

Index

Symbols

1G 196
 1G analog 98
 1G analog cellular networks 95
 1G analog mobile standards 96
 1G cellular mobile networks 97
 1G generation mobile cellular networks 97
 1G mobile networks 95
 1G networks 95
 2.5 G Digital 98
 2.5 generation mobile network 102
 2-D Strings 1569
 2G 196
 2G cellular mobile communication standards 100
 2G cellular mobile networks 100
 2G cellular networks 675
 2G digital 98
 2G digital communication technologies 96
 2G GSM networks 103
 2G Japanese digital cellular standard 101
 2G mobile communication standards 96, 101
 2G standards 96, 99, 100
 2G+ digital 98

2nd generation (2G) mobile systems 1423
 3D audio 95
 3D video 95
 3-dimensional (3D) 1125
 3G 194, 197, 1320, 1324, 1618
 3G (third generation mobile network) 1750
 3G base station 104
 3G broadband mobile communications 103
 3G cellular mobile networks 103
 3G digital 98
 3G handset 103
 3G mobile cricket 112
 3G mobile multimedia services adoption 182–192
 3G networks 103
 3G services 106
 3G speeds 106
 3G standard 96
 3G technology 108, 197
 3G characteristics and applications 105
 3G future of 108
 3G/EDGE deployment strategies 108
 3G/UMTS (3rd Generation Universal Mobile Telecommunications System) 1431

3GPP (3rd Generation Partnership Project) Technical Specification Group 1431
 3rd generation (3G) mobile communication 1423
 3rd generation networks 1317
 4G 489
 4G cellular mobile networks 108
 4G digital 98
 4G mobile communication networks 96, 112
 4G mobile communication standards 94
 4G mobile networks 1422
 4G network architectures 109
 4G networks 94, 107, 108
 4G networks, characteristics 108
 7-group cell patterns 98

A

A New Global Environment for Learning (ANGEL) 1071
 AAA (authentication, authorization, and accounting) 836, 1635
 ABCD (Action for Boston Community Development) 1287
 Absolute Category Rating (ACR) 1498
 abstract-iconic 445
 accentuation 1607
 acceptance model for mobile technology and services 200
 access control 517
 access control lists 667
 access control mechanisms 665
 access control services 665
 access router 619
 accurate presentation 95
 ACL (see asynchronous connectionless) 659
 acoustic diagrams 442
 acoustic media 441
 Active Fingerprinting 550
 active slots 102
 Active Worlds Educational Universe (AWEDU) 1136
 ad hoc mode 1779
 ad hoc networks 123, 1770
 ad hoc-environments 122
 adaptation 1592
 Adaptation Manager 842
 adaptive and light weight security system 111
 Adaptive Content Selection 1626
 adaptive hypermedia 1169
 Adaptive Hypermedia Overview 1621
 Adaptive Hypermedia Systems 1622
 Adaptive interfaces 841

Adaptive Multimedia Systems 1492
 Adaptive Navigation Support 1626
 Adaptive Presentation 1626
 ADDIE 900
 ad-hoc 109
 ad-hoc sensor networks 96
 adoption behaviour 193
 adoption strategies 193
 ADSL 991
 advanced 3G system 103
 advanced audio coding (AAC) 1426
 Advanced Mobile Phone Service (AMPS) 95, 97
 advanced mobile technologies 194
 advanced video coding (AVC) 1428
 advanced video coding (AVC) 603
 agent-based paradigms 1617
 aggregation 127
 amplitude modification 742
 AMPS 97, 98, 99
 analog broadcasting 95
 analog cellular networks 100
 analog cellular system 97
 analog cellular technologies 97
 analog devices 643
 analog mobile communication standard 100
 analog mobile telephone standard 100
 analog mobile telephone technology 96
 analog service 97
 analog-to-digital converter (ADC) 600
 animation 95, 604, 1090
 annotation 1367
 antenna system 97
 anti-malware protection software 677
 anti-spyware 675
 anti-virus 675
 anti-virus products 693
 anti-virus security software 693
 anti-virus software companies 693
 AoI (see areas of interest) 1004
 Aperto Networks 643
 API (see application programming interface) 659
 App Developers 639
 Apple iTunes Music Store 1730, 1732, 1735, 1742
 application
 application layer framing (ALF) 1636
 application perspective layer (APL) 1432
 application servers (AS) 495, 497, 499
 application-layer authentication 684
 areas of interest (AoI) 1004
 artificial life 309
 asymmetric encryption methods 1716

- asymmetrical digital subscriber loop (ADSL) 592
asynchronized modes 1643
asynchronous
 asynchronous transfer mode (ATM) 269
 asynchronous collaborative learning 1161
 asynchronous service discovery 121
atomic functions 1604
Attrasoft Image Finder 272
audio applications 1429
audio coding 1425
audio coding schemes 1425
audio compression techniques 100
audio conferencing 615
audio data transmission 617
audio generation 1703
audio restoration attack 750
audio watermarking 552, 731
audiolingual approach 1043
augmented reality (AR) 1127, 1148, 1600
authenticate marking 774
authentication 793
authentication requirements 677
authentication, authorization, and accounting (AAA)
 1635
authoring end-user device 2
automated cinematography 841
automatic network system discovery 110
automatic selection of a network system 111
automatic speech recognition (ASR) system 892
autonomy 1159
available channel capacity 96
AVATON 998
average revenue per user (ARPU) 196
Aviation Industry Computer-Based Training Committee (AICC) 422
- B**
- back-end layer 1628
bandwidth 103, 104, 1095
bandwidth efficiency 622
base station (BS) 619, 622
base station controller 97
Bayesian model 516
Bayesian network-based multimedia knowledge
 representation framework 888
behavioral profile 1620
behaviorism 901
billing system 112
biometric identification 696
biometric technology 692
biometric user authentication 667
- biometrics 667
bit rate 95
bit rate transmission 96, 109
bit-error rate (BER) 750
bitmap image 1427
bitstream watermarks 739
Blackboard 1130
blind watermarking 775
block-based image 1451
Blooms Taxonomy 1072
Bluetooth 94, 109, 645, 655
Bluetooth devices 671
Bluetooth technology 194, 671
Boneh-Shaw Fingerprint Scheme 550
boundary modifications 297
branding technique 1311
bricolage-type activity 988
broadband communication 96
broadband integrated service digital network (B-ISDN) 648
broadband Internet connection 102
broadband networks 95
broadcast monitoring 739
business games. learning 1353–1359
business idea 1336
business model types 1343
business model typology 1334–1343
- C**
- cable modems 3
cache 1779
caches 1777
CAL (computer-assisted learning) 1093
CALL 1045
call admission control policy 1435
call admission controller (CAC) 1401, 1408
CapXML 1687
cartographic data 1003, 1006
cartography teaching 1196
CDMA 639
CDMA (code-division multiple access) 1431
CDMA2000 1xEV 98
cell clusters 98
cell patterns 98
cell site switch (CSS) 104
cell structures 103
cells 96
cells in a cluster 98
cells, neighboring 97
cellspace 721
cellular analog technology 95

