SAVITRIBAI PHULE PUNE UNIVERSITY

A PROJECT REPORT ON

Trust-but-Verify: Verifying Result Correctness of Outsourced Frequent Itemset Mining in Data-mining-as-a-service Paradigm

SUBMITTED TOWARDS THE
PARTIAL FULFILLMENT OF THE REQUIREMENTS OF

BACHELOR OF ENGINEERING
(Computer Engineering)

BY

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CERTIFICATE

This is to certify that the Project Entitled

Trust-but-Verify: Verifying Result Correctness of Outsourced Frequent Itemset Mining in Data-mining-as-a-service Paradigm

Submitted by

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is a bonafide work carried out by Students under the supervision of Prof. Guide Name and it is submitted towards the partial fulfillment of the requirement of Bachelor of Engineering (Computer Engineering).

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PROJECT APPROVAL SHEET

Trust-but-Verify: Verifying Result Correctness of Outsourced Frequent Itemset Mining in Data-mining-as-a-service Paradigm

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SAVITRIBAI PHULE PUNE UNIVERSITY,PUNE

ACADEMIC YEAR 2016-2017

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Abstract

Nowdays,Data Mining and Cloud computing help in our qualified and experienced analysts,manage and extract relevant information from data sets and Internet-based computing that provides shared processing resources and data to computers and other devices on demand.But How client can define server returns correct mining result. The increasing ability to generate vast quantities of data presents technical challenges for efficient data mining. Outsourcing data mining computations to a third-party service provider (server) offers a cost-effective option, especially for data owners (clients) of limited resources. This introduces the data-mining-as-a-service (DMaS) paradigm.so need to consider that some servers potentially untrusted.Client returns the vast outsourced data to the server.in this paper propose that server returns Correct and Completeness Frequent Itemsets mining,remove a small set of items from the original dataset and insert small set of artificial transactions into the dataset to construct frequent itemsets.so demonstrate usefull and effective method for results on dataset.We also design efficient verification methods for both cases that the data and the mining setup are updated. We demonstrate the effectiveness and efficiency of our methods using an extensive set of empirical results on real datasets.

Acknowledgments

It gives us great pleasure in presenting the preliminary project report on ***'Trust-but-Verify: Verifying Result Correctness of Outsourced Frequent Itemset Mining in Data-mining-as-a-service Paradigm'****.*

I would like to take this opportunity to thank my internal guide ***Prof. Mangesh Manke*** *for giving me all the help and guidance I needed. I am really grateful to them for their kind support. Their valuable suggestions were very helpful.*

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Akshay Mohite
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Chapter 1

Synopsis

1.1 Project Title

Trust-but-Verify: Verifying Result Correctness of Outsourced Frequent Itemset Mining in Data-mining-as-a-service Paradigm

1.2 Project Option

Internal Project

1.3 Internal Guide

Prof. Mangesh Manke

1.4 Technical Keywords

1. Information System
   (a) Database Management
      i. Database Applicatiion
         A. Data Mining
         B. Cloud Computing
   (b) Informattion Storage Retrieval
      i. Online Information Service
         A. commercial Service
         B. web base service

C. Data Sharing

1.5 Problem Statement

To study Frequent Itemset Mining and verification of Trusted server and show correct and complete result from outsourced Data.

1.6 Abstract

Cloud computing is popularizing the computing paradigm in which data is outsourced to a third-party service provider (server) for data mining. Outsourcing, however, raises a serious security issue: how can the client of weak computational power verify that the server returned correct mining result? In this paper, we focus on the specific task of frequent itemset mining. We consider the server that is potentially untrusted and tries to escape from verification by using its prior knowledge of the outsourced data. We propose efficient probabilistic and deterministic verification approaches to check whether the server has returned correct and complete frequent itemsets. Our probabilistic approach can catch incorrect results with high probability, while our deterministic approach measures the result correctness with 100for both cases that the data and the mining setup are updated. We demonstrate the effectiveness and efficiency of our methods using an extensive set of empirical results on real datasets.

