RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Computer Science & Information Technology, VII-Semester

CSIT-701 Internet of Things

Objective:
Students will understand the concepts of Internet of Things and can able to build IoT applications.

Course Outcomes: At the end of this course, students would be able to:

1. Understand the key components that make up an IoT system.
2. Appreciate the role of big data, cloud computing and data analytics in a typical IoT system.
3. Understand where the IoT concept fits within the broader ICT industry and possible future trends.
4. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks.
5. Apply the knowledge and skills acquired during the course to build and test a complete, working IoT system involving prototyping, programming and data analysis

UNIT I
Introduction: Definition, Characteristics of IOT, IOT Conceptual framework, IOT Architectural view, Physical design of IOT, Logical design of IOT, Application of IOT.

UNIT II
Machine-to-machine (M2M), SDN (software defined networking) and NFV(network function virtualization) for IOT, data storage in IOT, IOT Cloud Based Services.

UNIT III
Design Principles for Web Connectivity: Web Communication Protocols for connected devices, Message Communication Protocols for connected devices, SOAP, REST, HTTP Restful and Web Sockets. Internet Connectivity Principles: Internet Connectivity, Internet based communication, IP addressing in IOT, Media Access control.

UNIT IV
Sensor Technology , Participatory Sensing, Industrial IOT and Automotive IOT , Actuator, Sensor data Communication Protocols ,Radio Frequency Identification Technology, Wireless Sensor Network Technology.

UNIT V
IOT Design methodology: Specification -Requirement, process, model, service, functional & operational view.IOT Privacy and security solutions, Raspberry Pi & arduino devices. IOT Case studies: smart city streetlights control & monitoring.

Recommended Books:

1. Rajkamal,"Internet of Things", Tata McGraw Hill publication
2. Vijay Madisetti and Arshdeep Bahga, "Internet of things (A-Hand-on-Approach)" 1st Edition, Universal Press

1. Hakima Chaouchi "The Internet of Things: Connecting Objects", Wiley publication.
2. Charless Bell "MySQL for the Internet of things", Apress publications.
3. Francis dacosta "Rethinking the Internet of things:A scalable Approach to connecting everything", 1st edition, Apress publications 2013.
4. Donald Norris"The Internet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi and BeagleBone Black", McGraw Hill publication.

List of Experiments:

1. Familiarization with Arduino/Raspberry Pi and perform necessary software installation.
2. To interface LED/Buzzer with Arduino/Raspberry Pi and write a program to turn ON LED for 1 sec after every 2 seconds.
3. To interface Push button/Digital sensor (IR/LDR) with Arduino/Raspberry Pi and write a program to turn ON LED when push button is pressed or at sensor detection.
4. To interface DHT11 sensor with Arduino/Raspberry Pi and write a program to print temperature and humidity readings.
5. To interface motor using relay with Arduino/Raspberry Pi and write a program to turn ON motor when push button is pressed.
6. To interface OLED with Arduino/Raspberry Pi and write a program to print temperature and humidity readings on it.
7. To interface Bluetooth with Arduino/Raspberry Pi and write a program to send sensor data to smartphone using Bluetooth.
8. To interface Bluetooth with Arduino/Raspberry Pi and write a program to turn LED ON/OFF when '1'/'0' is received from smartphone using Bluetooth.
9. Write a program on Arduino/Raspberry Pi to upload temperature and humidity data to thingspeak cloud.
10. Write a program on Arduino/Raspberry Pi to retrieve temperature and humidity data from thingspeak cloud.
11. To install MySQL database on Raspberry Pi and perform basic SQL queries.
12. Write a program on Arduino/Raspberry Pi to publish temperature data to MQTT broker.
13. Write a program on Arduino/Raspberry Pi to subscribe to MQTT broker for temperature data and print it.
14. Write a program to create TCP server on Arduino/Raspberry Pi and respond with humidity data to TCP client when requested.
15. Write a program to create UDP server on Arduino/Raspberry Pi and respond with humidity data to UDP client when requested.

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Computer Science & Information Technology, VII-Semester

Departmental Elective CSIT- 702 (A) Information Storage & Management

Objectives:

1. To introduce data creation, the amount of data being created, the value of data to a business, challenges in data storage and data management,
2. To introduce solutions available for data storage, Core elements of a data center infrastructure, role of each element in supporting business activities

Course Outcomes: After the completion of this course, the students will be able to:

1. To Understand the Concept of Information Storage and Data centre Environment.
2. To understand about Data Protection.
3. To Understand Fiber Channel SAN.
4. To describe the different backup and recovery topologies and their role in providing disaster recovery and business continuity capabilities.
5. To Understand Cloud Computing.

