DR. A P J ABDUL KALAM UNIVERSITY, INDORE

SYLLABUS

of

MASTER OF TECHNOLOGY (COMPUTER TECHNOLOGY & APPLICATION)

Department of Computer Application

(Second Year)

(Session July- December 2017)

College of Engineering

Dr. A P J Abdul Kalam University, Indore

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Master of Technology (Computer Technology & Application)

Department of Computer Application

List of Subject (Second Year)

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Unit 1 : Introduction:–: Data Mining: Definitions, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

Unit 2: Association Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori, Partition, Pincer search etc., Generalized association rules. Clustering paradigms; Partitioning algorithms like K-Medioid, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS.

Unit 3 : Other DM techniques & Web Mining: Application of Neural Network, AI, Fuzzy logic and Genetic algorithm, Decision tree in DM. Web Mining, Web content mining, Web structure Mining, Web Usage Mining.

Unit 4 : Temporal and spatial DM: Temporal association rules, Sequence Mining, GSP, SPADE, SPIRIT, and WUM algorithms, Episode Discovery, Event prediction, Time series analysis. Spatial Mining, Spatial Mining tasks, Spatial clustering, Spatial Trends.

Unit 5 : Data Mining of Image and Video : A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

References :

[1]. Data Mining Techniques ; Arun K.Pujari ; University Press.

[2]. Data Mining; Adriaans & Zantinge; Pearson education.

[3]. Mastering Data Mining; Berry Linoff; Wiley.

[4]. Data Mining; Dunham; Pearson education.

[5]. Text Mining Applications, Konchandy, Cengage

Unit 1: Introduction: layering, DNS - encapsulation, de-multiplexing, client /server model, port numbers, standardization process, the Internet. Link layer: introduction, Ethernet and IEEE 802 encapsulation, trailer encapsulation, SLIP, PPP- Loop back interface, MTU.

Unit 2: Internet protocol: introduction, IP header, IP routing, subnet addressing, subnet mask- special case of IP addresses, a subnet example. Address Resolution Protocol: Introduction, an example, ARP cache, ARP packet format, ARP examples, Proxy ARP, ARP command.

Unit 3: RARP: Introduction, RARP packet format, RARP examples, RARP server design. ICMP: Introduction, ICMP message types, ICMP address mask request and reply- ICMP timestamp request and reply- 4.4 BSD processing of ICMP Messages.

Unit 4: Ping Program: Introduction, ping program, IP record route option, IP Time stamp option. Trace route program: Introduction, trace route program operation, LAN output, and WAN output- IP source routing option. IP routing: Introduction, routing principles, ICMP host, and ICMP redirect errors. Dynamic Routing protocols: introduction, dynamic routing, RIP-OSPF, BGP, CIDR.

Unit 5 UDP: introduction, UDP header, UDP checksum, IP Fragmentation, UDP Server design. DNS Introduction basics, message format, simple example, pointer quires, resource records, caching, UDP. TFTP: introduction, protocol, security. BOOTP: introduction, packet format, server design, through router.

Unit 6: TCP: Introduction, services, headers, connection establishment and termination, timeout of connection establishment- maximum segment size- half, close, state transition diagram, reset segments, simultaneous open and close- options, server design.

Unit 7:SNMP Introduction, protocol, structure of management information, object identifiers, management information base, instance identification. Telnet: rlogin protocols, examples, telnet protocol and examples. FTP, protocol, examples, SMTP protocols, examples, NFS, TCP/IP Applications.

References :

1. W. Richard Stevens, TCP/IP Illustrated Volume-I "The Protocols ", Addison W

2. Jaiswal .S, TCP\IP Principles, Architecture, Protocols And Implementation, First Edition, Galgotia Publications Pvt Ltd.