1.7 Goals and Objectives

- To return Correct frequent dataset mining.
- To verify trusted servers product items.
- providing security to the data server.
- By correctness and completeness to construct cryptographic proofs of the mining result.

1.8 Relevant mathematics associated with the Project

System Description:

- Input: Upload the Product items on the server
- Output:Frequent itemset mining on outsourced data
- To verify the trusted Un-trusted product

Models:

1. Frequent Itemset Mining
2. Untrusted Server
3. Verification

Algorithms:

1. Markle Hash Tree

$$h_l = hash(l||T[l]) \tag{1.1}$$

T:Markle Hash Tree
l:Leaf Node

2. Bilinear Pairings

$$e : G1 * G1 \rightarrow G2 \tag{1.2}$$

G1,G2 :Two multiplicative groups
e:Bilinear Map

1.9 Names of Conferences / Journals where papers can be published

- IEEE
- ACM Conference
- IJETCS
- The International Journals of Research Papers(IJRP)
- International journal of Computers and Technology(IJCT)

1.10 Review of Conference/Journal Papers supporting Project idea

1. Fast algorithms for mining association rules in large databases.
   Rakesh Agrawal and Ramakrishnan Srikant-Database mining is motivated by the decision support problem faced by most large retail organizations Progress in bar
   code technology has made it possible for retail organizations to collect

2. Checking computations in polylogarithmic time .
   Laszlo Babai, Lance Fortnow, Leonid A. Levin, and Mario Szegedyx.
   The proof of the Four Color Theorem [AHK77], considered controversial at the time, started with a Lemma that the Theorem follows if certain computation terminates. It was completed with the experimental fact that the computation did indeed terminate within two weeks on contemporary computers.

3. Verifiable computation with two or more clouds
   Ran Canetti, Ben Riva, and Guy N. Rothblum
   The current move to Cloud Computing raises the need for verifiable delegation of computations, where a weak client delegates his computation to a powerful cloud, while maintaining the ability to verify that the result is correct.

4. Non-interactive verifiable computing: outsourcing computation to untrusted workers
   Rosario Gennaro, Craig Gentry, and Bryan Parno
   Introduced the notion of Verifiable Computation as a natural formulation for the increasingly common phenomenon of outsourcing computational tasks to untrusted workers

5. Privacy-preserving data mining from outsourced databases
   Fosca Giannotti, Laks V. S. Lakshmanan, Anna Monreale, Dino Pedreschi, and Wendy Hui Wang
   There are two aspects of data mining when we look at it from a privacy perspective Being able to mine the data without seeing the actual data Protecting the privacy of people against the misusage of data

6. The knowledge complexity of interactive proof systems-S. Goldwasser, S. Micali, and C. Rackoff- introduce a new theorem-proving procedure, that is a new eflcierlt method of communicafirrg a proof: Any such method implies, directly or indirectly, a definition of proof. Our proofs arc probabilistic in nature

7. Dynamic authenticated index structures for outsourced databases
   Feifei Li, Marios Hadjieleftheriou, George Kollios, and Leonid Reyzin
   a comprehensive evaluation of authenticated index structures based on a variety of cost metrics and taking into account the cost of cryptographic operations, as well as that of index maintenance.

8. On the security and (im)practicality of outsourcing precise association rule mining
   Ian Molloy, Ninghui Li, and Tiancheng Li
   Presented an attack on a database encoding scheme for outsourcing association rule mining. We showed how an attacker may identify patterns in the data created by the encoding algorithm, allowing a significant amount of the original data to be recovered.