- Cellular Digital Packet Data (CDPD) 95
 cellular mobile communication technology 97
 cellular mobile telephone networks 96
 character-driven VEs 841
 chat rooms 1664
 circuit switched network 96
 circuit-switched mobile telephone network 101
 class structure 1072
 client/server architecture 474
 clustering 97, 12, 1457
 CML (computer-manager learning) 1094
 coalition attack secure fingerprinting 548
 code developers 1348
 Code-Division Multiple Access (CDMA) 101
 coding techniques 1422
 cognition 988
 cognitive behavior 1443
 cognitive functionality of multimedia 1216–1232
 cognitive learning theory (CLT) 466
 cognitive load 68
 cognitive media types 438
 cognitive psychology 608, 1603
 cognitive science 1209
 cognitive style analysis (CSA) 1482
 cognitive theory of multimedia learning (CTML) 454, 458
 cognitive tools 466, 903
 coherence principal 1096
 collaboration annotations, filtering 257
 collaboration knowledge access 257
 collaborative consultations, enriching 254
 collaborative e-business 1367
 collaborative filtering (CF) 233, 235
 collaborative group learning 1070
 collaborative learning 391, 1070, 1157, 1195
 collaborative learning environment with virtual reality (CLEV-R) 1140, 1147
 collusion attack 752
 collusion secure fingerprinting 548
 color similarity 1554
 Color Masked Signal to Noise Ratio (CMSNR) 1268, 1275
 commercial SMS 195
 communication engineering 636
 communication infrastructure technologies 194
 Composite Capability/Preference Profiles (CC/PP) 559, 560, 561
 Comprehensive User Requirements 1619
 compression performance 1442
 compression techniques 95, 1422
 compression technologies 95
 Computational Models of Attention 1444
 computed tomography (CT) 1148
 computer forensics 663
 computer generated graphics 95
 computer literacy 1653
 Computer Management Instruction (CMI) 422
 computer supported cooperative working 95
 Computer-aided design and manufacturing (CAD/CAM) 269
 computer-based simulations 1353
 computer-based training (CBT) 1085
 computer-mediated communication (CMC) 1089
 Computer-mediated communications 1170
 computers and communication technology 1078
 Computer-technology-related questionnaires 1053
 computing platform, single 94
 concept map 611
 conceptualizations of “distance” 1296
 concrete-iconic 445
 Conference of European Posts and Telegraphs (CEPT) 100
 congestion 1786
 congestion control 103, 1634
 congestion experienced (CE) 1640
 conjoint analysis 185
 connection security management 677
 Connectivity 449, 638
 constrained generating procedures (CGP) 306
 constructivism 609, 901
 constructivist learning theory 1195
 content aggregation model (CAM) 421
 content management systems (CMS) 1194
 content presentation 1626
 content-based filtering 235
 content-based image retrieval 1512
 content-based image retrieval (CBIR) 268, 280, 1553
 content-based retrieval 244
 content-based retrieval system 883
 content-level quality 1278
 content-targeting attack 796
 context awareness 152, 154
 context extractor (CEx) 512
 context-awareness 1016
 contextual learning 390
 continuous media 1768
 continuous media object 1274
 Continuous Quality Scale (CQS) 1498
 contrast sensitivity function (CSF) 1395, 1444
 converged networks, evolution toward 1790
 cooperation policy 1779

- cooperative group learning 1070
cooperative learning 1070, 1157, 1195
copy prevention 293
copyright owner identification 739
CORAL 1739
core semantics 442, 446, 447
Core Semantics and Emergent Semantics 441
country-to-country communication 196
course management system (CMS) 1071
Credential Evaluator (CEv) 512
critical thinking 1195
cross-media relevance model 885
cryptographic operations 678
cryptographic signatures 668
cryptography 771, 1715
CS-1 103
CS-2 103
CS-3 103
CS-4 103
CSD 98
cumulative color histograms 1555
customer identification 548
cyber-literacy 1166
cyclic redundancy codes (CRC) 668
- D**
- D-AMPS 98, 101
data collection 207
data communication, interruption of 617
data compression 16
data flow 559
data hiding process 292
data layer 854
data link 97
data mining 510, 1360
data network Internet 101
data networking technologies 194
data rates 95
data services 101
data speed 105
data storage 1623
data structure tutorial system 1210
data transfer 101, 102
data transfer 617
data transmission 100, 617
database management systems (DBMS) 224
datagram congestion control protocol (DCCP) 1635
DCCP (datagram congestion control protocol) 1635
decomposed theory of planned behaviour 199
dedicated connection 101
defining multimedia 1089
- deformation 449
Degraded Category Rating (DCR) 1498
delay variance 1422
delivering content 1592
denial-of-service (DoS) attacks 678
Design for Multimedia in Learning (DML) 1157
design theory 1603
Desktop Video Conferencing system (DVC) 1273
detection mechanism 1275
device manufacturers 639
Device/Channel Characteristics 1627
diagrammatic forms of representation 445
dial telephone networks 96
dial-up connection 101
didactic contract 909
didactic economy 904
didactic problématique 899
differential forms 443
DiffServ code point (DSCP) 496
Diffserv networks 618
diffusion 200
Digital AMPS (D-AMPS) 96, 100, 101
digital audio broadcast (DAB) 109, 166
digital broadcasting medium 1381
digital cameras 5
digital cellular communication standards 100
digital curriculum 41
digital data service 95
digital divide 1286
digital encoding 100, 196
digital information age 770
digital item adaptation (DIA) 1596
digital library 279
digital media 794
digital multimedia broadcasting (DMB) 166, 1377
digital multimedia broadcasting (DMB) technology 164
digital multimedia broadcasting, current status 164–181
digital multimedia training 1286–1294
digital music industry value chain 1733
digital radio 1429
digital radio technologies 100
digital rights management (DRM) 293, 1707
digital signature 776, 794
digital signing 678
digital teachers 41
digital television 183
digital typography 725
digital video 603
digital video broadcasting (DVB) 1426