UNIT I

Introduction to Storage Technology: Data proliferation, evolution of various storage technologies, Overview of storage infrastructure components, Information Lifecycle Management, Data categorization.

UNIT II

Storage Systems Architecture: Intelligent disk subsystems overview, Contrast of integrated vs. modular arrays, Component architecture of intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, RAID levels & parity algorithms, hot sparing, Front end to host storage provisioning, mapping and operation.

UNIT III

Introduction to Networked Storage: JBOD, DAS, NAS, SAN & CAS evolution and comparison. Applications, Elements, connectivity, standards, management, security and limitations of DAS, NAS, CAS & SAN.

UNIT IV

Hybrid Storage solutions; Virtualization: Memory, network, server, storage & appliances.Data center concepts & requirements, Backup & Disaster Recovery: Principles Managing & Monitoring: Industry management standards (SNMP, SMI-S, CIM), standard framework applications, Key management metrics (Thresholds, availability, capacity, security, performance).

UNIT V

Information storage on cloud :Concept of Cloud, Cloud Computing, storage on Cloud, Cloud Vocabulary, Architectural Framework, Cloud benefits, Cloud computing Evolution, Applications & services on cloud, Cloud service providers and Models, Essential characteristics of cloud computing, Cloud Security and integration.

Recommended Books:

1. G. Somasundaram & Alok Shrivastava (EMC Education Services) editors; Information Storage and Management: Storing, Managing, and Protecting Digital Information; Wiley India.
2. Ulf Troppens, Wolfgang Mueller-Friedt, Rainer Erkens, Rainer Wolafka, Nils Haustein; Storage Network explained : Basic and application of fiber channels, SAN, NAS, iSESI, INFINIBAND and FCOE, Wiley India.
3. John W. Rittinghouse and James F. Ransome; Cloud Computing : Implementation , Management and Security, CRC Press, Taylor Frances Pub.
4. Nick Antonopoulos, Lee Gillam; Cloud Computing : Principles, System & Application, Springer.
5. Anthony T. Velete, Toby J.Velk, and Robert Eltenpeter, Cloud Computing : A practical Approach, TMH Pub.
6. Saurabh , Cloud Computing : Insight into New Era I

List of Experiments:

1: Logging into and Navigating Navisphere Manager Lab

Part 1: Logging into the Navisphere Manager Lab Exercise

Part 2: Navigating the Navisphere Manager User Interface

2: Enable/Disable Navisphere Classic CLI andConfiguring NTP

Part 1: Enabling and Disabling Navisphere Classic CLI

Part 2: Configuring NTP

3: Storage Management - Allocating and Assigning LUNs

Part 1 : Using the Storage Allocatation Wizard to assign LUNs.

Part 2 : Manually Bind LUNs.

4: Configuring SnapView Snapshots

5: Configuring SnapView Clones

6: Configuring Full and Incremental SANCopy

7: Creating Synchronous and Asynchronous

8: Expanding LUNs and Migrating LUNs

Part 1 : Expanding LUNs with Stripe Expansion

Part 2: Expanding LUNs with Concatenation Expansion

Part 3: Migrating LUNs

Case Study:

1. NAS
2. SAN
3. IP-SAN
4. Virtulization

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Computer Science & Information Technology, VII-Semester

Departmental Elective CSIT- 702 (B) Compiler Design

Course Objective:
The Objectives of this course is to explore the principles, algorithms, and data structures involved in the design and construction of compilers. Topics include context-free grammars, lexical analysis, parsing techniques, symbol tables, error recovery, code generation, and code optimization.

Course outcomes:
1. State the overview of phase of compiler and Lexical analysis.
2. Design and implement various parsing techniques of compiler.
3. Apply type checking for semantic analysis and analyze Run time environment.
4. Design and implement different intermediate code generation techniques.
5. Analyze various code optimization techniques.

UNIT I
Introduction to compiling & Lexical Analysis
Introduction of Compiler, Major data Structure in compiler, types of Compiler, Front-end and Back-end of compiler, Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, Lexical analysis: Input buffering , Specification & Recognition of Tokens, Design of a Lexical Analyzer Generator, LEX.