9. Authenticated hash tables
   Charalampos Papamanthou, Roberto Tamassia, and Nikos Triandopoulos
   provably secure, cryptographic construction for authenticating the hash table functionality. Use nested RSA accumulators on a tree of constant depth in order to provide with authenticated hash table queries with constant query

10. An audit environment for outsourcing of frequent itemset mining
    W. K. Wong, David W. Cheung, Ben Kao, Edward Hung, and Nikos Mamoulis
    In this paper put forward the integrity problem in outsourcing the task of frequent itemset mining.

1.11 Plan of Project Execution

Project Plan					
	Jul	Aug	Sept	Oct	Nov
Requirement analysis	✓	✓			
SRS document preparation		✓	✓		
Discussion with guide for modules and report			✓		
Finalize report content from guide and testing				✓	
Discussion and report checking with guide				✓	✓
Completion and submission of stage I report					✓

Chapter 2

Technical Keywords

2.1 Area of Project

Data Mining

2.2 Technical Keywords

(a) Information System

i. Database Management

A. Database Applicatiion

B. Data Mining

C. Cloud Computing

ii. Informattion Storage Retrieval

A. Online Information Service

B. commercial Service

C. web base service

D. Data Sharing

Chapter 3

Introduction

The increasing ability to generate vast quantities of data presents technical challenges for efficient data mining. Outsourcing data mining computations to a third-party service provider (server) offers a cost-effective option.This introduces the data-mining-as-a-service (DMaS) paradigm. Cloud computing provides a natural solution for the DMaS paradigm. A few active industry projects. In this paper focus on frequent itemset mining as the outsourced data mining task. Informally, frequent itemsets refer to a set of data values whose number of co-occurrences exceeds a given threshold. Frequent itemset mining has been proven important in many applications such as market data analysis, networking data study, and human gene association study. Previous research has shown that frequent itemset mining can be computationally intensive, due to the huge search space that is exponential to data size as well as the possible explosive number of discovered frequent itemsets. Therefore, for those clients of limited computational resources, outsourcing frequent itemset mining to computationally powerful service providers (e.g., the cloud) is a natural solution. Although it is advantageous to achieve sophisticated analysis on tremendous volumes of data in a cost effective way, end users hesitate to place full trust in cloud computing. This raises serious security concerns. One of the main security issues is the integrity of the mining result. There are many possible reasons for the service provider to return incorrect answers. Since sometimes the mining results are so critical that it is imperative to rule out errors during the computation, it is important to provide efficient mechanisms to verify the result integrity of outsourced data mining computations. In this paper, focus on the problem of verifying whether the server returned correct and complete frequent itemsets. By correctness, mean that all itemsets returned by the server are frequent. By completeness, we mean that no frequent itemset is missing in the returned result.

3.1 Project Idea

- Project Idea

3.2 Motivation of the Project

- We conduct experiments to evaluate the proposed method with real-life datasets, and compare the results with those of existing methods that are adapted to the problem. From our experimental results, the proposed method is at least an order of magnitude faster than the existing methods in most cases while achieving high accuracy.

3.3 Literature Survey

- Fast algorithms for mining association rules in large databases.
  Rakesh Agrawal and Ramakrishnan Srikant-Database mining is motivated by the decision support problem faced by most large retail organizations Progress in bar
  code technology has made it possible for retail organizations to collect

- Checking computations in polylogarithmic time .
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- Verifiable computation with two or more clouds
  Ran Canetti, Ben Riva, and Guy N. Rothblum
  The current move to Cloud Computing raises the need for verifiable delegation of computations, where a weak client delegates his computation to a powerful cloud, while maintaining the ability to verify that the result is correct.

Chapter 4

Problem Definition and scope

4.1 Problem Statement

To study Frequent Itemset Mining and verification of Trusted server and show correct and complete result from outsourced Data.

4.1.1 Goals and objectives

- To return Correct frequent dataset mining.
- To verify trusted servers product items.
- providing security to the data server.
- By correctness and completeness to construct cryptographic proofs of the mining result.

4.1.2 Statement of scope

- A description of the software with Size of input, bounds on input, input validation, input dependency, i/o state diagram, Major inputs, and outputs are described without regard to implementation detail.
- The scope identifies what the product is and is not, what it will and won?t do, what it will and wont contain.

