J.K.K. MUNIRAJAH COLLEGE OF TECHNOLOGY

Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

T.N.Palayam (Po), Gobi (Tk), Erode (Dt) – 638 506

ACADEMIC YEAR (2021-2022)						
S.No	Name of the course	Course Code	Programme Offering	Project work	Internship training	Number of students
1	Project Work	MC5414	MASTER OF COMPUTER APPLICATIONS	✓		3
2	Python Programming	MC5107	MASTER OF COMPUTER APPLICATIONS	✓		1
3	Advanced Database Technology	MC5105	MASTER OF COMPUTER APPLICATIONS		✓	3
4	Artificial Intelligence and Machine Learning	MC5208	MASTER OF COMPUTER APPLICATIONS	✓		1
5	Data Science	MC5306	MASTER OF COMPUTER APPLICATIONS		✓	1
6	Internet programming	MC5206	MASTER OF COMPUTER APPLICATIONS	✓		3
7	Cloud Computing Technologies	MC5207	MASTER OF COMPUTER APPLICATIONS	✓		2

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

J.K.K. MUNIRAJAHCOLLEGE OF TECHNOLOGY

Approved by AICTE, New Delhi And Affiliated to Anna University, Chennai.

T.N. Palayam (Po), Gobi (Tk), Erode (Dt) – 638 506

MASTER OF COMPUTER APPLICATIONS

2021-2022

S.NO	REG.NO	STUDENT NAME	PROJECT	INTERNSHIP
1	731220622001	NAVANEETHARAN.L.N	✓	✓
2	731220622002	NITHYA.A	✓	✓
3	731220622005	THARUN VISHAL.A.K.	✓	✓

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

J.K.K. MUNIRAJAHCOLLEGE OF TECHNOLOGY

Approved by AICTE, New Delhi And Affiliated to Anna University, Chennai.

T.N. Palayam (Po), Gobi (Tk), Erode (Dt) – 638 506

MASTER OF COMPUTER APPLICATIONS

S.No	Name of the Course that include experiential learning through Project Work/Internship/Field Visit
1	Project Work
2	Python Programming
3	Advanced Database Technology
4	Artificial Intelligence and Machine Learning
5	Data Science
6	Internet programming
7	Cloud Computing Technologies

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

PROJECT

MC5105 **ADVANCED DATABASE TECHNOLOGY** **L T P C**
3 0 0 3

OBJECTIVES:

- To learn the fundamentals of data modeling and design in advanced databases.
- To study the working principles of distributed databases.
- To have an introductory knowledge about the query processing in object-based databases and its usage.
- To understand the basics of spatial, temporal and mobile databases and their applications.
- To learn emerging databases such as XML, Data warehouse and NoSQL.

UNIT I DISTRIBUTED DATABASES **9**

Distributed Systems – Introduction – Architecture – Distributed Database Concepts – DistributedData Storage – Distributed Transactions – Commit Protocols – Concurrency Control – DistributedQuery Processing

UNIT II NOSQL DATABASES **9**

NoSQL – CAP Theorem – Sharding - Document based – MongoDB Operation: Insert, Update, Delete, Query, Indexing, Application, Replication, Sharding, Deployment – Using MongoDB with PHP / JAVA – Advanced MongoDB Features – Cassandra: Data Model, Key Space, Table Operations, CRUD Operations, CQL Types – HIVE: Data types, Database Operations, Partitioning – HiveQL – OrientDB Graph database – OrientDB Features

UNIT III ADVANCED DATABASE SYSTEMS **9**

Object Oriented Databases-Need for Complex Data Types - The Object-Oriented Data Model-Object-Oriented Languages-Spatial Databases: Spatial Data Types, Spatial Relationships, Spatial Data Structures, Spatial Access Methods – Temporal Databases: Overview – Active Databases – Deductive Databases – RecursiveQueries in SQL – Mobile Databases: Location and Handoff Management, Mobile TransactionModels, Concurrency – Transaction Commit Protocols – Multimedia Databases.

UNIT IV XML AND DATAWAREHOUSE **9**

XML Database: XML – XML Schema – XML DOM and SAX Parsers – XSL – XSLT – XPath and XQuery – Data Warehouse: Introduction – Multidimensional Data Modeling – Star and SnowflakeSchema – Architecture – OLAP Operations and Queries.

UNIT V INFORMATION RETRIEVAL AND WEB SEARCH **9**

IR concepts – Retrieval Models – Queries in IR system – Text Preprocessing – Inverted Indexing – Evaluation Measures – Web Search and Analytics – Ontology based Search - Current trends.

TOTAL: 45 PERIODS

OUTCOMES:

On completion of the course, the student will be able to:

1. Design a distributed database system and execute distributed queries.
2. Use NoSQL database systems and manipulate the data associated with it.
3. Design a data warehouse system and apply OLAP operations.
4. Design XML database systems and validating with XML schema.
5. Apply knowledge of information retrieval concepts on web databases.

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.

REFERENCES:

1. Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts", 6th Edition, McGraw Hill, 2011.
2. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Seventh Edition, Pearson Education/Addison Wesley, 2017.
3. C. J. Date, A. Kannan, S. Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.
4. Jiawei Han, MichelineKamber ,Jian Pei, "Data Mining: Concepts and Techniques", Third Edition, Morgan Kaufmann, 2012.
5. Brad Dayley, "Teach Yourself NoSQL with MongoDB in 24 Hours", Sams Publishing, First Edition, 2014.
6. ShashankTiwari, "Professional NoSQL", O'Reilly Media, First Edition, 2011.
7. Vijay Kumar, "Mobile Database Systems", John Wiley & Sons, First Edition, 2006

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

MC5207 **CLOUD COMPUTING TECHNOLOGIES** **L T P C**
3 0 0 3

OBJECTIVES:

- To understand the basic concepts of Distributed systems
- To learn about the current trend and basics of Cloud computing
- To be familiar with various Cloud concepts
- To expose with the Server, Network and storage virtualization
- To be aware of Microservices and DevOps

UNIT I DISTRIBUTED SYSTEMS **9**

Introduction to Distributed Systems – Characterization of Distributed Systems – Distributed Architectural Models –Remote Invocation – Request-Reply Protocols – Remote Procedure Call – Remote Method Invocation – Group Communication – Coordination in Group Communication – Ordered Multicast – Time Ordering – Physical Clock Synchronization – Logical Time and Logical Clocks

UNIT II INTRODUCTION TO CLOUD COMPUTING **9**

Cloud Computing Basics – Desired features of Cloud Computing – Elasticity in Cloud – On demand provisioning - Applications – Benefits – Cloud Components: Clients, Datacenters & Distributed Servers – Characterization of Distributed Systems – Distributed Architectural Models - Principles of Parallel and Distributed computing - Applications of Cloud computing – Benefits – Cloud services – Open source Cloud Software: Eucalyptus, Open Nebula, Open stack, Aneka, Cloudsim.

UNIT III CLOUD INFRASTRUCTURE **9**

Cloud Architecture and Design – Architectural design challenges – Technologies for Network based system - NIST Cloud computing Reference Architecture – Public, Private and Hybrid clouds – Cloud Models : IaaS, PaaS and SaaS – Cloud storage providers - Enabling Technologies for the Internet of Things – Innovative Applications of the Internet of Things.

UNIT IV CLOUD ENABLING TECHNOLOGIES **9**

Service Oriented Architecture – Web Services – Basics of Virtualization – Emulation – Types of Virtualization – Implementation levels of Virtualization – Virtualization structures – Tools & Mechanisms – Virtualization of CPU, Memory & I/O Devices – Desktop Virtualization – Server Virtualization – Google App Engine – Amazon AWS - Federation in the Cloud.