- digital video broadcasting handheld (DVB-H) 661
digital video broadcast-terrestrial (DVB-T) 109
digital watermark 678
digital watermarking 292, 551, 770, 772, 795
digitized documents 95
digitized graphic arts 95
digitized pictures 95
directed instruction 24
directional 3D sound 442
directory agent (DA) 119
discursive environment 1195
display styles 1605, 1611
Disruptive Students 49
distance education 1067
distance learning 1058
distance teaching 36
distanced leadership 1295–1302
distributed cognition 442
distributed coordination function (DCF) 1399
distributed multimedia databases 223–232
distributed multimedia systems 619
distributed service directories 120
dither watermarking 743
divisive contrast normalisation mechanism 1275
DMB phone price 175
Domain knowledge 1623
dots per inch (dpi) 601
downlink 105
downloading capabilities 196
downloads to portable devices 195
DReaM 1736
DSL 645
dual identity 105
dual-mode handsets 105
duplicated video packets 622
DVB-H (digital video broadcasting handheld) 661
dynamic authoring 331
Dynamic Bayesian Network (DBN) 527
dynamic classifier selection (DCS) 516
dynamic QoS management interface 1435
- E**
- EAP (Extensible Authentication Protocol) 673
EAP authentication exchange messages 674
EAP-TLS (EAP-Transport Layer Security) 673
EAP-TTLS (EAP-Tunneled Transport Layer Security) 673
e-business transactions 1367
EDGE 98
EDGE networks 108
EDGE support 108
- education 36
educational multimedia 25
educational multimedia technologies 1653
educational software development methods 900
educational software model 921
Educational Technology 1034
educational television 1079
e-health 490
electric telecommunications 1431
electroacoustic 945
electrocutaneous stimulators 1264
electronic data archives 1206
electronic learning 36
embedded collaborative systems (ECS) 1193, 1195
embedded system 472
e-medicine 976, 976–984
emergent properties 443
emergent semantic systems, characteristics of 307
emergent semantics 305, 448
emerging all-IP networks 1789–1797
emotional design in multimedia learning, model 1253
EMS advantages 131
enabling multimedia applications 474
encryption 678, 693
encryption software performance measurements 699
encryption techniques 103
end handoff 619
end-to-end QoS 835
end-user device 2
enhanced data rates for GSM evolution (EDGE) 1010
enhanced messaging service (EMS) 100, 131
Equal Average Bit Rate (EABR) 1496
ERC (edge router & controller) 684
ergonomics 45
error rate 1422
e-services 1016
Ethereal 624
European roaming 95
EVE project 1138
evolution of digital mobile systems 1431
evolution of mobile systems 1431
evolution of telecommunications 1431
examples demonstration 935
exercises resolution 935
expanding radio spectrum 103
experiential learning 391
experiential learning environments 390
Extended ASCII codes 1424

Extended ASCII sets 1424
Extended TACS (ETACS) 100
extroversion 1630

F

facilitating conditions 205
false positive rate (FPR) 755
fast mobile Web browsing 103
fault tolerance 111
FDD 105
Feature-based Multimedia Semantics 446
feature-based taxonomy 451
fiber-optic cable 8
field dependence/independence 1479
fieldwork data collection 207
file masking 667
file transfer 101, 102
film semiotics 1459
filtering 100, 516
fingerprint authentication 691, 692
fingerprinting 292, 739, 787, 1720
firewall products 697
firewall programs 696
firm routing calls 106
first generation (1G) cellular mobile networks 97
Fisher's license model 1738
fixed wireless communication systems 1431
fixed-mobile convergence (FMC) 105
flexible learning 1410
FMC 105, 107
FMC, advantage of 106
FMC, characteristics 105
FMC, implementation of 105
foreign agent (FA) 616, 618, 623
Formal Concept Analysis (FCA) 449
formative evaluation 924
fourth generation (4G) cellular mobile networks 108
FPLMTS (Future Public Land Mobile Telecommunications System) 647
fragile watermarking 798
fragile watermarks 738
frequencies 96
frequencies, clustering 97
frequencies, lower 99
frequencies, upper 99
frequency bands 101
frequency distribution 103
frequency division duplex (FDD) 105
frequency division multiple accesses (FDMA) 99
frequency repetition 98

frequency reuse 96, 98
frequency scalability 1594
frequency spectrum 108
front-end hexagonally sampled quadrature mirror fi 1275
Front-End Layer 1625
full-duplex transmission 96
functional aspect 365
functional transparency 105

G

G cellular mobile communication standards 100
Galvanic Skin Resistance (GSR) 1276
GAP (see generic access profile) 659
gateways 495
Gaussian kernel 882
Gaussian Minimum Shift Keying (GMSK) 101
Gaussian-mixture models (GMM) 890
General Packet Radio Services (GPRS) 101, 197, 1010
genotype 306
geographic information systems (GIS) 216, 443
gestic media 441
gestural control 942, 947, 954
global mobility freedom 104
global roaming 96, 103, 104, 112, 196
global satellite networks 109
Global System for Mobile Communications (GSM) 96, 100, 196, 479, 1431
global virtual teams (GVTs) 1303
global virtual teams, leadership competencies 1303–1310
GOEXP (see generic object exchange profile) 659
GPRS 639, 669
GPRS 96, 98, 194
GPRS (general packet radio service) networks 1431
GPRS core network 101
GPRS network 101
GPRS support node (GGSN) 494
GPS (see global positioning system) 1312
granularity 453
graphic interchange format (GIF) 601
graphic traces of movement 441
graphical content 435
graphical design 436
graphical media 440
graphical user interface (GUI) 326, 721, 1141
graphical user interface (GUI) design 143
group list management 495
GSM 96, 98, 99, 100, 194, 479, 639, 669
GSM network 101, 196, 676

GSM popularity 196
 GSM technology, advantages of 196
 GSM, evolutions of 101
 GSM, popularity of 100
 GUI elements 1435