Unit 1 Introduction to Bioinformatics, algorithm design and computational complexity aspects in bioinformatics, paradigms for algorithm design like greedy, divide and conquer, dynamic programming, exhaustive search and randomization help in obtaining useful bioinformatics algorithms,

Unit 2 Genome rearrangement, bock alignment, global sequence alignment, finding regulatory motifs in DNA sequences, finding minimum energy conformation in drug molecules respectively exemplifying the uses of these paradigms.

Unit 3 Application of computational learning in bioinformatics, the learning of probabilistic finite automata (Hidden Markov Models)

Unit 4 Several important problems in computational biology, like protein folding which turnout to be NP-hard, study some of these problems and corresponding approximation algorithms that address the issue of intractability.

Reference:

1. Neil Jones and P Pevzner; An introduction to Bioinformatics Algorithms, MIT Press

2. Peter Clote and R Backofen, Computational Molecular Biology, J Wiley

3. R. Durbin, Eddy etc; Biological sequence analysis, probabilistic models of protein and nucleic acids; Cambridge Univ Press

Sub Code : MTCTA 302-1 Sub Name : Software testing and quality assurance 4 Credits

Unit 1: Introduction to software testing, concepts, issues and techniques, test activities, management and automation. Coverage and usage testing based on checklist, input domain portioning and boundary testing,

Unit 2: object oriented testing: testing OOA and OOD models, object oriented testing strategies, test case design for OO software, testing methods applicable at the class level, interclass test case design. Web application testing, debugging, security & reliability.

Unit 3: Programming style and program quality: simple style rules, comment statements, program quality, quantifying program quality,

Unit 4: Software quality and quality Assurance: Principle of Software Quality Assurance (SQA), Applying SQA to software project, proven factors for SQA success, SQA during software requirements, SQA during software design phase, SQA during software code and test,

Unit 5: Advance quality engineering topics. Human factors in software engineering: Human factors history, HCL requirements and design process, HCL testing.

Reference:

1. Ali Behforooz and Frederick J. Hudson, Software Engineering Fundamentals, Oxford University Press

2. JeffTain, Software Quality Engineering: Testing, Quality Assurance and Quantifiable improvement, Willy Pub.

3. Aditya Mathur, Foundation of Software Testing 1/e, Pearson Education

4. Paul C. Jorgensen, Software Testing, A Craftsman's Approach, Second Edition, CRC Press

Unit 1: Ad Hoc Networking : An introduction, Model of operation, symmetric Links, Layer-2 Ad Hoc solutions, Proactive versus reactive protocols, multicast, commercial Applications of Ad Hoc networking, conferencing, Home Networking, Emergency services, personal Area Networks and Bluetooth, Embedded Computing Applications, Sensor Dust, Automotive/PC Interaction. Factors Affecting Ad Hoc Networks, Scalability, Wireless Data Rates, DARPA packet Radio network, Survivable Radio Networks.

Unit 2. Ad Hoc Wireless Media Access Protocols: Issues in Designing a MAC protocol for Ad Hoc Wireless networks. Design Goals of a MAC Protocol for Ad Hoc Wireless Networks. Classifications of MAC Protocols. ContentionBased Protocols, Contention-Based Protocols with reservation Mechanisms. Contention –Based MAC Protocols with Scheduling Mechanisms. MAC protocols that use Directional Antennas. Other MAC Protocols.

Unit 3. Overview of Ad Hoc Routing Protocols: Table-Driven Approaches, Destination Sequenced Distance Vector (DSDV) , Wireless Routing Protocol (WRP), Cluster Switch Gateway Routing (CSGR) , Source-Initiated On – Demand Approaches . Ad Hoc On-Demand Distance Vector Routing (AODV) , Dynamic Source Routing (DSR) , Temporally Ordered Routing Algorithm (TORA), Signal Stability Routing (SSR) , Location-Aided Routing (LAR) , Power – Aware Routing (PAR), Zone Routing Protocol (ZRP), Source Tree Adaptive Routing (STAR) , Relative Distance Microdiversity Routing (RDMAR) , Multicast Routing in Mobile Ad Hoc Networks, Existing Ad Hoc Multicast Routing Protocols, ABAM : Associativity-Based Ad Hoc Multicast.