UNIT V MICROSERVICES AND DEVOPS **9**

Defining Microservices - Emergence of Microservice Architecture – Design patterns of Microservices – The Mini web service architecture – Microservice dependency tree – Challenges with Microservices - SOA vsMicroservice – Microservice and API – Deploying and maintaining Microservices – Reason for having DevOps – Overview of DevOps – History of DevOps – Concepts and terminology in DevOps – Core elements of DevOps – Life cycle of DevOps – Adoption of DevOps - DevOps Tools – Build, Promotion and Deployment in DevOps - DevOps in Business Enterprises.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to

- Use Distributed systems in Cloud Environment
- Articulate the main concepts, key technologies, strengths and limitations of Cloud computing
- Identify the Architecture, Infrastructure and delivery models of Cloud computing
- Install, choose and use the appropriate current technology for the implementation of Cloud
- Adopt Microservices and DevOps in Cloud environment

REFERENCES:

1. Kai Hwang, Geoffrey C. Fox & Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, First Edition, 2012
2. Andrew S. Tanenbaum& Maarten Van Steen, "Distributed Systems - Principles and Paradigms", Second Edition, Pearson Prentice Hall, 2006
3. Thomas Erl, ZaighamMahood& Ricardo Puttini, "Cloud Computing, Concept, Technology & Architecture", Prentice Hall, SecondEdition,2013
4. Richard Rodger, "The Tao of Microservices", ISBN 9781617293146, Manning Publications, First Edition,December 2017.
5. Magnus Larsson, "Hands-On Microservices with Spring Boot and Spring Cloud: Build and deploy microservices using spring cloud, Istio and kubernetes", Packt Publishing Ltd, First Edition,September 2019.
6. Jim Lewis, "DEVOPS: A complete beginner's guide to DevOps best practices", ISBN-13:978-1673259148, ISBN-10: 1673259146, First Edition, 2019.

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

MC5206	INTERNET PROGRAMMING	L T P C 3 0 0 3

COURSE OBJECTIVES:

- To understand the fundamentals of web programming and client side scripting.
- To learn the server side development using servlets, websocket.
- To learn the Spring framework and build applications using Spring.
- To learn and implement the concept of Java Persistence API.
- To learn the advanced client side scripting and framework.

UNIT I INTRODUCTION TO WEB & CLIENT SIDE PROGRAMMING 9

Introduction to Web: Server - Client - Communication Protocol (HTTP), JavaScript: Data Types and Variables - Expressions - Operators and Statements - Objects and Arrays - Functions - Classes - Modules - DOM - Events - Storage: LocalStorage, Cookies, IndexedDB, JSON, AJAX

UNIT II SERVER SIDE PROGRAMMING 9

Web Server: Web Containers - Web Components, Servlet: Lifecycle - Request - Servlet Context - Response - Filter - Session - Dispatching Requests, WebSocket, Logging - Log4j2, Build tool - Gradle. Introduction to Spring: IoC Container and Dependency Injection (DI)

UNIT III SPRING 9

Spring Configuration and Spring Boot, Spring MVC: DispatcherServlet and Configuration - Interceptors - Controllers - Views - Input Validation - File Upload, Building RESTful Web Services, Spring Security Architecture, Spring Cache.

UNIT IV JAVA PERSISTENCE API AND HIBERNATE 9

Entity: Basic, Embeddable and Collection Types - Identifiers - Entity Relationship - Inheritance, Persistence Context and Entity Manager, JPQL, Criteria API, Spring Data JPA - Specification and Projection.

UNIT V ADVANCED CLIENT SIDE PROGRAMMING 9

Asynchronous JavaScript: Callbacks - Promises - async and await, React JS: ReactDOM - JSX - Components - Properties - State and Lifecycle - Events - Lifting State Up - Composition and Inheritance - Higher Order Components.

TOTAL: 45 PERIODS

Course Outcomes:

Upon completion of the course the students should be able to:

- To write client side scripting.
- To implement the server side of the web application.
- To implement Web Application using Spring.
- To implement a Java application using Java Persistence API.
- To implement a full-stack Single Page Application using React, Spring and JPA.

REFERENCE BOOKS

1. David Flanagan, "Java Script: The Definitive Guide", O'Reilly Media, Inc, 7th Edition, 2020
2. Matt Frisbie, "Professional JavaScript for Web Developers", Wiley Publishing, Inc, 4th Edition, ISBN: 978-1-119-36656-0, 2019

3. Alex Banks, Eve Porcello, "Learning React", O'Reilly Media, Inc, 2nd Edition, 2020 https://reactjs.org/docs
4. David R. Heffelfinger, "Java EE 8 Application Development", Packt Publishing, First edition2017
5. Benjamin Muschko, "Gradle in Action", Manning Publications, First edition2014
6. IulianaCosmina, Rob Harrop, Chris Schaefer, Clarence Ho, "Pro Spring 5: An In-Depth Guide to the Spring Framework and Its Tools", Apress, Fifth edition2017
7. Christian Bauer, Gavin King, and Gary Gregory, "Java Persistence with Hibernate", Manning Publications, \r, 2nd Edition, 2015

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

DEFECT TRACKING SYSTEM

A PROJECT REPORT

Submitted by

L N NAVANEETHARAN (731220622001)

in partial fulfillment for the award of the degree

of

MASTER OF COMPUTER APPLICATIONS

J.K.K.MUNIRAJAH COLLEGE OF TECHNOLOGY

T.N.PALAYAM, GOBI-638 512

ANNA UNIVERSITY: CHENNAI 600 025

SEPTEMBER 2022

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

ANNA UNIVERSITY:CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report on **"DEFECT TRACKING SYSTEM"** is the bonafide work of **"L.N.NAVANEETHARAN (731220622001)"** who carried out the project work under my supervision.

5-9-22 M.Senthilkumar

SIGNATURE
Dr.N.SATHYABALAJI.M.E,M.I.S.T.E.,Ph.D.,
HEAD OF THE DEPARTMENT
Associate Professor
Dept. of Computer Applications
J.K.K. Munirajah College of Technology
T.N. Palayam

SIGNATURE
Mr.M.SENTHILKUMAR.MCA,.
SUPERVISOR
Assistant Professor
Dept. of Computer Applications
J.K.K. Munirajah College of Technology
T.N. Palayam

Submitted for the Project Viva-Voce examination held on 05.09.2022

5-9-22. M.Senthilkumar

INTERNAL EXAMINER

EXTERNAL EXAMINER

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

ABSTRACT

Bug-Tracking mechanism is employed only is some of the large software development houses. Most of the others never bothered with bug tracking at all, and instead simply relied on shared lists and email to monitor the status of defects. This procedure is error-prone and tends to cause those bugs judged least significant by developers to be dropped or ignored.

Bug-Tracking System is an ideal solution to track the bugs of a product, solution or an application. Bug Tacking System allows individual or groups of developers to keep track of outstanding bugs in their product effectively. This can also be called as Defect Tracking System.The Bug Tracking System can dramatically increase the productivity and accountability of individual employees by providing a documented work flow and positive feedback for good performance.