UNIT II
Syntax Analysis &Syntax Directed Translation
Syntax analysis: CFGs, Top down parsing, Brute force approach, recursive descent parsing, transformation on the grammars, predictive parsing, bottom up parsing, operator precedence parsing, LR parsers (SLR,LALR, LR),Parser generation. Syntax directed definitions: Construction of Syntax trees, Bottom up evaluation of S-attributed definition, L-attribute definition, Top down translation, Bottom Up evaluation of inherited attributes Recursive Evaluation, Analysis of Syntax directed definition.

UNIT III
Type Checking & Run Time Environment
Type checking: type system, specification of simple type checker, equivalence of expression, types, type conversion, overloading of functions and operations, polymorphic functions. Run time Environment: storage organization, Storage allocation strategies, parameter passing, dynamic storage allocation , Symbol table, Error Detection & Recovery, Ad-Hoc and Systematic Methods.

UNIT IV
Code Generation
Intermediate code generation: Declarations, Assignment statements, Boolean expressions, Case statements, Back patching, Procedure calls Code Generation: Issues in the design of code generator, Basic block and flow graphs, Register allocation and assignment, DAG representation of basic blocks, peephole optimization, generating code from DAG.

UNIT V

Code Optimization

Introduction to Code optimization: sources of optimization of basic blocks, loops in flow graphs, dead code elimination, loop optimization, Introduction to global data flow analysis, Code Improving transformations ,Data flow analysis of structure flow graph Symbolic debugging of optimized code.

Recommended Books:

1. A. V. Aho, R. Sethi, and J. D. Ullman. Compilers: Principles, Techniques and Tools, Pearson Education
2 Raghavan, Compiler Design, TMH Pub.
3. Louden. Compiler Construction: Principles and Practice, Cengage Learning
4. A. C. Holub. Compiler Design in C , Prentice-Hall Inc., 1993.
5. Mak, writing compiler & Interpreters, Willey Pub.

List of Experiments:

1. Design a lexical analyzer for given language and the lexical analyzer should ignore redundant spaces, tabs and new lines.
2. Write a C program to identify whether a given line is a comment or not.
3. Write a C program to recognize strings under 'a*', 'a*b+', 'abb'.
4. Write a C program to test whether a given identifier is valid or not.
5. Write a LEX Program to count the number of token.
6. Write a LEX Program to identify the identifier.
7. Write a LEX Program to convert the substring abc to ABC from the given input string.
8. Write a lex program to find out total number of vowels, and consonants from the given input sting.
9. Write a C program to implement operator precedence parsing.
10. Write a C program to implement LALR parsing.

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Computer Science & Information Technology, VII-Semester

Departmental Elective CSIT- 702 (C) Semantic Web & Service Oriented Architecture

Objective:

1.To Introduce Semantic Web Vision
2.Understanding about XML,RDF,RDFS,OWL
3.Querying Ontology
4.Ontology Reasoning
5.Migration from Document to Data Web

Course Outcomes:

1.Understand the semantic web Vision and technologies
2.Understand about ontology
3.Understanding about Data Web(Linked opendata Cloud)

UNIT-I

Semantic Web: Building Models , Calculating with knowledge, Exchanging Information, Semantic Web Technologies ,Types of Web :Smart Web & Dumb Web, Applications ,Semantic Data ,Search Engine for Semantic Web

UNIT-II

Semantic Modeling: Modeling for human communication, Explanation and prediction, Mediating Variability: Variation & Classes, Variation & Layers, Expressivity in Modeling.

UNIT-III

Resource Description Language RDF : Introduction , Advanced features , simple ontologies in RDF Schema , encoding of special data structures, RDF formal semantics ,syntactic reasoning with deduction rules ,Distributing data across web , Managing data from multiple sources .

UNIT-IV

Web Ontology Language OWL : OWL syntax and Intuitive semantics , OWL species , Owl formal semantics : Description Logics , Model-Theoretic Semantics of OWL, Automated reasoning with OWL ,Ontology Matching and Distributed Information .

UNIT-V

Semantic Web Application Architecture: RDF Parser/Serializer, RDF store: RDF data standards and Interoperability of RDF stores , RDF query engines , SPARQL: Query language for RDF , conjunctive Queries for OWL DL ,RDF backed web portals , Data federation .

