V

Variable Bit Rate (VBR) 126
 variational filtering (VF) 224-227, 230, 233, 238, 242-243, 246-247
 Vertical or straight line topology 347
 Video Event Markup Language (VEML) 212
 Video Event Representation Language (VERL) 212, 221
 virtual heights 186-191
 visual camera nodes (VCNs) 2-5, 7, 10
 Visual Cluster Head (VCH) 2-3, 7
 Visual Data Coding (VDC) 96-97, 112-113

Index

Visual Human Tracking 12, 160, 175
Visual Monitoring (VM) 274, 292
Visual Sensor Networks (VSNs) 1-10, 12-17, 59-62, 64-74, 76, 80, 83, 86, 89-90, 93-99, 104, 112-113, 198, 204-206, 211-215, 218-219, 293-295, 300, 303, 319
visual sensor (VS) 1-2, 5, 14, 16-18, 21-22, 37-38, 59-62, 64-67, 69-75, 78-80, 83-94, 99, 104, 114-115, 141, 151-155, 163, 173, 194, 197-199, 204, 211, 219-222, 241, 251, 259, 269, 293-294, 323, 325-326, 329, 332-333, 336-340, 355

W

wavelet-based coder (WBC) 9, 59-62, 66-67, 89, 93
wireless camera networks (WCN) 12, 18, 160-162, 165, 172, 174
wireless image sensor networks (WISNs) 2, 92, 290
Wireless Line Sensor Network (WLSN) 280, 283, 290, 292

wireless multimedia sensor networks (WMSNs) 2, 14, 17, 92, 114, 116, 118-120, 123-132, 275, 290, 292, 320-321, 338-339, 355
Wireless Sensor Networks (WSNs) 1-3, 6, 10, 13, 17-18, 22, 34, 38-39, 66, 91-95, 112-114, 116-120, 122-123, 128, 130-134, 136, 139-141, 143, 156-157, 177, 203, 224-226, 229, 235, 238, 243-246, 251-252, 254, 266-267, 272-277, 279-280, 286, 290-292, 294, 321-322, 324, 326-327, 333-339, 341-342, 354-356
Wireless visual sensor networks (WVSNs) 2, 4, 7, 17, 21-25, 27, 31, 34, 37, 40-41, 53-55, 93, 251, 269, 325-326, 329, 332, 336-338, 340-353
Wishart distribution 229, 232, 249
Write Back (WB) 297, 299, 306, 310-312
Wronskian Change Detector (WCD) 101-103, 113
Wyner-Ziv Encoding Procedure 47
Wyner-Ziv theorem 41