Features:

- Product and Component based
- Creating & Changing Bugs at ease
- Query Bug List to any depth
- Reporting & Charting in more comprehensive way
- User Accounts to control the access and maintain security
- Simple Status & Resolutions
- Multi-level Priorities & Severities
- Targets & Milestones for guiding the programmers
- Attachments & Additional Comments for more information
- Robust database back-end

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

CHAPTER 1

INTRODUCTION

1.1 Purpose

The main objective of this system is develop flawless system, which is access real time information from anywhere in the world, 24 hours a day 365 days in a year. Another aim is that manage hundred of projects in multiple locations or just a few. The another main objective of this system is track the all the defects or bugs in the project and make the project user friendly and bugs free system.

1.2 Existing System

In any software development bugs are inevitable. Let it be in any kind of product bugs arise at any phase of development. One has to take a great care in the proper maintenance and resolution of the bugs. In the Existing system the bugs are not properly maintained and they are simply relied on shared lists and email to monitor the bugs.

In this type of system it becomes difficult to track a bug if a bug is over looked then it may cause tremendous errors in the next phase and can improve the cost of project whatever necessary effort spent on the bug maintenance may not be worthy. So bug history has to be maintained properly. And there is no efficient search technique.

One has to search the whole database for the details of particular bug which might have occurred sometime earlier. It is both time consuming and error prone. And it is very difficult to share the bug among several users as there is no proper maintenance

of the bugs. In order to have an efficient product bugs must be maintained properly and should be resolved in time both to reduce time and money spent on the development.

1.3 Proposed System

- This system maintains the products, Bugs and bug Tracking. It has advantage of maintaining bug history it stores all the details from bug origin to bug resolution.
- Each product can have versions for easy maintenance of the product and all the user of the product is stored in the database. It provides the advantage of maintaining users to the bugs and resolutions provided by them.
- Our System provides the searching based on status, priority, and operating system.
- It provides with user and bug hierarchy, which would be helpful in knowing the relation between bugs and users allotted to the bug.
- It is provided with a fully authenticated system with password encryption. And has the facility for storing attachments for a bug.
- One can keep a track of the bug in a product with much lower cost and effort.
- The most advantage of this system is maintaining log records which are helpful in knowing any errors or misuse of the system by other users.

CHAPTER 9

CONCLUSION

User comes to the search engine and makes a query, typically by giving key words, the engine looks up the index and provides a listing of best-matching web pages according to its criteria, usually with a short summary containing the document's title and sometimes parts of the text.

Most search engines employ methods to rank the results to provide the "best" results first. How a search engine decides which pages are the best matches, and what order the results should be shown in, varies widely from one engine to another.

Search engine is technically the software and algorithms used to perform a search, the term have become synonymous with the website itself.

FUTURE ENHANCEMENT

Currently, this project is a simple prototype, but it can be improvised in future with some enhancements. At present, there is no live chat feature for helping clients which can be added in future . An online help document also can be added on the home page of the website which would give instructions for setup and installation. Currently, this project supports only English language. However, in future, multiple language support can be included. In addition, features such as scrum-ban boards and ability to build reports based on the bug history can be included. This would help software professionals in statistical analysis. Lastly, user interface can be enhanced by including the ability to configure Agile boards based on sprint cycle. As most of the software industry is adapting Agile methodology, this feature would benefit all organizations.

MC5105 **ADVANCED DATABASE TECHNOLOGY** L T P C
3 0 0 3

OBJECTIVES:

- To learn the fundamentals of data modeling and design in advanced databases.
- To study the working principles of distributed databases.
- To have an introductory knowledge about the query processing in object-based databases and its usage.
- To understand the basics of spatial, temporal and mobile databases and their applications.
- To learn emerging databases such as XML, Data warehouse and NoSQL.

UNIT I DISTRIBUTED DATABASES 9

Distributed Systems – Introduction – Architecture – Distributed Database Concepts – DistributedData Storage – Distributed Transactions – Commit Protocols – Concurrency Control – DistributedQuery Processing

UNIT II NOSQL DATABASES 9

NoSQL – CAP Theorem – Sharding - Document based – MongoDB Operation: Insert, Update, Delete, Query, Indexing, Application, Replication, Sharding, Deployment – Using MongoDB with PHP / JAVA – Advanced MongoDB Features – Cassandra: Data Model, Key Space, Table Operations, CRUD Operations, CQL Types – HIVE: Data types, Database Operations, Partitioning – HiveQL – OrientDB Graph database – OrientDB Features

UNIT III ADVANCED DATABASE SYSTEMS 9

Object Oriented Databases-Need for Complex Data Types - The Object-Oriented Data Model-Object-Oriented Languages-Spatial Databases: Spatial Data Types, Spatial Relationships, Spatial Data Structures, Spatial Access Methods – Temporal Databases: Overview – Active Databases – Deductive Databases – RecursiveQueries in SQL – Mobile Databases: Location and Handoff Management, Mobile TransactionModels, Concurrency – Transaction Commit Protocols – Multimedia Databases.

UNIT IV XML AND DATAWAREHOUSE 9

XML Database: XML – XML Schema – XML DOM and SAX Parsers – XSL – XSLT – XPath and XQuery – Data Warehouse: Introduction – Multidimensional Data Modeling – Star and SnowflakeSchema – Architecture – OLAP Operations and Queries.

UNIT V INFORMATION RETRIEVAL AND WEB SEARCH 9

IR concepts – Retrieval Models – Queries in IR system – Text Preprocessing – Inverted Indexing – Evaluation Measures – Web Search and Analytics – Ontology based Search - Current trends.

TOTAL: 45 PERIODS

OUTCOMES:

On completion of the course, the student will be able to:

1. Design a distributed database system and execute distributed queries.
2. Use NoSQL database systems and manipulate the data associated with it.
3. Design a data warehouse system and apply OLAP operations.
4. Design XML database systems and validating with XML schema.
5. Apply knowledge of information retrieval concepts on web databases.

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.

REFERENCES:

1. Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts", 6th Edition, McGraw Hill, 2011.
2. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Seventh Edition, Pearson Education/Addison Wesley, 2017.
3. C. J. Date, A. Kannan, S. Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.
4. Jiawei Han, MichelineKamber ,Jian Pei, "Data Mining: Concepts and Techniques", Third Edition, Morgan Kaufmann, 2012.
5. Brad Dayley, "Teach Yourself NoSQL with MongoDB in 24 Hours", Sams Publishing, First Edition, 2014.
6. ShashankTiwari, "Professional NoSQL", O'Reilly Media, First Edition, 2011.
7. Vijay Kumar, "Mobile Database Systems", John Wiley & Sons, First Edition, 2006

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

MC5208 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING **L T P C**
3 0 0 3

OBJECTIVES:

- To familiarize with the principles of Artificial intelligence like problem solving,inference, perception, knowledge representation, and learning.
- To understand the various characteristics of Intelligent agents
- To design and implement the machine learning techniques for real world problems
- To gain experience in doing research using Artificial intelligence and Machinelearning techniques.

UNIT I ARTIFICIAL INTELLIGENCE **9**

Foundation of AI-History of AI-State of Art.-Intelligent Agents: Agents and Environments- Concepts of Rationality-Nature of Environments-Structure of Agents. Problem Solving: Problem Solving by Search: Problem Solving Agents-Searching for Solutions-Uniform Search Strategies-Heuristic Search Strategies- local Search Algorithms and Optimization Problems.

UNIT II KNOWLEDGE AND REASONING **9**

Logical Agents: Knowledge Based Agents-Logic-Propositional Logic-Propositional Theorem Proving-Model Checking-Agent based on Propositional Logic. First-Order Logic: Syntax and Semantics- Using First-Order Logic-Knowledge Engineering. Inference in First-Order Logic:

Prepositional Vs. First-Order Inference-Unification and Lifting-Forward Chaining-Backward Chaining – Resolution.