Ontology Engineering: Constructing Ontologies manually, Reusing Existing Ontologies,
Semiautomatic Ontology Acquisition, Ontology Mapping

Recommended Books:

1. Hitzler, Markus, Rudolph , " Foundations of Semantic Web Technologies" , Chapman & Hall/CRC,2009,ISBN 9781420090505
2. Allemang , Hendler , " Semantic Web for the working Ontologist" 2nd ed. Elsevier Pub
3. Liang Yu , " Introduction to the Semantic Web and Semantic Web Services", Chapman & Hall/CRC
4. Antoniou , Harmelen , "A semantic Web Primer", PHI Pub.
5. Rajendra Akerkar ," Foundations of Semantic Web" , Narosa Publishing ,NewDelhi

List of Experiments:

1. Working with XML
2. Working with XML Schema, DTD
3. Design of Ontology using RDF
4. Design RDF document with different Serialization format (e.g. tutle,N-triple)
5. Design of Ontology using RDFS
6. Design of Ontology using OWL
7. Case study : Pizza Ontology
8. Querying Ontology using SPARQL
9. Case Study : Dbpedia
10. Case study : LOD Cloud

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New Scheme Based On AICTE Flexible Curricula

Computer Science & Information Technology, VII-Semester

Department Elective CSIT –702 (D) Natural Language Processing

Objective: To gain the knowledge for developing advanced technology of computer systems like Speech recognition and machine translation.

Course Outcomes: After the completion of this course, the students will be able to:

To tag a given text with basic Language features

1. To design an innovative application using NLP components
2. To implement a rule based system to tackle morphology/syntax of a language
3. To design a tag set to be used for statistical processing for real-time applications
4. To compare and contrast the use of different statistical approaches for different types of NLP applications.

UNIT I

Introduction to Natural Language Understanding- Levels of language analysis- Syntax, Semantics, Pragmatics, Applications, Ambiguity, Morphology, Parsing with Finite State Transducers, Regular Expressions, Stemmer, Spelling errors.

UNIT II

Computational Phonology: speech sound, phonetic transcription, text to speech, Pronunciation Variations, Bayesian Method to spelling and pronunciations, Minimum Edit Distance, Weighted Automata, N-grams.

UNIT III

HMM and speech recognition, Viterbi algorithm, Acoustic processing of speech, Feature Extraction, Speech Synthesis; Part-of-Speech Tagging: rule based, stochastic, transformation based.

UNIT IV

Syntax Processing: Parsing with CFG, CKY parsing and the Earley parser, Probabilistic parsing; Semantic Processing: Meaning representation, First Order Predicate Calculus. Lexical Semantics: Internal structure of words, thematic roles, Primitive decomposition, WordNet.

UNIT V

Word sense disambiguation; Information Retrieval: Vector space model, Improving user queries; Pragmatic Processing: Discourse; Natural Language Generation, Machine Translation.

Recommended Books:

[1] D. Jurafsky and J.H. Martin; Speech and Language Processing; Processing; Prentice Hall; 2000.

[2] C. Manning and H. Schutze, "Foundations of Statistical Natural Language Processing",

[3] James Allen."NaturalLanguage Understanding",AddisonWesley,1994.

[4] Richard M Reese, Natural Language Processing with Javall, OReilly Media, 2015.

[5] Tanveer Siddiqui, U.S. Tiwary, Natural Language Processing and Information Retrieval, Oxford University Press, 2008.

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Computer Science & Information Technology, VII-Semester

Open Elective CSIT – 703(A) E- Commerce & Web Technology

Objective:

1. Discuss fundamentals of web technology and e-commerce, types and applications.
2. Evaluate the role of the major types of information systems in a business environment and their relationship to each other
3. Assess the impact of the Internet and Internet technology on business electronic commerce and electronic business
4. Identify the major management challenges for building and using information systems and learn how to find appropriate solutions to those challenges.
5. Learn strategies for e-commerce, Mobile Commerce, Wireless Application Protocol, WAP technology and Mobile Information devices.

Course Outcomes: After the completion of this course, the students will be able to:

1. Understand the basic concepts and technologies used in the field of ecommerce.
2. Understand the processes of developing and implementing information systems.
3. Understand and apply the advance technology for e commerce.
4. Understand the basic building blocks for ecommerce.
5. Understand the role of different technologies for developing web pages.

