Index

A
absolute equivalence 149
accelerometer 192-193, 198, 230, 276
accessory remote control 272-273
Adaptive Slot Assignment Protocol (ASAP) 22
Ad-Hoc On demand Distance Vector (AODV) 25
ALLIANCE architecture 34, 171
analog/digital (A 118
Ant Colony Optimization (ACO) 21, 56
Apex robot 162, 165-173, 178-181, 184
Application Program Interface (API) 207
Application Specific Integrated Circuits (ASIC) 207
Army Research Laboratory (ARL) 280
Artificial Intelligence (AI) 89, 105
Artificial Neural Network 96, 105
artificial Neural Network 96, 105
artificial vision system 124, 138, 140-141
Australian Centre for Field Robotics (ACFR) 280
Automated Guided Vehicles (AGV) 149
Autonomous Underwater Vehicle (AUV) 186, 188
autoregressive with external input (ARX) 60

B
backpropagation 97-98, 100
B-MAC 22
Broadcast of Local Eligibility (BLE) 33, 172

C
Carnegie Mellon Robot Navigation Toolkit (CAR-MEN) 174
Central Processing Unit (CPU) 90
chemical adhesion 238-239
chromosome 127
communication bandwidth 164-165, 167, 171, 173, 181
compone complete state transition model 10
Complex Programmable Logic Devices (CPLD) 207
computational power 164-165, 167-168, 171, 173, 181
Computer-Aided Design (CAD) 188
Computer-Aided Engineering (CAE) 188
conflagration 108
control architecture 89-90, 92-93, 95, 105, 202-203, 210, 234
Control Area Network (CAN) 189
control law 59, 61, 70-71, 77, 79
Control Lyapunov Function (CLF) 59
control science 59-60
control volume 260-261
convolution 87-88
coordination episode 168-173, 179
crossover 42-43, 45, 52, 127, 131-132, 141
crown and rack 191
crown and worm 191
CSMA 22-23, 30
Custom Computing Machine (CCM) 207
Cyber-Physical Systems 20-21

D
data-centric 21-23
data router 21
data source 21, 60
decomination graph 109
deliberative approach 93, 105
Destination Sequenced Distance Vector Routing protocol (DSDV) 25
Digital Signal Processor (DSP) 280
direct current (DC) 59-60
Direct Sequence Spread Spectrum (DSSS) 283
domotics 258, 270
Dynamically Field Programmable Gate Array (DFGA) 207
Dynamic Source Routing (DSR) 25

E
electrostatic adhesion 238
Erasable Programmable Logic Devices (EPLD) 207
Index

**F**
- Fast Fourier Transform (FFT) 207
- Feasible Label Routing (FLR) 25
- Field Programmable Gate Array (FPGA) 206
- flatness system 150
- floater 259-260, 266, 268
- FPGA-based Custom Computing Machines (FCCM) 207

**G**
- gasket 191, 198, 265
- Genetic Algorithms (GA) 21
- Geographic Adaptive Fidelity (GAF) 23
- Geographic and Energy-Aware Routing (GEAR) 23
- global navigation 81
- Graphical User Interface (GUI) 174, 176
- Guaranteed-Time Slot (GTS) 23

**H**
- Hardware In-the-Loop (HIL) 210
- hybrid approach 22, 42, 47, 95, 105
- hydroblasting 238, 247
- Hydropower Plant (HPP) 186
- hydrosandblasting 238

**I**
- infrared sensors (IR) 118
- Intellectual Property Core (IP-CORE) 207
- Interlaced Extended Kalman Filter (IEKF) 1
- Interlaced Kalman Filter (IKF) 3, 7

**K**
- Kalman filter 1-4, 7, 9, 17, 26, 51, 80-84, 87, 122, 213-214, 233

**L**
- LegoLibrary 253
- Lego Mindstorms 280
- Lego NXT 253
- LegoSimulationLibrary 253
- Light Detection And Ranging (LIDAR) 26
- Line Of Sight (LOS) 284
- Local Access Networks (LANs) 3
- local navigation 81
- Low-Power Wireless Personal Area Networks (LoWPANs) 23
- Low-Rate Wireless Local Area Networks (LR-WPANs) 22