UNIT III BAYESIAN LEARNING **9**

Basic Probability Notation- Inference – Independence - Bayes' Rule. Bayesian Learning: Maximum Likelihood and Least Squared error hypothesis-Maximum Likelihood hypotheses for predicting probabilities- Minimum description Length principle -Bayes optimal classifier - Naïve Bayes classifier - Bayesian Belief networks -EM algorithm.

UNIT IV PARAMETRIC MACHINE LEARNING **9**

Logistic Regression: Classification and representation – Cost function – Gradient descent – Advanced optimization – Regularization - Solving the problems on overfitting. Perceptron – Neural Networks – Multi – class Classification - Backpropagation – Non-linearity with activation functions (Tanh, Sigmoid, Relu, PRelu) - Dropout as regularization.

UNIT V NON PARAMETRIC MACHINE LEARNING **9**

k-Nearest Neighbors- Decision Trees – Branching – Greedy Algorithm - Multiple Branches – Continuous attributes – Pruning. Random Forests:ensemble learning. Boosting – Adaboost algorithm. Support Vector Machines – Large Margin Intuition – Loss Function - Hinge Loss – SVM Kernels.

TOTAL: 45 PERIODS

REFERENCES:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach" , ThirdEdition Pearson Education Limited, 2015
2. CalumChace , "Surviving AI: The Promise and Peril of Artificial Intelligence", Three CS publication, Second Edition, 2015.
3. Christopher M Bishop, "Pattern Recognition and Machine Learning", Spring 2011 Edition.
4. Trevor Hastie, Robert Tibshirani, Jerome Friedman, "The Elements of StatisticalLearning: Data Mining, Inference and Prediction", Springer 2nd Edition

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.

5. EthemAlpaydin, "Introduction to Machine Learning", Second Edition, MIT Press, 2010.
6. Tom M. Mitchell, "Machine Learning", India Edition, 1st Edition, McGraw-Hill EducationPrivate Limited, 2013
7. Elaine Rich, Kevin Knight, Shivashankar B. Nair, "Artificial Intelligence", Third Edition, Tata McGraw-Hill Education, 2012
8. Elaine Rich, Kevin Knight, Shivashankar B. Nair, "Artificial Intelligence", Third Edition,Tata McGraw-Hill Education, 2012

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

MC5306	DATA SCIENCE	L T P C
		3 0 0 3

OBJECTIVES:

- To know the fundamental concepts of data science and analytics.
- To learn fundamental data analysis using R.
- To understand various data modeling techniques.
- To learn the basic and advanced features of open source big data tools and frameworks.
- To study various analytics on stream data.

UNIT I INTRODUCTION TO DATA SCIENCE AND BIG DATA **9**

Introduction to Data Science – Data Science Process – Exploratory Data analysis – Big data: Definition, Risks of Big Data, Structure of Big Data – Web Data: The Original Big Data – Evolution Of Analytic Scalability – Analytic Processes and Tools – Analysis versus Reporting – Core Analytics versus Advanced Analytics– Modern Data Analytic Tools – Statistical Concepts: Sampling Distributions – Re-Sampling – Statistical Inference – Introduction to Data Visualization.

UNIT II DATA ANALYSIS USING R **9**

Univariate Analysis: Frequency, Mean, Median, Mode, Variance, Standard Deviation, Skewness and Kurtosis – Bivariate Analysis: Correlation – Regression Modeling: Linear and Logistic Regression – Multivariate Analysis – Graphical representation of Univariate, Bivariate and Multivariate Analysis in R: Bar Plot, Histogram, Box Plot, Line Plot, Scatter Plot, Lattice Plot, Regression Line, Two-Way cross Tabulation.

UNIT III DATA MODELING **9**

Bayesian Modeling – Support Vector and Kernel Methods – Neuro – Fuzzy Modeling – Principal Component Analysis – Introduction to NoSQL: CAP Theorem, MongoDB: RDBMS VsMongoDB, Mongo DB Database Model, Data Types and Sharding – Data Modeling in HBase: Defining Schema – CRUD Operations

UNIT IV DATA ANALYTICAL FRAMEWORKS **10**

Introduction to Hadoop: Hadoop Overview – RDBMS versus Hadoop – HDFS (Hadoop Distributed File System): Components and Block Replication – Introduction to MapReduce – Running Algorithms Using MapReduce – Introduction to HBase: HBase Architecture, HLog and HFile, Data Replication – Introduction to Hive, Spark and Apache Sqoop.

UNIT V STREAM ANALYTICS **8**

Introduction To Streams Concepts – Stream Data Model and Architecture – Stream Computing – Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window.

TOTAL: 45 PERIODS

OUTCOMES:

On completion of the course, the students will be able to:

1. Convert real world problems to hypothesis and perform statistical testing.
2. Perform data analysis using R.
3. Design efficient modeling of very large data and work with big data platforms..
4. Implement suitable data analysis for stream data.
5. Write efficient MapReduce programs for small problem solving methods.

REFERENCES:

1. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, First Edition,2013.
2. Umesh R Hodeghatta, UmeshaNayak, "Business Analytics Using R – A Practical Approach", Apress, First Edition,2017.
3. J. Leskowec, AnandRajaraman, Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, Second Edition,2014.
4. NishantGarg, "HBase Essentials", Packt, First Edition, 2014.
5. Rachel Schutt, Cathy O'Neil, "Doing Data Science", O'Reilly, First Edition,2013
6. Foster Provost, Tom Fawcet, "Data Science for Business", O'Reilly, First Edition,2013.
7. Bart Baesens, "Analytics in a Big Data World: The Essential Guide to Data Science and its Applications", Wiley, First Edition,2014.
8. https://www3.cs.stonybrook.edu/~skiena/519/

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

MC5107	PYTHON PROGRAMMING	L T P C 3 0 0 3

OBJECTIVES:

- To develop Python programs with conditionals and loops.
- To define Python functions and use function calls.
- To use Python data structures – lists, tuples, dictionaries.
- To do input/output with files in Python.

UNIT I PYTHON BASICS **10**

Introduction to Python Programming – Python Interpreter and Interactive Mode– Variables and Identifiers – Arithmetic Operators – Values and Types – Statements. Operators – Boolean Values – Operator Precedence – Expression – Conditionals: If-Else Constructs – Loop Structures/Iterative Statements – While Loop – For Loop – Break Statement-Continue statement – Function Call and Returning Values – Parameter Passing – Local and GlobalScope – Recursive Functions.

UNIT II DATA TYPES IN PYTHON **10**

Lists, Tuples, Sets, Strings, Dictionary, Modules: Module Loading and Execution – Packages – Making Your OwnModule – The Python Standard Libraries

UNIT III FILE HANDLING AND EXCEPTION HANDLING **8**

Files: Introduction – File Path – Opening and Closing Files – Reading and Writing Files –File Position – Exception: Errors and Exceptions, Exception Handling, Multiple Exceptions

UNIT IV MODULES, PACKAGES **9**

Modules: Introduction – Module Loading and Execution – Packages – Making Your OwnModule – The Python Libraries for data processing, data mining and visualization-NUMPY, Pandas, Matplotlib, Plotly

UNIT V OBJECT ORIENTED PROGRAMMING IN PYTHON **8**

Creating a Class, Class methods, Class Inheritance, Encapsulation, Polymorphism, class method vs. static methods, Python object persistence

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, students will be able to

- Develop algorithmic solutions to simple computational problems
- Structure simple Python programs for solving problems.