4.2 Major Constraints

- Any constraints that will impact the manner in which the software is to be specified, designed, implemented or tested are noted here.

4.3 Methodologies of Problem solving and efficiency issues

- The single problem can be solved by different solutions. This considers the performance parameters for each approach. Thus considers the efficiency issues.

4.4 Outcome

- To Construct the cryptographic proof
- To reduce the complexity of System
- To increase the efficiency of the system
- To study different frequent item set mining algorithm and encryption algorithm
- Create probabilistic verification approach to design robust against the attack.

4.5 Applications

- E-commerce application
- Market data Analysis
- Networking data study
- Humman gene Association

4.6 Hardware Resources Required

- System : Pentium IV 2.4 GHz.
- Hard Disk : 40 GB.
- Monitor : 15 VGA Colour.
- Mouse : Logitech.
- Ram : 4 GB

Sr. No.	Parameter	Minimum Requirement	Justification
1	CPU Speed	2.4 GHz	Does not Interrupt
2	RAM	4 GB	Faster Execution
3	Hard disk	40 GB	Data Storage
2	Monitor	15 VGA colour	Better UI

Table 4.1: Hardware Requirements

4.7 Software Resources Required

Platform :

1. Operating System: Window 8.1
2. IDE: Netbeans/Eclipse
3. Programming Language: Advanced Java,HTML
4. Database: Mysql

Chapter 5

Project Plan

5.1 Project Estimates

Use Waterfall model and associated streams derived from assignments 1,2, 3, 4 and 5(Annex A and B) for estimation.

5.1.1 Reconciled Estimates

5.1.1.1 Cost Estimate

5.1.1.2 Time Estimates

5.1.2 Project Resources

Project resources [People, Hardware, Software, Tools and other resources] based on Memory Sharing, IPC, and Concurrency derived using appendices to be referred.

5.2 Risk Management w.r.t. NP Hard analysis

This section discusses Project risks and the approach to managing them.

5.2.1 Risk Identification

For risks identification, review of scope document, requirements specifications and schedule is done. Answers to questionnaire revealed some risks. Each risk is categorized as per the categories mentioned in [**?**]. Please refer table 5.1 for all the risks. You can refereed following risk identification questionnaire.

1. Have top software and customer managers formally committed to support the project?
2. Are end-users enthusiastically committed to the project and the system/product to be built?
3. Are requirements fully understood by the software engineering team and its customers?
4. Have customers been involved fully in the definition of requirements?
5. Do end-users have realistic expectations?
6. Does the software engineering team have the right mix of skills?
7. Are project requirements stable?
8. Is the number of people on the project team adequate to do the job?
9. Do all customer/user constituencies agree on the importance of the project and on the requirements for the system/product to be built?

5.2.2 Risk Analysis

The risks for the Project can be analyzed within the constraints of time and quality

ID	Risk Description	Probability	Impact		
			Schedule	Quality	Overall
1	Description 1	Low	Low	High	High
2	Description 2	Low	Low	High	High

Table 5.1: Risk Table

5.2.3 Overview of Risk Mitigation, Monitoring, Management

Following are the details for each risk.

Probability	Value	Description
High	Probability of occurrence is	$> 75\%$
Medium	Probability of occurrence is	$26 - 75\%$
Low	Probability of occurrence is	$< 25\%$

Table 5.2: Risk Probability definitions [**?**]

Impact	Value	Description
Very high	$> 10\%$	Schedule impact or Unacceptable quality
High	$5 - 10\%$	Schedule impact or Some parts of the project have low quality
Medium	$< 5\%$	Schedule impact or Barely noticeable degradation in quality Low Impact on schedule or Quality can be incorporated

Table 5.3: Risk Impact definitions [**?**]