H

half-duplex communication mode 96
 half-toned images 299
 handheld device 154
 handheld radio frequency scanner 99
 handoff 616
 handoff latency 111
 handoff latency 617, 624
 handoff latency, high 617
 handoff latency, large 617
 handoff management 111
 handoff performance 617
 handoff schemes 615
 handoff schemes for multimedia transmission 615
 handoff with mobile node 616
 haptic media 441
 Haptics 1263
 hash 127
 HCLP (hybrid content location protocol) 124
 head mounted displays (HMDs) 1148
 head related transfer function 755
 head-of-line blocking delay 1636, 1642
 hermeneutic 396
 heterogeneity 511
 heterogeneity management 513
 heterogeneous device 998
 heuristic methods 890
 hexagonal cells for a coverage area 97
 hexagonal cellular regions 98
 hexagonal zones 96
 HI (host identity) 683
 hidden Markov model 886
 hierarchical cell structure (HCS) 96, 103
 hierarchical cell structure, example 104
 high performance radio LAN (HIPERLAN) 109
 high powered radio 96
 high quality video 95
 high signaling traffic 617
 High Speed Circuit Switched Data (HSCSD) 101
 high transmission mobile services 94
 higher capacity system 98
 higher-level learning 608
 higher-order learning 1090, 1648
 higher-order thinking skills 4
 high-fidelity CD-quality audio 95

high-level features 318
 high-performance computing for multimedia retrieval 226
 high-quality multimedia transmission 1423
 high-speed transmission 108
 HIP (host identity protocol) 683
 HIP-related research projects 683
 histogram intersection 1555
 holographic 233
 HomeRF (HomeRF) 645
 host identity (HI) 683
 host identity protocol (HIP) 683
 host mobility 616
 hot spot 1114
 human activity system (HAS) 1080
 human auditory system (HAS) 755
 human computer interaction 152
 human computer interaction (HCI) 79
 human perception of quality 1422
 human visual system 1442
 human visual system (HVS) 1395, 1495, 1534
 hybrid content location protocol (HCLP) 124
 hybrid filtering 236
 HyperCard 986
 hypermedia 1090
 hypermedia video links 218
 hypertext markup language (HTML) 602

I

iconic 445
 iDEN 98
 IEEE 802.11 standard 1428
 IETF Transport Area Working Group (TSVWG) 620
 IKE (Internet Key Exchange) 682
 illegal file sharing 1709
 image-based applications 1430
 Improved Mobile Telephone Service (IMTS) 96
 IMS 479, 489
 IMS architecture 1791
 IMS charging identifier (ICID) 496
 IMS motivation and standardization 1791
 IMS network architecture 492
 IMS service control 495
 IMS service integration 496
 IMS service provisioning 499
 IMS session management 499
 IMS, key components 1791
 independent component analysis (ICA) 770, 779
 independent learning 1070
 indexical 445

- indigenous learning approaches 1034
individual learning 1070
info pyramid 1592
information dissemination 770
information infrastructure 510
information lens 233
information literacy 1166
information processing quality 1233, 1234, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1245
information retrieval 770, 1560
information retrieval (IR) technologies 243
information security 509
information technology 268
information types 28
infotainment 1478
infrared (IR) 644
Infrared Data Association (IrDA) 644
innovation diffusion theory (IDT) 198, 200
INR (intentional name resolver) 119
INS (intentional naming system) 119
instant messaging (IM) 253
instructional design 436, 451, 994, 1096
instructional technologies 1194
integration layer 856
intellectual property (IP) 279, 771
intellectual property rights 279
intelligent agent 610
intelligent home appliances 96
intentional naming system (INS) 119
interactive electronic communities 1078
Interactive Feedback Tool 1042
Interactive High Multimedia 649
Interactive Learning Modules (ILM) 1071
interactive multimedia 94
interactive screens 721
interactive television 1, 95
interactive video 1643
interactivity 3, 77, 439, 468, 1090
interactivity research 79
inter-channel interferences 101
interdependence 1159
interface design 1248–1261
international roaming 101
Internet facilities for mobile users 96
Internet protocol version 6 (IPv6) 479
Internet, multicast transmission 1781
interoperability 121
inter-operator identifier (IOI) 496
interpersonal skills 4
interrogating call state control function (I-CSCF) 492, 1793
interworking 109
Intonation 1049
intrusion prevention tool 675
INVITE-exchange method 685
IP multicasting 809
IP multimedia subsystem (IMS) 1789–1797
IP multimedia subsystem (IMS) 491
IP networks 616
IP security protocol (IPSec) 496
IP-based backbone 109, 112
IP-based mobile communication (4G) networks 111
IP-based mobility management 111
IP-based services 183
IP-core heterogeneous networks 108
IP-core networks 96
- J**
- J2ME 602
Japan International Cooperation Agency (JICA) 1032
Japanese Digital Cellular (JDC) 1431
Java Virtual Machine (JVM) 119
JINI 137
jitter 16, 1266
JPEG 601
JPEG (Joint Photographic Experts Group) 1426
JPEG 2000 1427
JPEG 2000 Wireless (JPWL) 1427
JPEG 2000 Wireless (JPWL) methods 1428
JPEG standard 1427
JPEG type compression techniques 1430
JPEG2000 601
JVM (Java Virtual Machine) 119
JXTA 133
JXTA core building blocks 135
JXTA versus .NET 137
- K**
- keitai 722
keitai map 726
kernel 656
key-frame images semantic annotation 882
keypad of the mobile device 196
Kiribati 1031
knowledge construction 1096
knowledge management 253
knowledge management infrastructure 1085
knowledge worker 1079
Kuleshov experiments 528

L

labeling-based techniques 794, 1535
 laboratory environment 41
 land-base fixed communications 95
 latency in data transmission 617
 latent semantic analysis 885
 lattice 447
 layered encoded video 1783
 layered encoding 1785
 layers of simplicity 1034
 leadership competencies 1303
 learner confidence 1233, 1234, 1236
 learning communities 989
 learning environments 1652
 learning management systems (LMSs) 419
 learning management systems, evaluating 57–76
 learning object databases 1206
 learning object metadata (LOM) 421, 452, 456
 learning process 36
 learning styles 466, 609, 1094
 light weight security system 111
 linguistic literacy 1166
 linguistic structure 438
 link key 671
 link signal strength 618
 location-based multimedia services for tourists 998–1007
 location-based services (LBS) 198, 1312
 location-independent service 637
 logical media parts 373
 long-ranged data analysis 510
 look-at-this (LAT) applications 1430
 lost device 664
 low complexity 1233
 low powered output 98
 low quality video 95
 lower interference 98
 low-fidelity speech 95

