Gujarat University
Syllabus
M.Tech (Web Technologies) – III

Subject Name: Service Oriented Architecture

Subject Code: MTWT – 211

Objectives:

To make students enable to
- Understand the concepts of Service Oriented Architecture along with the evolution of SOA
- Be aware of the key issues facing many organizations, especially dealing with integration among systems and providing architectural abstractions to them
- Integrate SOA technologies with Web Services paradigms.
- Know related technologies and implementation basics of SOA

Prerequisites:
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Contents:

1. **Introducing SOA:**
   Fundamental SOA, Characteristics of contemporary SOA, Misperception about SOA, Tangible benefits of SOA.

2. **The Evolution of SOA:**
   An SOA timeline, Continuing evolution of SOA, Roots of SOA.

3. **Web Services and Primitive SOA:**
   Web services framework, Services (Web services: Definition, Architecture and standards), Service descriptions with WSDL, Messaging with SOAP, UDDI.

4. **Web Services and Contemporary SOA (I: Activity Management and Composition):**
   Message exchange patterns, Coordination, Atomic transactions, Business activities, Orchestration, Choreography.

5. **Web Services and Contemporary SOA (II: Advanced Messaging, Metadata, and Security):**
   Addressing, Reliable messaging, Correlation, Policies, Metadata exchange, Security, Notification and eventing

References:

1) Thomas Erl, "Service Oriented Architecture: Concepts, Technology, and Design", Pearson education.
2) Mark D Hansen, "SOA using Java Web Services", Prentice Hall Publication.
3) Michael Rosen & et el., "Applied SOA", Wiley Publication.
4) Roshen, "SOA based Enterprise Integration", TMH Publication.
5) Muninder Singh & Michael Huhns, "Service Oriented Computing", Wiley Publication.
6) B.V.Kumar, Prakash Narayan & Tony Ng, "Implementing SOA Using Java EE", Pearson Education.
7) Ron Schmelzer et al., "XML and Web Services", Pearson Education.
8) William A. Brown, Robert G. Laird, Clive Gee & Tilak Mitra, "SOA Governance", Pearson Education.

Accomplishments of the student after completing the course:

After the completion of this course student will be able to
- Understand primary concepts of SOA
- Know the integration of SOA technological points with Web Services.
- Implement of SOA in development cycle of Web Services.

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Subject Name: Web Intelligence and Usability

Subject Code: MTWT – 212 (1)

Objectives:

To make students enable to
- Understand the algorithms which will help to write smart program to access interesting datasets from other web sites.
- Improve search ranking, product recommendations on internet.

Prerequisite:

Contents:

1. **Introduction to Collective Intelligence:**
   What Is Collective Intelligence? What Is Machine Learning? Limits of Machine Learning, Real-Life Examples, Other Uses for Learning Algorithms

2. **Making Recommendations:**
   Collaborative Filtering, Collecting Preferences, Finding Similar Users, Recommending Items, Matching Products, Building a del.icio.us Link Recommender, Item-Based Filtering, Using the MovieLens Dataset, User-Based or Item-Based Filtering

3. **Discovering Groups:**
   Supervised versus Unsupervised Learning, Word Vectors,   Hierarchical Clustering, Drawing the Dendrogram, Column Clustering,   K-Means Clustering, Clusters of Preferences, Viewing Data in Two Dimensions, Other Things to Cluster

4. **Searching and Ranking:**
   What's in a Search Engine? A Simple Crawler, Building the Index,   Querying, Content-Based Ranking, Using Inbound Links, Learning from Clicks

5. **Optimization:**
   Group Travel, Representing Solutions, The Cost Function, Random Searching, Hill Climbing, Simulated Annealing, Genetic Algorithms, Real Flight Searches, Optimizing for Preferences, Network Visualization, Other Possibilities

6. **Document Filtering:**
Filtering Spam, Documents and Words, Training the Classifier, Calculating Probabilities, A Naïve Classifier, The Fisher Method, Persisting the Trained Classifiers, Filtering Blog Feeds, Improving Feature Detection, Using Akismet, Alternative Methods

7. **Modeling with Decision Trees:**
Predicting Signups, Introducing Decision Trees, Training the Tree, Choosing the Best Split, Recursive Tree Building, Displaying the Tree, Classifying New Observations, Pruning the Tree, Dealing with Missing Data, Dealing with Numerical Outcomes, Modeling Home Prices, Modeling "Hotness", When to Use Decision Trees

8. **Building Price Model:**
Building a Sample Dataset, k-Nearest Neighbors, Weighted Neighbors, Cross-Validation, Heterogeneous Variables, Optimizing the Scale, Uneven Distributions, Using Real Data—the eBay API, When to Use k-Nearest Neighbours

9. **Advanced Classification: Kernel Methods and SVMs:**
Matchmaker Dataset, Difficulties with the Data, Basic Linear Classification, Categorical Features, Scaling the Data, Understanding Kernel Methods, Support-Vector Machines, Using LIBSVM, Matching on Facebook

10. **Finding Independent Features:**
A Corpus of News, Previous Approaches, Non-Negative Matrix Factorization, Displaying the Results, Using Stock Market Data

11. **Evolving Intelligence:**
What Is Genetic Programming?, Programs As Trees, Creating the Initial Population, Testing a Solution, Mutating Programs, Crossover, Building the Environment, A Simple Game, Further Possibilities

12. **Algorithm Summary:**
Bayesian Classifier, Decision Tree Classifier, Neural Networks, Support-Vector Machines, k-Nearest Neighbors, Clustering, Multidimensional Scaling, Non- Negative Matrix Factorization, Optimization

References:

1) Toby Segaran, Programming Collective Intelligence, O'reilly
2) Haralambos Marmanis, Dmitry Babenko, "Algorithms of The Intelligent Web**",** Dreamtech Press
3) Satnam Alag, Richard Mac Manus, "Collective Intelligence in Action", Manning Publication

Accomplishments of the student after completing the course:

After completion of this course students will be able to

- Understand the concept of machine learning and able to do smart programs which help them to draw conclusions about user experience, marketing, personal tastes, and human behavior in general
- Use the algorithms learned in the course on their web site, blog, Wiki, or specialized application.