Unit 4. Transport Layer for Ad Hoc Wireless Network : Introduction , Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocols for Ad Hoc Wireless Networks.

Unit 5. Quality of service in Ad-hoc wireless networks: Issues and challenges in providing QoS in Ad Hoc Wireless Networks, Classification of QoS Solutions, MAC Layer Solutions,

MAC Layer Solutions, Network Layer Solutions, Qos Frameworks for Ad Hoc Wireless Networks.

Unit 6. Energy Conservation : Power Life Issues: Power Management, Advances in Device Power Management, Advances in Protocol Power Management, Power Conservation by mobile Applications, Periodic Beaconing On Battery Life, Standalone Beaconing, HF Beaconing with Neighboring Nodes, Comparison of HF Beaconing with and without Neighbors, LF Beaconing with Neighboring Nodes, Comparison of LF Beaconing with and without Neighbors, Deductions, Conclusions, Smart Batteries and Battery Characteristics, Effects of Beaconing on Battery Life.

Unit 7: Sensor Network: Sensor Network Architecture, Network Protocols, Data Storage and Manipulation, Localization and Management, Data Dissemination, Data Gathering, MAC protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network, Evolving Standards.

Unit 8. Security issues in Ad Hoc Network: Security in Ad Hoc Wireless Network, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, and Secure Routing in Ad Hoc Wireless Networks.

References:

1. Ad Hoc Mobile Wireless Networks : Protocols and Systems, C. K. Toh, Springer.
2. Ad Hoc Network, C E Perkins, Pearson Education.
3. Ad Hoc Wireless Networks : Architectures and protocols, C, Siva Ram Murthy and B.S. Manoj, Pearson Education.

Unit 1: Introduction to cellular mobile systems: Basic cellular system, performance, criteria, Uniqueness of mobile Radio environment, operation of cellular systems, marketing Image of Hexagonal shaped cells, Planning of cellular system, Analog cellular systems, digital cellular systems, cell splitting.

Unit 2: Cell coverage for signal & Traffic: Introduction, obtaining the mobile point to point model, Propagation over water or flat open areas, Foliage loss, Propagation in near in distance, long distance Propagation obtain path less from a point to point Prediction model, call-site antenna Heights & Signal coverage calls, mobile to mobile Propagation.

Unit 3 :Co channel Interference reduction: Co channel interference , exploring co channel interference area, in a system, Real time co channel interference measurement at mobile radio Transceivers, Decision of an omni directional antenna system, Design of a directional antenna system,. Lowering the antenna height, reduction of co-channel interference by mean of a notech in the tilted antenna Pattern, Power control.

Unit 4: Frequency management & channel Assignment: Frequency management, Frequency-spectrum utilization, set up channels definition of channel assignment, fixed channel assignment, Non fixed channel assignment algorithms How to operate north additional spectrum, Traffic & channel assignment, Perception of call blocking from the subscribers.

Unit 5: Handoffs & Dropped calls: Value of Implementing Handoffs, initiation of a hand off, Delaying a handoff, Forced Handoffs, Queuing of Handoffs, power difference handoff , Mobile assisted handoff & soft Handoff, call site Handoff only, intersystem Handoff, introduction to dropped call rate, Formula of Dropped call rate, Finding the values of g & u.

Unit 6: Special topics: Wireless and Mobile Computation – SS7, GSM, CDMA, Mobile IP, Wireless Mobile ATM, Multicast Routing Protocols, Location Management, Mobile Agents, Mobility Management.

References :

1. J. Schiller, Mobile Communication, Pearson Press.
2. Wireless Network, Kaveh Pahalwan
3. Adhoc Networking by Charles E. Perkins, Addison Wisely
4. Mobile cellular Telecommunications by William C.Y. Lee TMH