M

machine translation research 884
 macro (urban) cells 108
 macroblock 1273
 malicious software 662
 management message modified 1402
 MANET (see mobile ad-hoc network) 837
 manual switching 102
 mapping 68
 market evolution 637
 Markov chain 618

Markov Model Mediator (MMM), 1553
 Marshall Islands 1031
 MAX/MSP 945, 950
 Mayer's cognitive theory of multimedia learning 1252
 MBMS (multimedia broadcast/multimedia service) 661
 mean opinion score (MOS) 1265, 1501
 mean square error (MSE) 1393
 mean squared error (MSE) 1441
 media access controller (MAC) 1408
 media and modality 436
 media elements, audio 94
 media elements, image 94
 media elements, text 94
 media elements, video 94
 media gateway controller function (MGCF) 495
 media ontology 888
 media selection guidelines 30
 media Semantics 305
 medical image archiving 793
 memory-limited mobile devices 472–477
 message authentication codes (MAC) 668
 messages, decrypt 99
 messages, encrypt 99
 metadata binding 293
 metadata generation 865, 867
 meta-information 1429, 1607
 m-health 479
 middle layer 1627
 middleware 1016
 military intelligence 794
 mindtools 899
 miniaturization 637
 Minimum Bounding Rectangle (MBR) 1571
 MIP handoff 626
 MIP handoff latency 617
 mixed-mode approach 1652
 m-learning 607
 MMS (multimedia messaging service) 151, 1325, 1750
 MMS composer 140
 MMS Kiosk 137
 MMS Kiosk design 142
 MMS peer 137
 MMS services 195
 MMS versus e-mail 132
 mobile ad hoc network 127
 mobile ad-hoc networks 1437
 mobile audio commercials 1429
 mobile business models 1335

- mobile buyers needs 1329
mobile cellular users 99
mobile communication 113, 151, 153, 154
mobile communication systems 1423, 1431
mobile communication technologies 94, 98, 197
mobile communication technologies, 1G 94
mobile communication technologies, 3G 94
mobile communication technologies, generations of 94
mobile convergence 105
mobile device access 107
mobile device limitations 1327
mobile device security 662
mobile devices, and multimedia 590–598
mobile entertainment 107, 599–606
mobile host (MH) 615, 619
mobile multimedia communications 1423
mobile multimedia communications 95, 96
mobile multimedia computing 1326
mobile multimedia content 1423
mobile multimedia for commerce 1326–1333
mobile multimedia networks, generations of 96
mobile multimedia research 682
mobile multimedia systems 1423
mobile multimedia telediagnostic environment (MMTE) 979
mobile multimedia-based service delivery channels 1618
mobile node (MN) 616, 623
mobile sales force automation 106
mobile sales force automation, schematic diagram 106
mobile services, acceptance model method 206
mobile services, future research 210
mobile services, high transmission 94
mobile services, key challenges 112
mobile services, proposed model of acceptance 207
mobile services, qualitative stage 206
mobile services, quantitative stage 208
mobile technologies 1617
mobile technologies and services 193
mobile technologies, managerial implications 208
mobile technology and services, acceptance model 200
mobile telephone standard 96
mobile telephone users 97
mobile terminal 103, 104, 109, 1779
mobile terminal manufacturers 637
mobile terminals 94, 110, 151, 196
mobile terminals, key challenges 110
mobile ticket reservations 195
mobile transmission systems 1424
mobile video conferencing, research issues 683
mobile video streaming 1320
mobile video telephony 1430
mobile VoIP 107
mobile wireless devices 615
mobile wireless technology, current status 164–181
mobility patterns 1772
mobility prediction model 1771
mobility problem 616
modified discrete cosine transform (MDCT) 1426
modulation technique 101
Moore's Law 7
motivational theories 200
multicast 127
multiframe coder 618
multiframe video coding 618
multiframe-block motion compensation (MF-BMC) approach 618
multi-homing 617, 619
multikey indexing 269
Multi-Level Content Analysis 515
Multimedia Cartography 1193
multimedia annotation 1368
multimedia applications 1423
multimedia authentication 793
multimedia authoring 329, 1643
multimedia authoring systems 3
multimedia authoring tools 1197
multimedia composition 340
multimedia computing power 183
multimedia content adaptation 85
multimedia data 96, 109, 223, 510
multimedia data transfer 627
multimedia data, transmission of 1786
multimedia database management systems (MDBMS) 270, 1108
multimedia databases 216–222, 268, 580, 581, 584, 585, 589, 1105
multimedia digital libraries 280
multimedia educational environment 1157
multimedia electronic mail 95
multimedia elements 94
multimedia end-user devices 1
multimedia hardware 809
multimedia in wireless networks 615
multimedia information filtering 233–241
multimedia instruction 1181
multimedia instruction, benefit 1671
multimedia instruction, effective planning 1668–1682

multimedia instructional design 26
multimedia interactivity on the Internet 77–84
Multimedia Learning Environment (MLE) 1071
Multimedia Learning Model 1157
multimedia literacy 6
multimedia management products, known 219
multimedia materials 608
multimedia media 3
multimedia message service (MMS) 1325
multimedia messages service (MMS) 599
multimedia messaging 130
multimedia messaging peer 129–150
multimedia messaging service (MMS) 1425, 1430
multimedia messaging service (MMS) 151, 194, 197
Multimedia messaging service (MMS) 1750
Multimedia Messaging Service (MMS) 648
multimedia middleware 1750
multimedia multicast conferences (MMC), 1410
multimedia opera, interactive systems 942–957
multimedia over wireless networks 615, 617
multimedia presentations 1644
Multimedia principle 1096
multimedia principles 1095
Multimedia Production 990
multimedia queries 217
multimedia real-time gaming 103
multimedia representation, annotation-based 581, 584, 587
multimedia representation, clustering-based 581, 582, 587
multimedia representation, decision-tree-based 581, 583, 587
multimedia representation, representative-region-based 581, 582, 587
multimedia retrieval 224
multimedia security 510
multimedia semantics 848
multimedia transmission 615, 617
multimedia units (MMU) 619
multimedia units (MMUs) 622
multimedia, applications of 95
multimedia, instructional design principles 20
multimedia, interactive 94
multimedia, professional development issues 21
multimedia, what is it? 1670
multimodal representation 95
multi-modality 246
multimodality 436, 438
multimode mobile terminal 111
multimode mobile terminals 110

multiple watermarking 772
multiplexing 101
multiplexing technology 101
multipurpose Internet mail extensions (MIME) 1425
multi-scale random field (MSRF) 886
multi-tier information transmission processes 1429