UNIT I

Electronic Commerce and physical Commerce: Different type of e-commerce, e-commerce scenarios, advantages of e-commerce. Business models: Feature of B2B e-commerce, Business models, Integration. E-Services: category of e-services, Web- enabled services, Matchmaking services, and information-selling on the web.

UNIT II

Internet payment system: Characteristics of payment system, 4C payments methods, SET Protocol for credit card payment, E-cash, E-check, Micro payment system, Overview of smart card, overview of Mondex. E-Governance: E-Governance architecture, Public private partnership, Readiness, Security, Cyber Crime and Law, IT Act

UNIT III

Advanced technologies for e-commerce: Introduction to mobile agents. WAP: the enabling technology : The WAP model, WAP Architecture, Benefit of WAP to e-commerce.Web Security, Encryption Schemes, Secure Web documents, Digital signatures and firewalls.

UNIT IV

Introduction to building blocks of electronic commerce: Internet and networking. Technologies, IP addressing, ARP, RARP, BOOTP, DHCP, ICMP, DNS, TFTP, TELNET.

UNIT V

Static and dynamic web pages: tiers, plug-ins, frames and forms. Exposure to Markup languages, HTML, DHTML, VRML, SGML, XML etc. CGI, Applets & Serve-lets, JSP & JAVA Beans, active X control, ASP cookies creating and reading cookies, semantic web, semantic web service ontology Comparative case study of Microsoft and JAVA technologies, web server scalability,.Distributed objects, object request brokers, component technology, Web services, Web application architectures, Browsers, Search engines.

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Recommended Books:

1. Henry Chan, Raymond Lee, Tharam Dillon, E-Commerce Fundamental and Applications, Willey Publication.
2. Minoli & Minoli, Web Commerce Technology Hand Book,TMH
3. Satyanarayana, E-Government, PHI
4. Web Technology, Achyut Godbole, Atul Kahate, TMH
5. Uttam K: Web Technologies, Oxford University Press.
6. G. Winfield Treese, Lawrence C. Stewart, Designing Systems for Internet Commerce, Longman Pub.
7. Charles Trepper, E Commerce Strategies, Microsoft Press

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New Scheme Based On AICTE Flexible Curricula

Computer Science & Information Technology, VII-Semester

Open Elective CSIT– 703 (B) Mobile Application Development

Objective:

1. To facilitate students to understand android SDK.
2. To help students to gain a basic understanding of Android application development.
3. To inculcate working knowledge of Android Studio development tool.

Course Outcomes: After the completion of this course, the students will be able to:

1. Identify various concepts of mobile programming that make it unique from programming for other platforms.
2. Critique mobile applications on their design pros and cons.
3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces.
4. Program mobile applications for the Android operating system that use basic and advanced phone features.
5. Deploy applications to the Android marketplace for distribution.

UNIT I

Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file.

UNIT II

Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions.

UNIT III

Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.

UNIT IV

Testing Android applications: Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.

UNIT V

Using Common Android APIs: Using Android Data and Storage APIs, Managing data using Sqlite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.

Recommended Books:

1. Lauren Darcey and Shane Conder, “Android Wireless Application Development”, Pearson Education, 2nd ed. (2011)

2. Reto Meier, “Professional Android 2 Application Development”, Wiley India Pvt Ltd

3. Mark L Murphy, “Beginning Android”, Wiley India Pvt Ltd3.R3. Android Application Development All in one for Dummies by Barry Burd, Edition: I

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New Scheme Based On AICTE Flexible Curricula

Computer Science & Information Technology, VII-Semester

Open Elective CSIT – 703(C) Cloud Computing

Objective:

1. To provide students with the fundamentals and essentials of Cloud Computing.
2. To provide students a sound foundation of the Cloud Computing so that they are able to start using and adopting Cloud Computing services and tools in their real life scenarios.

Course Outcomes: After the completion of this course, the students will be able to:

1 State Cloud fundamentals & its application.
2 Describe the architecture of cloud & various solutions.
3.Paraphrase virtualization technologies & describe cloud management.
4. Explain cloud security fundamentals.
5.Apply various cloud platforms like Google App Engine, Hadoop etc.

UNIT I

Introduction: Historical development ,Vision of Cloud Computing, Characteristics of cloud computing as per NIST , Cloud computing reference model ,Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Cloud Adoption and rudiments.Overview of cloud applications: ECG Analysis in the cloud, Protein structure prediction, Gene Expression Data Analysis ,Satellite Image Processing ,CRM and ERP ,Social networking .