Risk ID	1
Risk Description	Description 1
Category	Development Environment.
Source	Software requirement Specification document.
Probability	Low
Impact	High
Response	Mitigate
Strategy	Strategy
Risk Status	Occurred

Risk ID	2
Risk Description	Description 2
Category	Requirements
Source	Software Design Specification documentation review.
Probability	Low
Impact	High
Response	Mitigate
Strategy	Better testing will resolve this issue.
Risk Status	Identified

Risk ID	3
Risk Description	Description 3
Category	Technology
Source	This was identified during early development and testing.
Probability	Low
Impact	Very High
Response	Accept
Strategy	Example Running Service Registry behind proxy balancer
Risk Status	Identified

5.3 Project Schedule

5.3.1 Project task set

Major Tasks in the Project stages are:

- Task 1:
- Task 2:
- Task 3:
- Task 4:
- Task 5:

5.3.2 Task network

Project tasks and their dependencies are noted in this diagrammatic form.

5.3.3 Timeline Chart

A project timeline chart is presented. This may include a time line for the entire project. Above points should be covered in Project Planner as Annex C and you can mention here Please refer Annex C for the planner

5.4 Team Organization

The manner in which staff is organized and the mechanisms for reporting are noted.

5.4.1 Team structure

The team structure for the project is identified. Roles are defined.

5.4.2 Management reporting and communication

Mechanisms for progress reporting and inter/intra team communication are identified as per assessment sheet and lab time table.

Chapter 6

Software requirement specification

6.1 Introduction

The increasing ability to generate vast quantities of data presents technical challenges for efficient data mining. Outsourcing data mining computations to a third-party service provider (server) offers a cost-effective option.This introduces the data-mining-as-a-service (DMaS) paradigm. Cloud computing provides a natural solution for the DMaS paradigm. A few active industry projects. In this paper focus on frequent itemset mining as the outsourced data mining task. Informally, frequent itemsets refer to a set of data values whose number of co-occurrences exceeds a given threshold. Frequent itemset mining has been proven important in many applications such as market data analysis, networking data study, and human gene association study. Previous research has shown that frequent itemset mining can be computationally intensive, due to the huge search space that is exponential to data size as well as the possible explosive number of discovered frequent itemsets. Therefore, for those clients of limited computational resources, outsourcing frequent itemset mining to computationally powerful service providers (e.g., the cloud) is a natural solution. Although it is advantageous to achieve sophisticated analysis on tremendous volumes of data in a cost effective way, end users hesitate to place full trust in cloud computing. This raises serious security concerns. One of the main security issues is the integrity of the mining result. There are many possible reasons for the service provider to return incorrect answers. Since sometimes the mining results are so critical that it is imperative to rule out errors during the computation, it is important to provide efficient mechanisms to verify the result integrity of outsourced

data mining computations. In this paper, focus on the problem of verifying whether the server returned correct and complete frequent itemsets. By correctness, mean that all itemsets returned by the server are frequent. By completeness, we mean that no frequent itemset is missing in the returned result.

6.1.1 Purpose and Scope of Document

- The results with those of existing methods that are adapted to the problem.
- The proposed method is at least an order of magnitude faster than the existing methods in most cases while achieving high accuracy.
- To study different frequent item set mining algorithm and encryption algorithm.

6.1.2 Overview of responsibilities of Developer

What all activities carried out by developer?

6.2 Usage Scenario

This section provides various usage scenarios for the system to be developed.

6.2.1 User profiles

The profiles of all user categories are described here.(Actors and their Description)

6.2.2 Use-cases

All use-cases for the software are presented. Description of all main Use cases using use case template is to be provided.