Subject Name: Web Data & Knowledge Management

Subject Code: MTWT – 212 (2)

Objectives:

To make students enable
- To understand the Web Data and use of XML to perform web data management.

Prerequisite:

Contents:

1. **A Syntax for Data:**
   Base Types, Representing Relational Databases, Representing Object Databases, Specification of Syntax, The Object Exchange Model (OEM), Object Databases, Other Representation, Terminology

2. **XML:**
   Basic Syntax, XML and Semi structured Data, Document Type Definitions, Document Navigation, DCD, Paraphernalia

3. **Query Language:**
   Path Expression, A Core Language, More on Core Language, UnQL, Label and Path Variables, Mixing with structured data

4. **Query Language for XML:**
   XML – QL, XSL

5. **Interpretation and Advanced Features:**
   First Order Interpretation, Object Creation, Graphical Languages, Structural Recursion, StruQL

6. **Typing Semi structured Data:**
   What is Typing Good For, Analyzing the Problem, Schema Formalism, Extracting Schemas from data, Inferring Schemas from Queries, Sharing, Multiplicity and Order, Path Constraints

7. **Query Processing:**
   Architecture, Semi structured Data servers, Mediators for semi structured data, Incremental Maintenances

8. **The Lore System:**
   Architecture, Query Processing and Indexes, Other Aspects of lore

9. **Strudel:**
  An Example, Advantages of Declarative Web Site

10. **Database Products Supporting XML:**
  Architecture, Storage, Application programming Interface, Query Language, Scalability

References:

1) Serge Abiteboul, Peter Buneman, Dan Suciu, "Data on the Web from relations to Semistructured Data and XML", Morgan Kaufmann Publisher
2) Soumen Chakrabarti, "Mining the Web: Discovering Knowledge from Hypertext Data", Morgan Kaufmann
3) Bhavani Thuraisingham, "Web Data Mining and Applications in Business Intelligence and Counter-Terrorism", CRC Press

Accomplishments of the student after completing the course:

After completion of this course students will be able to understand
  - Data
  - XML structure
  - Query using XML
  - Lore System
  - Database products supporting XML

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Subject Name: Social Media Application Development

Subject Code: MTWT – 212(3)

Objectives:
- To learn, how to reduce complex real-world situations to a simplified mathematical model
- Building a computer simulation based on mathematical model
- Appreciate the use of ideas borrowed from diverse fields like economics, sociology, computing and information science, and applied mathematics

Prerequisites:
Knowledge of Statistics

Contents:

1. **Graph Theory & Social Networks:**
   Overview, Graphs, Strong and Weak Ties, Networks in their Surrounding Contexts.

2. **Game Theory:**
   Games, Evolutionary Game Theory, Modeling Network Traffic using Game Theory, Auctions

3. **Markets and Strategic Interaction in Networks:**
   Matching Markets, Network Models of Markets with Intermediaries, Bargaining and Power in Networks

4. **Information Networks and the World Wide Web:**
   The Structure of the Web, Link Analysis and Web Search, Sponsored Search Markets

5. **Crowd Sourcing:**
   Overview, Methods of Crowd Sourcing, Types of Crowd Sourcing, Crowd Intelligence, Case Studies

6. **Overview of Social Network APIs:**
   OpenSocial APIs, Twitter OAuth, Twitter APIs, Facebook APIs, FQL, XFBML, Google Friend Connect Javascript APIs

7. **Case Studies:**
   Elgg, Facebook, LinkedIn, Google+, Twitter, Emerging Trends in Social Networks and Media

References:

1) David Easley and Jon Kleinberg ,"Networks, Crowds, and Markets: Reasoning about a Highly Connected World", Cambridge University Press
2) Matthew A. Russell, "Mining the Social Web: Analyzing Data from Facebook, Twitter, LinkedIn and other social media sites", O'Reilly Media
3) Derek L. Hansen, Ben Shneiderman, and Marc A. Smith , "nalyzing Social Media Networks with NodeXL: Insights from a Connected World", Morgan Kaufman
4) Easley, David, and Jon Kleinberg, "Networks, Crowds, and Markets: Reasoning about a Highly Connected World", Cambridge University Press
5) Jackson, Matthew O, "Social and Economic Networks", Princeton University Press
6) Osborne, Martin J.,"Introduction to Game Theory", Oxford University Press
7) Gibbons, Robert,"Game Theory for Applied Economists", Princeton University Press
8) Howe, J., "Crowdsourcing: Why the Power of the Crowd Is Driving the Future of Business", Crown Business, 2008
9) Mark D. Hawker, "Developer's Guide to Social Programming: Building Social Context Using Facebook, Google Friend Connect, and the Twitter API, The Developer's Library", Addison-Wesley Professional
10) Gavin Bell (Author), "Building Social Web Applications: Establishing Community at the Heart of Your Site", O'Reilly Media

Accomplishments of the student after completing the Course:

After completion of this course students will be able to
* Formulate a model for
* Implement a Network Management System
* Formulate SLAs and Policies for Network Management

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