Unit-II

Cloud Computing Architecture: Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and Fault Tolerance,

Cloud Solutions: Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management.

Cloud Offerings: Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure.

Unit –III

Cloud Management & Virtualization Technology: Resiliency, Provisioning, Asset management ,Conceps of Map reduce , Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental concepts of compute ,storage, networking, desktop and application virtualization .Virtualization benefits, server virtualization, Block and file level storage virtualization Hypervisor management software, Infrastructure Requirements , Virtual LAN(VLAN) and Virtual SAN(VSAN) and their benefits .

Unit-IV

Cloud Security: Cloud Information security fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Secutity Architecture .

Unit-V

Market Based Management of Clouds , Federated Clouds/Inter Cloud: Characterization & Definition ,Cloud Federation Stack , Third Party Cloud Services .

Case study : Google App Engine, Microsoft Azure , Hadoop , Amazon , Aneka

Recommended Books:

1. Buyya, Selvi ," Mastering Cloud Computing ",TMH Pub
2. Kumar Saurabh, "Cloud Computing" , Wiley Pub
3. Krutz , Vines, "Cloud Security " , Wiley Pub
4. Velte, "Cloud Computing- A Practical Approach" ,TMH Pub
5. Sosinsky, " Cloud Computing" , Wiley Pub

Listof Experiments:

1. Installation and configuration of Hadoop/Euceliptus etc.
2. Service deployment & Usage over cloud.
3. Management of cloud esources.
4. Using existing cloud characteristics & Service models .
5.Cloud Security Management.
6. Performance evaluation of services over cloud .

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New Scheme Based On AICTE Flexible Curricula

Computer Science & Information Technology, VII-Semester

Open Elective CSIT –703 (D) Data Visualization

Objective:

1.To understand the various types of data, apply and evaluate the principles of data visualization.
2. Acquire skills to apply visualization techniques to a problem and its associated dataset.
3.To apply structured approach to create effective visualizations thereby building visualization dashboard to support decision making

Course Outcomes:

1.Identify the different data types, visualization types to bring out the insight. Relate the visualization towards the problem based on the dataset.
2.Identify the different attributes and showcasing them in plots. Identify and create various visualizations for geospatial and table data.
3. Ability to visualize categorical, quantitative and text data. Illustrate the integration of visualization tools with hadoop.
4. Ability to visualize categorical, quantitative and text data.

UNIT I

Introduction to Data Visualization

Overview of data visualization - Data Abstraction -Analysis: Four Levels for Validation- Task Abstraction - Analysis: Four Levels for Validation.

UNIT II

Visualization Techniques

Scalar and point techniques Color maps Contouring Height Plots - Vector visualization techniques Vector properties Vector Glyphs Vector Color Coding Stream Objects.

UNIT III

Visual Analytics

Visual Variables- Networks and Trees - Map Color and Other Channels- Manipulate View, Arrange Tables Geo Spatial data Reduce Items and Attributes.

UNIT IV

Visualization Tools and Techniques

Introduction to data visualization tools- Tableau - Visualization using R.

UNIT V

Diverse Types of Visual Analysis

Time- Series data visualization Text data visualization Multivariate data visualization and case studies. Dashboard creation using visualization tools for the use cases: Finance-marketing-insurance healthcare etc.,

Recommended Books:

1. Tamara Munzer, Visualization Analysis and Design -, CRC Press 2014
2. AlexandruTelea, Data Visualization Principles and Practice CRC Press 2014.
3. Paul J. Deitel, Harvey Deitel, Java SE8 for Programmers (Deitel Developer Series) 3rd Edition, 2014.
4. Y. Daniel Liang, Introduction to Java programming-comprehensive version-Tenth Edition,Pearson ltd 2015.
5. Paul Deitel Harvey Deitel ,Java, How to Program, Prentice Hall; 9th edition , 2011.
6. Cay Horstmann BIG JAVA, 4th edition,John Wiley Sons,2009
7. Nicholas S. Williams, Professional Java for Web Applications, Wrox Press, 2014.

List of Experiments:

1. Acquiring and plotting data
2. Statistical Analysis such as Multivariate Analysis, PCA, LDA, Correlation, regression and analysis of variance.
3. Time-series analysis stock market
4. Visualization on Streaming dataset
5. Dashboard Creation
6. Text visualization