Sr No.	Use Case	Description	Actors	Assumptions
1	Use Case 1	Description	Actors	Assumption

Table 6.1: Use Cases

6.2.3 Use Case View

Use Case Diagram. Example is given below

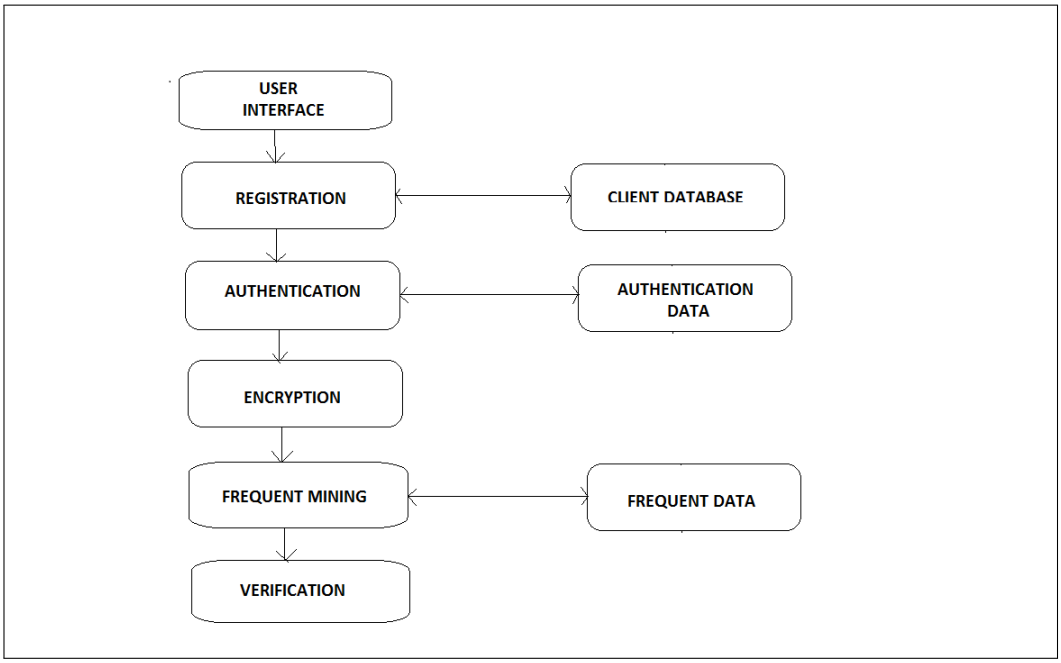

Figure 6.1: Use case diagram

6.3 Data Model and Description

6.3.1 Data Description

Data objects that will be managed/manipulated by the software are described in this section. The database entities or files or data structures required to be described. For data objects details can be given as below

6.3.2 Data objects and Relationships

Data objects and their major attributes and relationships among data objects are described using an ERD- like form.

6.4 Functional Model and Description

A description of each major software function, along with data flow (structured analysis) or class hierarchy (Analysis Class diagram with class description for object oriented system) is presented.

6.4.1 Data Flow Diagram

6.4.1.1 Level 0 Data Flow Diagram

6.4.1.2 Level 1 Data Flow Diagram

6.4.2 Activity Diagram:

- The Activity diagram represents the steps taken.

6.4.3 Non Functional Requirements:

- Interface Requirements
- Performance Requirements
- Software quality attributes such as availability [related to Reliability], modifiability [includes portability, reusability, scalability] , performance, security, testability and usability[includes self adaptability and user adaptability]

6.4.4 State Diagram:

State Transition Diagram
Fig.6.2 example shows the state transition diagram of Cloud SDK. The states are represented in ovals and state of system gets changed when certain events occur. The transitions from one state to the other are represented by arrows. The Figure shows important states and events that occur while creating new project.

6.4.5 Design Constraints

Any design constraints that will impact the subsystem are noted.

Figure 6.2: State transition diagram

6.4.6 Software Interface Description

The software interface(s)to the outside world is(are) described. The requirements for interfaces to other devices/systems/networks/human are stated.

Chapter 7

Detailed Design Document using Appendix A and B

7.1 Introduction

This document specifies the design that is used to solve the problem of Product.