N

NAI (network access identifier) 684
Naïve-Bayes 516
Narrative Manager 842
narrative multimedia learning 393
NAS (network access servers) 684
network bandwidth 3
network charts 448
network connection security 675
network diagram 448
network layer-based industry 615
network survivability 111
network systems 110
Network-Level Quality 1265
networks, cellular 94
networks, home 94
networks, personal 94
Neuroticism 1630
New User Profiling 1627
news application 1750
news markup 1750
news markup language 1750
news through a mobile phone 195
NGN (see next generation network) 837
noise visibility function (NVF) 776
nomadic nurse 261
non-cellular analog mobile system 98
non-cellular technology 97
non-IP based networks 111
nonparametric density 883
non-player characters (NPCs) 840
Non-Strict Authentication 1539
non-textual information 1425
notebook computers 194
notebook design, patient vital signs 262

O

object repositories 457
objectification 907
object-oriented technologies 1015
Olympic scoring 5
on-demand multimedia 2

- on-demand real time telephone network access 95
one way communication 96
on-line education 95
ontology 1714, 1750
ontology objects 374
ontology-based classification 1750
OntoMedia 864–879
OntoMedia core ontology (OMCO) 870, 872, 873, 874
open and distance learning (ODL) 1088
open environments 903
Open Mobile Alliance (OMA) 492, 1425, 1714
open service access (OSA) 491
open service architecture (OSA) 496, 499
OpenScape 253
open-source software business initiatives 1344–1352
operating environments 103
operational system (OS) 659
operator revenue 107
optical character recognition (OCR) products 269
optical line terminal (OLT) 680
optical network units (ONU) 680
Optimal Adaptation Perception (OAP) 1499
Optimal Adaptation Trajectory (OAT) 1492
OS (see operational system) 659
OSS business models 1347
OSS history 1345
- P**
- PABX 105
packet data services 102
packet encryption 685
packet interchange 108
packet switched network 96, 101, 1423
packet transmission 1403
packet-switched infrastructure 809
Pair Comparison (PC) methods 1498
PANA (protocol for carrying authentication for network access) 684
parallel multimedia databases 223–232
parametric stereo (PS) 1426
participatory content design 392
passive consumption 85
path management module 618
pattern extraction 605
PDA design 263
peak signal to noise ratio (PSNR) 1268, 1393, 1441, 1449, 1495
pedagogic theory 1643
pedagogical principles 1648
- peer-to-peer 130
peer-to-peer model 134
peer-to-peer networks (P2P) 1712, 1723, 1737
people subsystem 1080
perceived ease of use (PEU) 191
perceived quality of service (PQoS) 1392
perceived usefulness (PU) 191
perception-based approach 441
perceptual distortion metric (PDM) 1450
perceptual hashing 1720
perceptual quality metrics 1442
perceptual Semantics 1449
personal digital assistants (PDA) 615
personal digital assistants (PDAs) 194
personal digital assistants (PDAs) 648
personal firewalls 677
personal information management (PIM) 865
personal mobility 661
personal photo libraries, interactive browsing 1508–1533
personal verification 100
personalization techniques and paradigms 1621
person-machine interface 637
person-to-person video call 108
pervasive computing 1016
pervasive narrative experience 394
phenotype 306
phone quality audio signals 1425
pico-cell 104
picture-based password 691
PIN (personal identification number) 692
pivot point displacement 1435
pixel fonts 725
pixel per bits 638
PKI (public key infrastructure) 696
plasma screens 723
PNG (Portable Network Graphics) 1426
PocketPCs 194
PoI (see points of interest) 1004
points of interest (PoI) 1004
PON (passive optical network) 680
portable handheld devices 196
portable network graphics (PNG) 602
predictive positioning 1770
pre-paid accounts 100
presence agent (PA) 494
presence server (PS) 494
presence service (PS) 494, 499
presence user agent (PUA) 494
presentation design 31
presentation layer 474, 859

presentation-oriented modeling 365
pre-shared key (PSK) 672
principal component analysis (PCA) 319
privacy 205, 517, 1360
privacy management 510
privacy seal 1363
problem solving, cognitive functionality 1216
problem-based learning (PBL) 399, 1072
proprietary software 1346
public key infrastructure (PKI) 621
public switched telephone network (PSTN) 495
pulse code modulation (PCM) 1425

Q

QoS in mobile networks 1432
QoS management 1435
QoS negotiations 1432
QoS on user quality of perception 1271
QoS protocols 1422, 1432
QoS provision 1435
QoS provisioning 618, 1435
QoS request 1432
QoS requirements 1429, 1434
QoS routing protocol 1435
quality assessment 1596
quality control 496
quality model 1265
quality of perception (QoP) 1477
quality of service 16
quality of service (QoS) 104, 270, 479, 491, 500,
510, 559, 560, 591, 643, 1399, 1408, 1422,
1781
quality of service (QoS) parameters 111
quality of service (QoS) requirements 678
quality of service (QoS), in multimedia multicast
conference applications 1409–1421
quality scalability 1594
quality, cost temporal (QCTT) model 1434
query-by-example (QBE) 244, 320