**M**
- Markov Localization 82-87
- mechanical adhesion 240
- Metric-Based Iterative Closest Point (MbICP) 5
- million instructions per second (MIPS) 208, 212
- Minimum Mean Square Error (MMSE) 7
- Mobile Ad hoc NETwork (MANET) 2, 280
- mobility-constrained system 112
- Monte Carlo Localization 80, 82, 86-87, 126, 184
- Multiple-Input Multiple-Output (MIMO) 60, 64
- multi robot task allocation 20, 33, 56
- mutation 42, 45, 127-128, 131

**N**
- navigation 81
- node-search problem 109
- noise 86
- Non-Line-Of-Sight (NLOS) 284

**O**
- observation model 5-6, 10-11
- omnidirectional movement 262
- Operated Control Unit (OCU) 280
- Optimized Link State Routing (OLSR) 25

**P**
- particle filter 4, 16, 86-88
- path loss 276-277
  - free space path loss 276
  - path loss model for indoor space 277
- path planning 11, 19-21, 26, 28, 39-41, 43-45, 49-57, 59, 61, 123-126, 134, 138, 140, 142, 144-147, 183, 234
- path relaxation 124, 146
- Personal Area Network (PAN) 282
- Phase Locked Loop (PLL) 83
- pneumatic adhesion 239
- posterior probability density function 6
- potential field 40, 116, 122, 126, 128, 132-133, 135-137, 141-145
- printed circuits boards (PCB) 62
- Programmable Logic Devices (PLD) 207
- pseudo-random binary signal (PRBS) 60
- pulse width modulation (PWM) 62

**Q**
- Quality-of-Service (QoS) 22, 28
Index

R
Radio Frequency (RF) 3, 211
rCommPort 251-252
reactive approach 94-95, 106
Received Signal Strength Indicator (RSSI) 196, 281, 290
reconfigurable hardware 202-203, 206-209, 228
reconfigurable logic 207, 209
Remotely Operated Vehicles (ROVs) 187
reproduction 127
road planning 126, 147
RoboCup Rescue Physical Agent League Competition 164
RobotBASIC 248-253, 256-257
RobotBASIC Robot Operating System (RROS) 253
robotics mobile 90
robot tracker 4
ROMEO 271-274, 276-278
route parameterization 152-153

S
sandblasting 238, 244, 247
Scheduling by Edge Reversal (SER) 108-109
sensor-motor 95, 100
Sensor Protocols for Information via Negotiation (SPIN) 23
Shuffled Frog Leaping (SFL) 126
SIFT 22, 52
SIMULINK 60, 210, 219-220, 222-224
Simultaneous Localization and Mapping (SLAM) 1, 26
Single-Human Multiple-Robot System (SHMRS) 162, 164
Single-Input-Output (SISO) 60
sink decomposition 109-110, 112
S-MAC 22
subordinate robot 167-171, 173
SURV-TRACK 19-20, 26-33, 39-40, 49

T
teleoperation 62, 164
time Division Multiple Access (TDMA) 22
tracking 81

U
Unmanned Underwater Vehicles (UUVs) 187
Urban Search and Rescue (USAR) 162-163

V
Virtual Force Field method (VFF) 125
Von Neumann machine 207
vortex-chemical 241
vortex-electrostatic 242
vortex-magnetic 241
vortex-mechanical 242
vortex method 238
vortex-vacuum 242

W
waypoint 167-168, 176, 179, 181
Webots 108, 115, 117, 119-120
wheeled mobile robot (WMR) 60
wheel sensing 266
Wi-Fi, Infrared (IR) 211
WiseMAC 22, 50

X
Xbee 238, 272, 274, 283, 286, 289-290

Z
Ziegler Nichols 60
ZigBee 4, 12, 18, 251, 272, 278, 280, 285, 289