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

- Read and write data from/to files in Python Programs.
- Represent compound data using Python lists, tuples, dictionaries.
- Decompose a Python program into functions.

REFERENCES:

1. ReemaThareja, "Python Programming using Problem Solving Approach", Oxford University Press, First edition, 2017
2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", Second Edition, Shroff,O'Reilly Publishers, 2016 (http://greenteapress.com/wp/thinkpython/)
3. Guido van Rossum, Fred L. Drake Jr., "An Introduction to Python – Revised andUpdated forPython 3.2, Network Theory Ltd., First edition, 2011
4. John V Guttag, "Introduction to Computation and Programming Using Python",Revised and Expanded Edition, MIT Press, 2013
5. Charles Dierbach, "Introduction to Computer Science using Python", Wiley IndiaEdition, First Edition, 2016
6. Timothy A. Budd, "Exploring Python", Mc-Graw Hill Education (India) Private Ltd.,First edition,2011
7. Kenneth A. Lambert, "Fundamentals of Python: First Programs", Cengage Learning, second edition,2012

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

AN EFFICIENT SPAMDETECTION TECHNIQUE FOR IOT DEVICES USING MACHINE LEARNING

APROJECTREPORT

Submittedby

NITHYA A (731220622002)

inpartialfulfillmentfortheawardofthedegree

of

MASTER OF COMPUTER APPLICATION

J .K.K.MUNIRAJAH COLLEGE OF TECHNOLOGYT.N.PALAYAM,GOBI-638512

ANNAUNIVERSITY:CHENNAI600025

SEPTEMBER 2022

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report on **"AN EFFICIENT SPAM DETECTION TECHNIQUE FOR IOT DEVICES USING MACHINE LEARNING "** is the bonafide work of **"NITHYA A (731220622002)"** who carried out the project work under my supervision.

SIGNATURE
Dr.N.SATHYABALAJI.M.E,M.I.S.T.E.,Ph.D.,
HEAD OF THE DEPARTMENT
Associate Professor
Dept. of Computer Applications
J.K.K. Munirajah College of Technology
T.N. Palayam

SIGNATURE
Mrs.A.KANIMOZHI.MCA., M.Phil.,
SUPERVISOR
Assistant Professor
Dept. of Computer Applications
J.K.K. Munirajah College of Technology
T.N. Palayam

Submitted for the Project Viva-Voce examination held on 5/9/2022

INTERNAL EXAMINER

EXTERNAL EXAMINER

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

ABSTRACT

The Internet of Things (IoT) is a group of millions of devices having sensors and actuators linked over wired or wireless channel for data transmission. IoT has grown rapidly over the past decade with more than 25 billion devices are expected to be connected by 2020. The volume of data released from these devices will increase many-fold in the years to come. In addition to an increased volume, the IoT devices produces a large amount of data with a number of different modalities having varying data quality defined by its speed in terms of time and position dependency. In such an environment, machine learning algorithms can play an important role in ensuring security and authorization based on biotechnology, anomalous detection to improve the usability and security of IoT systems. On the other hand, attackers often view learning algorithms to exploit the vulnerabilities in smart IoT-based systems. Motivated from these, in this project, we propose the security of the IoT devices by detecting spam using machine learning. To achieve this objective, Spam Detection in IoT using Machine Learning framework is proposed. In this framework, five machine learning models are evaluated using various metrics with a large collection of inputs features sets. Each model computes a spam score by considering the refined input features. This score depicts the trustworthiness of IoT device under various parameters. REFIT Smart Home dataset is used for the validation of proposed technique. The results obtained proves the effectiveness of the proposed scheme in comparison to the other existing schemes.

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

CHAPTER 1

INTRODUCTION

1.1 About the project

Internet of Things (IoT) enables convergence and implementations between the real world objects irrespective of their geographical locations. Implementation of such network management and control make privacy and protection strategies utmost important and challenging in such an environment. IoT applications need to protect data privacy to fix security issues such as intrusions, spoofing attacks, DoS attacks, DoS attacks, jamming, eavesdropping, spam, and malware. The safety measures of IoT devices depend upon the size and type of organization in which it is imposed.

The behavior of users forces the security gateways to cooperate. In other words, we can say that the location, nature, application of IoT devices decides the security measures. For instance, the smart IoT security cameras in the smart organization can capture the different parameters for analysis and intelligent decision making. The maximum care to be taken is with web based devices as maximum number of IoT devices are web dependent. It is common at the workplace that the IoT devices installed in an organization can be used to implement security and privacy features efficiently.

For example, wearable devices collect and send user's health data to a connected smartphone should prevent leakage of information to ensure privacy. It has been found in the market that 25-30% of working employees connect their personal IoT devices with the organizational network.

The expanding nature of IoT attracts both the audience, i.e., the users and the attackers. However, with the emergence of ML in various attacks scenarios, IoT devices choose a defensive strategy and decide the key parameters in the security protocols for trade-off between security, privacy and computation. This job is challenging as it is usually difficult for an IoT system with limited resources to estimate the current network and timely attack status.

A. Contributions Based upon the above discussions, following contributions are presented in this paper. 1) The proposed scheme of spam detection is validated using five different machine learning models. 2) An algorithm is proposed to compute the spamicity score of each model which is then used for detection and intelligent decision making. 3) Based upon the spamicity score computed in previous step, the reliability of IoT devices is analyzed using different evaluation metrics. B. Organization Rest of the paper is structured as follows. Section II discussed the related work. Section III illustrated the proposed scheme. Results are discussed and analyzed in Section IV. Finally, the paper is concluded in Section V.

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

CHAPTER 9

CONCLUSION AND ENHANCEMENT

The proposed framework, detects the spam parameters of IoT devices using machine learning models. The IoT dataset used for experiments is preprocessed by using feature engineering procedure. By experimenting the framework with machine learning models, each IoT appliance is awarded with a spam score. This refines the conditions to be taken for successful working of IoT devices in a smart home. In future, we are planning to consider the climatic and surrounding features of IoT device to make them more secure and trustworthy.

FUTURE ENHANCEMENT

- We are planning to consider the climatic and surrounding features of IoT device to makethem more secure and trustworthy.
- IoT devices using AI models will be able to clearly delineate their spam bounds. Using a highlight design technique, the IoT dataset used for testing is pre-processed. Using artificial intelligence (AI) algorithms, each IoT device receives.
- This improves the conditions necessary for smart home IoT devices to functioneffectively.

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

MC5105 **ADVANCED DATABASE TECHNOLOGY** L T P C
3 0 0 3

OBJECTIVES:

- To learn the fundamentals of data modeling and design in advanced databases.
- To study the working principles of distributed databases.
- To have an introductory knowledge about the query processing in object-based databases and its usage.
- To understand the basics of spatial, temporal and mobile databases and their applications.
- To learn emerging databases such as XML, Data warehouse and NoSQL.