R

RA cache 618
RA entry 618
radio channels 103
radio frequency (RF) 96, 642, 644
radio frequency channel 100, 101
radio frequency scanner 96
radio networks 637
radio telephone network 96
radio waves 104

radio-based transmitter 96
radiographs 409
RADIUS (remote authentication dial-in user ser-
vice) 673
raster data processing engine 1001
real time applications 500
real time transmission protocol / real time control
transmission protocol (TRP/RTCP) 501
realism 989
real-time data analysis 510
real-time embedded multimedia systems 1016
real-time interaction 107
real-time multimedia applications 617
real-time multimedia transmission 111
real-time paradigms 1617
Real-Time Streaming Protocol (RTSP) 420
Real-time Transport Control Protocol (RTCP) 678
Real-Time Transport Protocol (RTP) 420, 661
Regulation of emotions 1631
relevance feedback 321
remote access 103
remote sensing 1609
remote wireless surveillance 103
resource description format (RDF) 867, 868, 869,
873, 877, 878, 879
resource reservation 1435
resource reservation protocol (RSVP) 496
resynchronization process 785
Reusable Learning Assets (RLA) 457
revenue models 1337
reversible watermarking 803
rich site summary 1751
rights description languages 1714
RLAN 1618
roaming, American 95
roaming, European 95
robust copyright marking 774
Robust Security Network (RSN) 642
robust watermarking 774
robust watermarks 738
robustness 782
router advertisement (RA) cache 622
router advertisements (RA) 618
routing costs 105
RTP (see real-time transfer protocol) 476

S

saccades 1443
sales force automation (SFA) 106
SAs (service agents) 119
satellite DMB 1380

- satellite-based communication systems 1432
scaffold efficacy 1165
scaffolding 409, 1160
scaffolding theory 1647
scalability 124, 128
scalable coding 89, 1592
scalable vector graphics (SVG) 602
scheme-targeting attack 796
Schwenk Fingerprint Scheme 550
scientific visualisation community 436
SCTP multi-homing 619
SDAP (see service discovery application profile) 659
SDP (session description protocol) 483
SDS (service discovery service) 120
seamless access 616
seamless IP-diversity based generalized mobility architecture (SIGMA) 617
seamless MPEG-4 streaming 618
seamless multimedia over Mobile networks 618
seamless multimedia transmission 619
seamless video 618
second generation (2G) cellular mobile networks 100
second generation of wireless devices (2G) 196
second-generation (2G) 639
secret keys 737
Secure Real-time Transport Protocol (SRTP) 678
secure universal mobility (SUM) 682
secured communication 96
security software 691
self-directed learning 398
self-directed learning (SDL) 399
self-scripted video 1053
semantic aspect 365
Semantic gap 322
Semantic gap, definition of 309
semantic model 1442
Semantic Multimedia Content 1627
Semantic pack 1758
Semantic pre-filtering 1447
Semantic Segmentation 1445
Semantic service discovery 121, 122
Semantic structure 881
Semantic Web technology 864, 877
Semantics 848, 1595
Semantics of multimedia 443
semi-fragile watermarking 795
semi-fragile watermarking schemes 802
semiotic structure 438
semiotic turn 443
semiotics 435, 443, 1603
Sender-based rate control 1493
sensitive examination technique (SET) 400
sensory modalities 1069
serial port profile (SPP) 659
service capability features (SCF) 496
service discovery service (SDS) 120
service location protocol (SLP) 119
service oriented architecture (SOA) 492
service-oriented multimedia componentization model 559, 560, 562
services capabilities 499
serving CSCF (S-CSCF) 492
session description protocol (SDP) 483, 491
session initiation protocol (SIP) 479, 491
Session Initiation Protocol (SIP) 661
Session Management Module (SMM) 512
SFA software 106
SFA, current problem 107
SGM learning challenges 1182
Sharable Content Object Reference Model (SCORM) 456
shared cultural environment 395
Shared Wireless Access Protocol (SWAP) 645
Shockwave file format 328
short message service (SMS) 100, 129, 130, 194, 1325, 1425, 1750
short message service (SMS), advertising 1311–1316
single frame-block motion compensation (SF-BMC) 618
single mobile terminals 110
singular value decomposition (SVD) 885
SIP (session initiation protocol) 479
situated learning and cognition 989
situated multimedia for mobile communications 151–163
SLA (see service level agreement) 822
SLP (service location protocol) 119
smart phone 1, 194, 196, 201
SMIL 2.0 452
SMIL Encoding 452
SMIL-enabled 419
SMR formatting language (SM-FL) 1697
SMR synchronization information (SM-SI) 1702
SMS (short message service) 1325, 1750
SMS advantages 130
SMS disadvantages 130
SMS text messaging 100
SNR level 618
social cognitive theory (SCT) 198

- software development economics 1346
 software engineering for mobile multimedia 1008–1021
 sound 600–606, 1090
 sound recording 793
 sound waves 95
 SPAM 1316
 spatial awareness 1609
 spatial contiguity principle 1096
 spatial scalability 1594
 spectral band replication (SBR) 1426
 spectrum licensing 103
 speech 441
 speech analysis tools 1046
 speech signal 95
 speech tool 1051
 speech-oriented communications 636
 SPIM 1316
 SQL (Structured Query Language) 121
 SSDP (simple service discovery protocol) 118
 SSL (secure sockets layer) 696, 821
 station management entity (SME) 1402
 statistical time division multiplexing (STDM) 1423
 steganography 292
 still image applications 1430
 still image coding 1426
 still image transmission 1430
 still images 95, 1423
 Stochastic model 1556
 stream control transmission protocol (SCTP) 619, 1635
 streaming multimedia 615
 streaming technology 1319
 streaming video 1772
 Structured Query Language (SQL) 121
 student Autonomy 1159
 student Interaction 43
 student types 45
 student-generated multimedia (SGM) 1181–1192
 subject portals 1206
 subnets 615
 subscriber identity module (SIM) card 196
 subscriber service profile (SSP) 494
 substance 443
 summary schemas model (SSM) 585, 586, 587
 surround sound 95
 Swedish PTT Televerket 1431
 Symbian 656
 symbolic music extensible format (SM-XF) 1685
 symmetric encryption methods 1715
 synchronous connection oriented (SCO) 659
 synthetic speech 1090
 Systems theory 1196
- T**
- TACS 95, 98, 99
 tactile 1263
 tagged image file format (TIFF) 601
 taxonomic information about the representational 435
 taxonomies in graphic design 436
 taxonomies of media 436
 taxonomy 1601, 1611
 TCP/IP network infrastructure 616
 TCP/IP networks 1425
 TCP-friendly rate control (TFRC) 1635
 TDMA 639
 TDMA technique 101
 teamwork quality construct (TWQ) 1354
 technology acceptance literature, review 198
 Technology Acceptance Model (TAM) 183, 198, 199
 telediagnostic environment, features 980
 tele-health 490
 telemedical applications 976–984
 telemedicine 251, 479, 490
 telephony 1618
 temporal contiguity principle 1096
 Teo-Heeger model 1275
 terminal mobility 104, 111
 terrestrial DBM 1382
 terrestrial networks 104
 text coding 1424
 TFTP (see trivial file transport protocol) 476
 TG3 (high rate) 646
 TG4 (low rate) 646
 theory of planned behavior (TPB) 183, 198, 199
 theory of reasoned action (TRA) 183, 198, 199
 Theory of Transactional Distance 1156
 thermal displays 1264
 third generation (3G) 479
 third generation (3G) cellular mobile networks 103
 third generation (3G) mobile network 1750
 time division duplex (TDD) 105
 time varying signals 95
 Time-dependent media objects 1273
 Time-independent media objects 1274
 Time-to-Collision (TTC) 529
 tool logic 900
 tool subsystem 1080
 Total Access Communication System (TACS) 95, 97, 99