7.2 Architectural Design

A description of the program architecture is presented. Subsystem design or Block diagram,Package Diagram,Deployment diagram with description is to be presented.

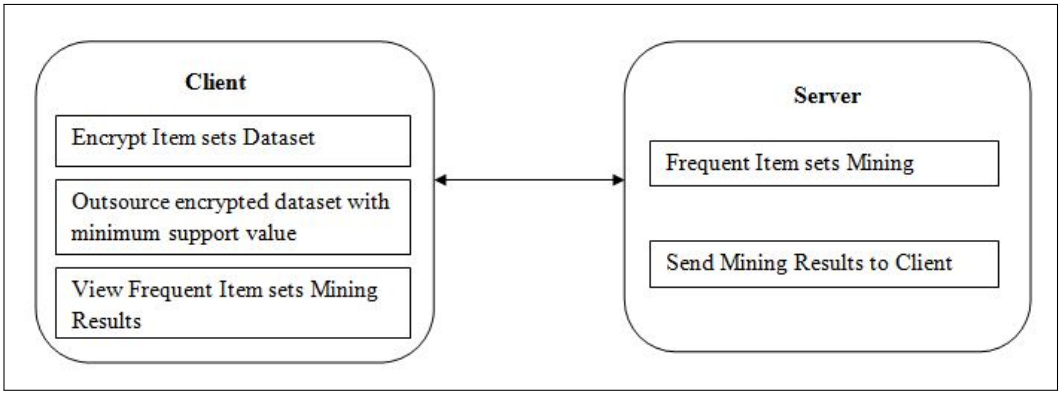

Figure 7.1: Architecture diagram

7.3 Data design (using Appendices A and B)

A description of all data structures including internal, global, and temporary data structures, database design (tables), file formats.

7.3.1 Internal software data structure

Data structures that are passed among components the software are described.

7.3.2 Global data structure

Data structured that are available to major portions of the architecture are described.

7.3.3 Temporary data structure

Files created for interim use are described.

7.3.4 Database description

Database(s) / Files created/used as part of the application is(are) described.

7.4 Compoent Design

Class diagrams, Interaction Diagrams, Algorithms. Description of each component description required.