UNIT I DISTRIBUTED DATABASES 9

Distributed Systems – Introduction – Architecture – Distributed Database Concepts – DistributedData Storage – Distributed Transactions – Commit Protocols – Concurrency Control – DistributedQuery Processing

UNIT II NOSQL DATABASES 9

NoSQL – CAP Theorem – Sharding - Document based – MongoDB Operation: Insert, Update, Delete, Query, Indexing, Application, Replication, Sharding, Deployment – Using MongoDB with PHP / JAVA – Advanced MongoDB Features – Cassandra: Data Model, Key Space, Table Operations, CRUD Operations, CQL Types – HIVE: Data types, Database Operations, Partitioning – HiveQL – OrientDB Graph database – OrientDB Features

UNIT III ADVANCED DATABASE SYSTEMS 9

Object Oriented Databases-Need for Complex Data Types - The Object-Oriented Data Model-Object-Oriented Languages-Spatial Databases: Spatial Data Types, Spatial Relationships, Spatial Data Structures, Spatial Access Methods – Temporal Databases: Overview – Active Databases – Deductive Databases – RecursiveQueries in SQL – Mobile Databases: Location and Handoff Management, Mobile TransactionModels, Concurrency – Transaction Commit Protocols – Multimedia Databases.

UNIT IV XML AND DATAWAREHOUSE 9

XML Database: XML – XML Schema – XML DOM and SAX Parsers – XSL – XSLT – XPath and XQuery – Data Warehouse: Introduction – Multidimensional Data Modeling – Star and SnowflakeSchema – Architecture – OLAP Operations and Queries.

UNIT V INFORMATION RETRIEVAL AND WEB SEARCH 9

IR concepts – Retrieval Models – Queries in IR system – Text Preprocessing – Inverted Indexing – Evaluation Measures – Web Search and Analytics – Ontology based Search - Current trends.

TOTAL: 45 PERIODS

OUTCOMES:

On completion of the course, the student will be able to:

1. Design a distributed database system and execute distributed queries.
2. Use NoSQL database systems and manipulate the data associated with it.
3. Design a data warehouse system and apply OLAP operations.
4. Design XML database systems and validating with XML schema.
5. Apply knowledge of information retrieval concepts on web databases.

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt)

REFERENCES:

1. Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts", 6th Edition, McGraw Hill, 2011.
2. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Seventh Edition, Pearson Education/Addison Wesley, 2017.
3. C. J. Date, A. Kannan, S. Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.
4. Jiawei Han, MichelineKamber ,Jian Pei, "Data Mining: Concepts and Techniques", Third Edition, Morgan Kaufmann, 2012.
5. Brad Dayley, "Teach Yourself NoSQL with MongoDB in 24 Hours", Sams Publishing, First Edition, 2014.
6. ShashankTiwari, "Professional NoSQL", O'Reilly Media, First Edition, 2011.
7. Vijay Kumar, "Mobile Database Systems", John Wiley & Sons, First Edition, 2006

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

MC5207 **CLOUD COMPUTING TECHNOLOGIES** L T P C
3 0 0 3

OBJECTIVES:

- To understand the basic concepts of Distributed systems
- To learn about the current trend and basics of Cloud computing
- To be familiar with various Cloud concepts
- To expose with the Server, Network and storage virtualization
- To be aware of Microservices and DevOps

UNIT I DISTRIBUTED SYSTEMS 9

Introduction to Distributed Systems – Characterization of Distributed Systems – Distributed Architectural Models –Remote Invocation – Request-Reply Protocols – Remote Procedure Call – Remote Method Invocation – Group Communication – Coordination in Group Communication – Ordered Multicast – Time Ordering – Physical Clock Synchronization – Logical Time and Logical Clocks

UNIT II INTRODUCTION TO CLOUD COMPUTING 9

Cloud Computing Basics – Desired features of Cloud Computing – Elasticity in Cloud – On demand provisioning - Applications – Benefits – Cloud Components: Clients, Datacenters & Distributed Servers – Characterization of Distributed Systems – Distributed Architectural Models - Principles of Parallel and Distributed computing - Applications of Cloud computing – Benefits – Cloud services – Open source Cloud Software: Eucalyptus, Open Nebula, Open stack, Aneka, Cloudsim.

UNIT III CLOUD INFRASTRUCTURE 9

Cloud Architecture and Design – Architectural design challenges – Technologies for Network based system - NIST Cloud computing Reference Architecture – Public, Private and Hybrid clouds – Cloud Models : IaaS, PaaS and SaaS – Cloud storage providers - Enabling Technologies for the Internet of Things – Innovative Applications of the Internet of Things.

UNIT IV CLOUD ENABLING TECHNOLOGIES 9

Service Oriented Architecture – Web Services – Basics of Virtualization – Emulation – Types of Virtualization – Implementation levels of Virtualization – Virtualization structures – Tools & Mechanisms – Virtualization of CPU, Memory & I/O Devices – Desktop Virtualization – Server Virtualization – Google App Engine – Amazon AWS - Federation in the Cloud.

UNIT V MICROSERVICES AND DEVOPS 9

Defining Microservices - Emergence of Microservice Architecture – Design patterns of Microservices – The Mini web service architecture – Microservice dependency tree – Challenges with Microservices - SOA vsMicroservice – Microservice and API – Deploying and maintaining Microservices – Reason for having DevOps – Overview of DevOps – History of DevOps – Concepts and terminology in DevOps – Core elements of DevOps – Life cycle of DevOps – Adoption of DevOps - DevOps Tools – Build, Promotion and Deployment in DevOps - DevOps in Business Enterprises.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

- Use Distributed systems in Cloud Environment
- Articulate the main concepts, key technologies, strengths and limitations of Cloud computing
- Identify the Architecture, Infrastructure and delivery models of Cloud computing
- Install, choose and use the appropriate current technology for the implementation of Cloud
- Adopt Microservices and DevOps in Cloud environment

REFERENCES:

1. Kai Hwang, Geoffrey C. Fox & Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, First Edition, 2012
2. Andrew S. Tanenbaum& Maarten Van Steen, "Distributed Systems - Principles and Paradigms", Second Edition, Pearson Prentice Hall, 2006
3. Thomas Erl, ZaighamMahood& Ricardo Puttini, "Cloud Computing, Concept, Technology & Architecture", Prentice Hall, SecondEdition,2013
4. Richard Rodger, "The Tao of Microservices", ISBN 9781617293146, Manning Publications, First Edition,December 2017.
5. Magnus Larsson, "Hands-On Microservices with Spring Boot and Spring Cloud: Build and deploy microservices using spring cloud, Istio and kubernetes", Packt Publishing Ltd, First Edition,September 2019.
6. Jim Lewis, "DEVOPS: A complete beginner's guide to DevOps best practices", ISBN-13:978-1673259148, ISBN-10: 1673259146, First Edition, 2019.

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

MC5206	INTERNET PROGRAMMING	L T P C 3 0 0 3

COURSE OBJECTIVES:

- To understand the fundamentals of web programming and client side scripting.
- To learn the server side development using servlets, websocket.
- To learn the Spring framework and build applications using Spring.
- To learn and implement the concept of Java Persistence API.
- To learn the advanced client side scripting and framework.

UNIT I INTRODUCTION TO WEB & CLIENT SIDE PROGRAMMING 9

Introduction to Web: Server - Client - Communication Protocol (HTTP), JavaScript: Data Types and Variables - Expressions - Operators and Statements - Objects and Arrays - Functions - Classes - Modules - DOM - Events - Storage: LocalStorage, Cookies, IndexedDB, JSON, AJAX

UNIT II SERVER SIDE PROGRAMMING 9

Web Server: Web Containers - Web Components, Servlet: Lifecycle - Request - Servlet Context - Response - Filter - Session - Dispatching Requests, WebSocket, Logging - Log4j2, Build tool - Gradle. Introduction to Spring: IoC Container and Dependency Injection (DI)

UNIT III SPRING 9

Spring Configuration and Spring Boot, Spring MVC: DispatcherServlet and Configuration - Interceptors - Controllers - Views - Input Validation - File Upload, Building RESTful Web Services, Spring Security Architecture, Spring Cache.