traditional learning environments 1654
traitor tracking 788
transaction tracking 770
transactional distance 1159
transactional watermarks 740
transcoding 89, 1592
transmission 637
transmission efficiency 618
transmission of control packets 618
transmission of duplicated video packets 618
transmission of multimedia data 503
transmission of multimedia information 1422
transmission perspective layer (TPL) 1432
transmoding 1595
transplantation attack 797
transport layer handoff schemes 615
triangle routing 617
trivial file transport protocol (TFTP) 476
TV direct to your mobile 103
two way voice communications 99

U

UAs (user agents) 119, 483
ubiquitous communications 96
ubiquitous computing 607, 1009, 1601
UDP-Lite 1635
UI (see user interface) 656
ultrasonic friction displays 1264
UMB 98
UMTS (universal mobile telecommunications system) 479
unicast 501
Unicode 1425
unified billing system 112
unified theory of acceptance and use of technology (UTAUT) 199
universal multimedia access (UMA) 88, 1592
usage time zone 112
user device 1429
user interface 153, 158, 159, 1435
user interface layer (UIL) 870
user interfaces 334
user mobility 117, 636
user perspective layer (UPL) 1432
user predisposition 200
user presence 254
user profile management 1625
user profiles 236
user profiling 1620
user requirements 1619
user satisfaction 1592

USIM (universal SIM) 668
USIM card 668
UWC 639

V

V-Card 1317, 1318, 1319, 1324
vector quantization attack 796
verbal and pictorial 437
verbal representations 1096
verbal/numerical 437
verbo-tonal system 1047
Verbo-tonalism 1047
vernacular metaphors 1032
Vernacular Metaphors 1036
Video 1090
video applications 1430
video caches 1772, 1774
video calling 103, 107
Video Classification Scheme (VCS) 1269
video coders 1442, 1447
video conferencing 96, 103, 615, 1423, 1428, 1430
video data 527
video data indexing 527–546
video data transmission 617
video entertainment services 108
video instrument 942, 952
video messaging 107
Video Metamodel Framework (VIMET) 1457
video object (VO) 1462
video on demand 103
video phone 95, 96, 1430
Video Quality Metric (VQM) 1495
video retrieval systems 527
video services 107
video streaming 103, 197, 1320, 1428
video telephony 103
video transmission 1431
video watermarking 553
video, high quality 95
video, low quality 95
videoconference 1393
virtual classroom 1084
virtual dental clinic 414
virtual environments 838, 1643
virtual pediatric diabetic patient 403
virtual private networks (VPNs) 194
virtual reality (VR) 1263, 1646
virtual reality modeling language (VRML) 604
virtual university 1084
virus intrusion 196
visual and cognitive processing 1629

visual attention processing 1629
 visual feature extraction 1513
 visual video analysis 890
 visualization styles 1602
 visuo-spatial working memory (VSWM) 1219
 voice communication 100
 voice data services 102
 voice delivery 111
 voice over Internet protocol (VoIP) 595
 voice over IP (VoIP) 491
 voice service 95
 VoIP 105
 VOIP integrated mobile services 107
 VoIP mobile 107
 VPN (virtual private network) 695
 VPN client 695
 VPN products 697
 VPN technologies 682

W

W4 1618
 WAN (Wide Area Network) 252
 WAP (wireless application protocol) 1425
 WAP GET command 1425
 WAP, benefits of 197
 WAP, challenges 197
 WAP-compatible mobile devices 197
 WAP-compatible Web pages 197
 watermark embedding algorithm 777
 watermark embedding scheme 776
 watermark extraction 778
 watermark recovery 774
 watermarking 678, 732, 793, 1718
 watermarking algorithms 552
 watermarking scheme 770
 watermarking techniques 678
 watermarking technology 270
 WAVE file 600
 wavelet transform 1430
 wayfinding 1602
 WCDMA (wide-band CDMA) 3G mobile network
 1431
 W-CDMA networks 109
 WCDMA technology 1432
 Web-based Distance Learning 1645
 Web-based learning 1643
 Web-based multimedia 1174–1180
 WebCT 1194
 Web-enabled phones 194
 Weber’s Law of Just Noticeable Difference (JND)
 1498

Wideband CDMA (WCDMA) 639
 Wideband Code Division Multiple Access (WCDMA) 103
 WiFi (wireless fidelity) 194, 642
 Wi-LAN 643
 WiMAX 643
 wireless access points 615
 Wireless Application Protocol (WAP) 196
 wireless application protocols (WAP) 1010
 wireless broadband service 106
 wireless channels 618
 wireless clients 619
 wireless communication (1G) 196
 wireless communication network 1399
 wireless communications 85
 wireless connections 1423
 wireless data networks 615
 wireless devices, 2G 196
 wireless devices, 3G 197
 wireless environment, privacy 205
 wireless environment, security 205
 wireless IP network 616
 wireless link 617
 wireless local area networks (WLAN) 109
 wireless markup language (WML) 1330
 wireless media 615
 wireless mobile devices 611
 wireless mobile networks 617
 wireless multimedia application 1399
 wireless personal area networks (WPANs) 646
 wireless technologies, evolution of 195
 wireless transport security layer 1331
 wire-line based video phones 1430
 wire-line networks 1428
 workflows 251
 working memory 1630
 workplace technology 103

Z

zip drive 50