UNIT IV JAVA PERSISTENCE API AND HIBERNATE 9

Entity: Basic, Embeddable and Collection Types - Identifiers - Entity Relationship - Inheritance, Persistence Context and Entity Manager, JPQL, Criteria API, Spring Data JPA - Specification and Projection.

UNIT V ADVANCED CLIENT SIDE PROGRAMMING 9

Asynchronous JavaScript: Callbacks - Promises - async and await, React JS: ReactDOM - JSX - Components - Properties - State and Lifecycle - Events - Lifting State Up - Composition and Inheritance - Higher Order Components.

TOTAL: 45 PERIODS

Course Outcomes:

Upon completion of the course the students should be able to:

- To write client side scripting.
- To implement the server side of the web application.
- To implement Web Application using Spring.
- To implement a Java application using Java Persistence API.
- To implement a full-stack Single Page Application using React, Spring and JPA.

REFERENCE BOOKS

1. David Flanagan, "Java Script: The Definitive Guide", O'Reilly Media, Inc, 7th Edition, 2020
2. Matt Frisbie, "Professional JavaScript for Web Developers", Wiley Publishing, Inc, 4th Edition, ISBN: 978-1-119-36656-0, 2019

3. Alex Banks, Eve Porcello, "Learning React", O'Reilly Media, Inc, 2nd Edition, 2020 https://reactjs.org/docs
4. David R. Heffelfinger, "Java EE 8 Application Development", Packt Publishing, First edition2017
5. Benjamin Muschko, "Gradle in Action", Manning Publications, First edition2014
6. IulianaCosmina, Rob Harrop, Chris Schaefer, Clarence Ho, "Pro Spring 5: An In-Depth Guide to the Spring Framework and Its Tools", Apress, Fifth edition2017
7. Christian Bauer, Gavin King, and Gary Gregory, "Java Persistence with Hibernate", Manning Publications, \r, 2nd Edition, 2015

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

ACCESS CONTROL FOR CLOUD BASED DATA STORAGE

A PROJECT REPORT

Submitted by

A.K.THARUN VISHAL (731220622005)

In partial fulfillment for the award of the degree

of

MASTER OF COMPUTER APPLICATIONS

J.K.K.MUNIRAJAH COLLEGE OF TECHNOLOGY

T.N.PALAYAM, GOBI-638506

ANNA UNIVERSITY::CHENNAI 600025

SEPTEMBER 2022

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

ANNA UNIVERSITY:CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report on **"ACCESS CONTROL FOR CLOUD BASED DATA STORAGE"** is the bonafide work of **"A.K.THARUN VISHAL (731220622005)"** who carried out the project work under my supervision.

SIGNATURE

Dr.N.SATHYABALAJI.M.E,M.I.S.T.E.,Ph.D.,
HEAD OF THE DEPARTMENT
Associate Professor
Dept. of Computer Applications
J.K.K. Munirajah College of Technology
T.N. Palayam

SIGNATURE

Mr.M.SENTHILKUMAR.MCA,.
SUPERVISOR
Assistant Professor
Dept. of Computer Applications
J.K.K. Munirajah College of Technology
T.N. Palayam

Submitted for the Project Viva-Voce examination held on 05.09.2022

INTERNAL EXAMINER

EXTERNAL EXAMINER

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

ABSTRACT

Distributed computing is a high-level breakthrough in the making. Information storage is a huge headache for everyone in this world. Distributed computing is an excellent solution for storing and retrieving data in the most straightforward and quickest way possible. Security is the most pressing concern in distributed computing. I'm attempting to show another approach for giving distributed computing had admission control in this paper. In distributed computing, this architecture provides secured admittance control. It adopts a progressive construction and use a clock to provide more granular access control. We can easily transmit, download, and delete documents from and to the cloud using this method. Access Control, Cloud Computing, and Cloud Privacy are some of the terms on the list. the National Institute of Standards and Technology states that. This decentralised computing has numerous advantages, especially in ubiquitous administrations where everyone can access PC administrations over the internet. You may create a device with a small display, processor, and RAM using distributed computing. Different types of equipment,such as extra memory, are not required. It will make our new invention gadgets smaller. In addition, it lowers our framework's costs. Virtualization, will on- demand configuration, Internet administration delivery, and it open source programming are all examples of distributed computing.

CHAPTER 1
INTRODUCTION

Due to its extensive list of advantages, which includes access freedom and the lack of local data management, in many Internet-based commercial products (such as Apple iCould). Nowadays, a growing number of people and businesses prefer to outsource their data to faraway clouds in order to avoid having to upgrade their local data management facilities or devices. However, one of the biggest barriers preventing Internet users from embracing cloud- based storage services generally may be their concern about security breaches involving outsourced data. Outsourced data may need to be subsequently shared with others in many practical scenarios. Alice, a Dropbox user, might send her friends pictures. Without employing data encryption, Alice must first create a sharing link and then distribute it to others in order to share the images. The sharing link may be exposed at the Dropbox administration level, even though it guarantees some level of access restriction over unauthorized users (for example, those who are not Alice's friends) (e.g., administrator could reach the link).

A simple solution to prevent shared photos from being accessed by system "insiders" is to specify the group of authorized data users before encrypting the data. However, Alice might not always be aware of who will be receiving or using the photos. Alice might only be aware of attributes related to photo receivers. Here, conventional public key encryption is used (e.g., Paillier Encryption),That cannot be used since it requires the encryptor to know who the data recipient is beforehand. It is therefore desirable to provide a policy-based encryption method over the outsourced photographs, such that Alice may use the mechanism to set access policies over the encrypted photos to ensure that only a select group of authorized people can access the photos. A frequent exploit known as a resource-exhaustion attack exists in cloud-based storage services.

1.1 DOMAIN OVERVIEW

One of the emerging developments is distributed computing. It addresses a fundamental shift in perspective in the way frameworks are communicated [8]. "Distributed computing is a model for enabling pervasive, advantageous, on-request network access to a common pool of configurable figuring assets (e.g., networks, servers, capacity, applications, and administrations) that can be quickly provisioned and delivered with insignificant administration exertion or specialist organization connection. A malicious service user may launch denial-of-service (DoS) or distributed denial-of-service (DDoS) attacks to consume the resources of the cloud storage service server in order to disrupt the cloud service because a (public) cloud may not have any control over download requests (i.e., a service user may send an unlimited number of download requests to the cloud server).Could not fulfill the service needs of sincere customers. Due to increased resource demand, the "pay-as-you-go" model runs the risk of upsetting the economy. Users of cloud services will experience a sharp increase in costs as the attacks intensify. This is referred to as an Economic Denial of Sustainability (EDoS) assault, which attacks the financial resources of cloud adopters.

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

1.2 SCOPE OF THE PROJECT

Distributed computing attacks have grown in tandem with the advent of cloud applications. As a result of these attacks, we urgently require a more advanced distributed computing security policy. Access control is a strategy or approach that allows, denies, or restricts access to a framework. It may also detect clients attempting to gain access to an unapproved system. One application can relay on another's identification thanks to access control [8]. The traditional model for access control, application-driven access control [1] is a common access control architecture in each application monitors and manages its own set of clients, isn't possible in cloud-based systems. Because we need a lot of memory for this strategy, we'll need a lot of RAM to store the client's nuances, such as username and secret phrase. As a result, the cloud necessitates a client-driven access control system, in which each client solicitation to any specialist organization is packed with the client's personality and privilege data. In distributed computing, we currently have a plethora of processes for access control. These, on the other hand, are not obtained and effective. As a result of this problem, we are attempting to suggest a new and more effective access control technique for distributed computing.

CONCLUSION

It is a highly efficient model for providing cloud computing access control. It has a hierarchical structure and uses a clock to provide a time-based decryption key. In cloud computing, this paradigm ensures both security and access control. Registration, file upload, file download, and file deletion are the major operations in this model.

We presented the idea of SE-EPOM and defined its security definitions in this work. Cloud computing is an enigma anyone can get lost in. But just like any other technology, cloud computing is also a double edged sword. On one end lies the promise of lightning fast technology, a huge array of applications to use, seemingly unlimited storage space. On the other end lie various security threats which emerge with shared spaces such as breach of confidentiality, hampering of data integrity and nonavailability of data. In this paper, we have proposed a framework which encrypts a file before it is uploaded on to the cloud. AES (Advanced Encryption Standard) is one of the most secure encryption algorithms and not many attacks are successful on data which is encrypted using AES. This proposal solves the problem of most, if not all, of the threats that data stored in the cloud faces. Our framework also suggests the use of login id and password to ensure authentic and authorized access to a user's data. Thus, if used securely, cloud computing provides a user with amazing benefits and overcomes its only disadvantage of security threat.

FUTURE ENHANCEMENT

The proposed framework can be developed in the form of a mobile application using the various operating systems such as android, iOS, Windows and Symbian. It can also be integrated with any of the social networking sites to exchange data securely in its encrypted form. The algorithm can also be enhanced to not only encrypt text files but also audio and video files.

INTERNSHIP

Request Letter For Internship

2.4.2022
T.N.Palayam

FROM,

Head Of The Department,
Department of Master of Computer Applications,
Jkk Munirajah College of Technology,
T.N.Palayam, Erode-638506
Tamilnadu.

TO

THE HR,
Qtree Technologies,
Coimbatore

Dear Sir,

On Behalf of JKK Munirajah College of Technology , I wish to request for permission to attend the internship in your company. Our college is reputed at providing quality education in the various courses .

I wish to undertake an internship program for final year students of Master of Computer Applications of JKK Munirajah College of Technology . I believe that your company willgive more practical knowledge during this internship program. So kindly allow our students to attend the internship program for 45 days **(11.4.2022 T0 25.5.2022)** to improvehis knowledge and also I attached students detail to this letter.

NAME OF THE STUDENTS: **(NAVANEETHARAN.L.N, NITHYA.A , THARUN VISHAL.A.K.)**

Thank you in Advance

Yours faithfully,

Head Of The Department,
Department of Master of Computer Applications,
JKK Munirajah College of Technology,
T.N.Palayam, Erode-638506
Tamilnadu.

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

Gmail

Internship
1 message

Thu 04 April 2022 at 10.00 a.m

From: KANIMOZHI .A <kanimozhia@jkkmct.edu.in>
Date: Mon 04 April 2022 at 10.00 a.m
Subject : Internship - reg
To: Qtree techonologies <Qtreetechnologies@gmail.com>

Dear SIR ,

I am requesting to be joining your Qtree technologies. The requirements are exactly what I have prepared for and hoped to do. I feel confident that I can make a significant contribution to your organization while at the same time learning from your staff.

Additionally, I shall complete all insurance forms for the new intern orientation. I look forward to working with you and your fine team. I appreciate your confidence in me and providing the chance to work with and observe your outstanding staff.

Ref: following the students:

(Navaneetharan.L.N. ,Nithya.A ,Tharun Vishal A.K.)

Sincerely,

Final Year MCA Students,
JKK Munirajah College of Technology,
T.N.Palayam, Erode-638506, Tamilnadu.

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

Gmail

Internship
1 message

Fri 05 April 2022 at 11.30 p.m

From: Qtree techonologies <Qtreetechnologies@gmail.com>
Date: Tue 05 April 2022 at 11.30 p.m
Subject: Internship - reg
To: KANIMOZHI .A < kanimozhia@jkkmct.edu.in >

Dear sir,

I am writing to confirm my acceptance of your internship offer of **11.04.2022 to 25.05.2022** and to tell you how to be joining our **Qtree technologies**. The requirements are exactly what I have prepared for and hoped to do. I feel confident that I can make a significant contribution to your organization while at the same time learning from my staff.

As we discussed, I will report at 8:30 a.m. on **APRIL 11, 2022** and will be ready to take on my first assignment as an intern for my company. Additionally, I shall complete all insurance forms for the new intern orientation. I look forward to working with you and your fine team. I appreciate your confidence in me and providing the chance to work with and observe your outstanding staff.

Ref: following the students:

(Navaneetharan.L.N. ,Nithya.A ,Tharun Vishal A.K.)

Sincerely,

A. Prakash, M.Tech.,
Project Manager,
Qtree Technologies,
No.22,23, First floor, Sarojini street,
Ram Nagar, Upstairs of Indian Bank,
Opposite to Hotel Junior Kuppanna
Coimbatore-641 009

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

No 22,23, First floor, Sarojini Street,
Ram Nagar, Upstairs of Indian Bank,
opposite to Hotel Junior Kuppanna,
Coimbatore, Tamil Nadu 641009

Mr.A.Prakash[M.Tech]
Project Manager
Phone No: 8489900332

INDUSTRIAL TRAINING CERTIFICATE

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Navaneetharan.L.N**, studying **II-Year** Master of Computer Applications at J.K.K.Munirajah College of Technology, T.N.Palayam, Gobi(TK), Erode District-638 506 had undergone the Internship program at Qtree Technologies and developed the project **" DEFECT TRACKING SYSTEM"** in our concern during **11.04.2022 to 25.05.2022**.

His conduct and character was good during the training period.

For Qtree technologies,

Date:25.05.2022

Place:Coimbatore

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

No 22,23, First floor, Sarojini Street,
Ram Nagar, Upstairs of Indian Bank,
opposite to Hotel Junior Kuppanna,
Coimbatore, Tamil Nadu 641009

Mr.A.Prakash[M.Tech]
Project Manager
Phone No: 8489900332

INDUSTRIAL TRAINING CERTIFICATE

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **NITHYA.A**, studying **II-Year** Master of Computer Applications at J.K.K.Munirajah College of Technology, T.N.Palayam, Gobi(TK), Erode District-638 506 had undergone the Internship program at Qtree Technologies and developed the project **"AN EFFICIENT SPAM DETECTION TECHNIQUE FOR IOT DEVICES USING MACHINE LEARNING"** in our concern during **11.04.2022 to 25.05.2022**.

Her conduct and character was good during the training period.

For Qtree technologies,

Date:25.05.2022

Place:Coimbatore

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

No 22,23, First floor, Sarojini Street,
Ram Nagar, Upstairs of Indian Bank,
opposite to Hotel Junior Kuppanna,
Coimbatore, Tamil Nadu 641009

Mr.A.Prakash[M.Tech]
Project Manager
Phone No: 8489900332

INDUSTRIAL TRAINING CERTIFICATE

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **THARUN VISHAL.A.K.**, studying **II-Year** Master of Computer Applications at J.K.K.Munirajah College of Technology, T.N.Palayam, Gobi(TK), Erode District-638 506 had undergone the Internship program at Qtree Technologies and developed the project **" ACCESS CONTROL FOR CLOUD BASED DATA STORAGE"** in our concern during **11.04.2022 to 25.05.2022**.

His conduct and character was good during the training period.

For Qtree technologies,

Date:25.05.2022

Place:Coimbatore

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).