7.4.1 Class Diagram

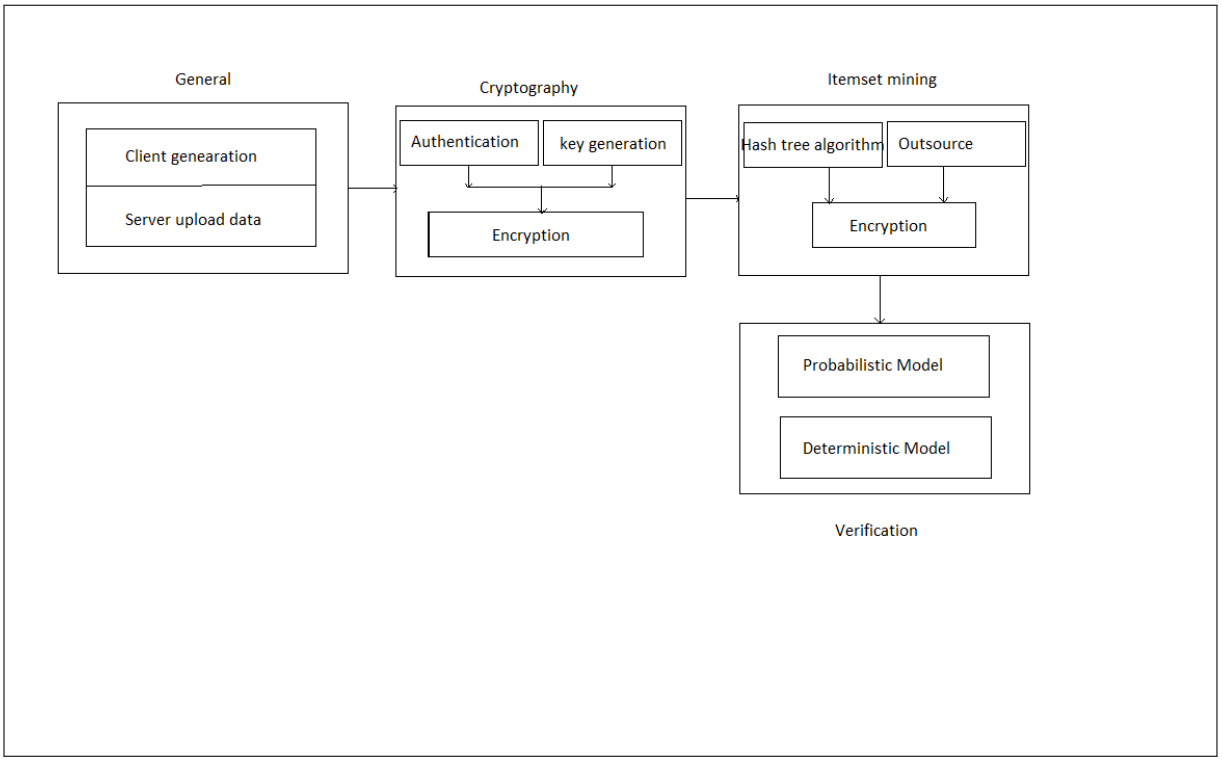

Figure 7.2: Class Diagram

Chapter 8

Project Implementation

8.1 Introduction

8.2 Tools and Technologies Used

8.3 Methodologies/Algorithm Details

8.3.1 Algorithm 1/Pseudo Code

8.3.2 Algorithm 2/Pseudo Code

8.4 Verification and Validation for Acceptance

Chapter 9

Software Testing

9.1 Type of Testing Used

Unit,Integration,system etc.

9.2 Test Cases and Test Results

for each type of testing done.

Chapter 10

Results

10.1 Screen shots

Outputs / Snap shots of the results

10.2 Outputs

Outputs / Snap shots of the results

Chapter 11

Deployment and Maintenance

11.1 Installation and un-installation

11.2 User help

Chapter 12

Conclusion and future scope

In this paper, we present two integrity verication approaches for outsourced frequent itemset mining. The probabilistic verication approach constructs evidence (in)frequent itemsets. In particular, we remove a small set of items from the original dataset and insert a small set of articial transactions into the dataset to construct evidence (in)frequent itemsets. The deterministic approach requires the server to construct cryptographic proofs of the mining result. The correctness and completeness are measured against the proofs with percent certainty. Our experiments show the efciency and effectiveness of our approaches. An interesting direction to explore is to extend the model to allow the client to specify her verication needs in terms of budget (possibly in monetary format) besides precision and recall threshold.

Annexure A

References

(Strictly in ACM Format)

Annexure B

Laboratory assignments on Project Analysis of Algorithmic Design

- To develop the problem under consideration and justify feasibilty using concepts of knowledge canvas and IDEA Matrix.
  Refer IDEA Matrix and Knowledge canvas model. Case studies are given in this book. IDEA Matrix is represented in the following form. Knowledge canvas represents about identification of opportunity for product. Feasibility is represented w.r.t. business perspective.

- Project problem statement feasibility assessment using NP-Hard, NP-Complete or satisfy ability issues using modern algebra and/or relevant mathematical models.

- input x,output y, y=f(x)

I	D	E	A
Increase:satisfies the User need	**Drive:**	**Educate:**User Should Log in the system using login details.	**Accelerate:** Interaction between the user and administrator
Improve: Result Accuracy	**Deliver:**Output With higher performance with user satisfaction	**Evaluate:**Reduce Response time by Redirecting request to other server	**Associate:**Instance Retrieval and Concept mapping
Ignore: Don't give Incorrect query as a input	**Decrease:** Unwanted concepts and sub concepts	**Eliminate:**Non Authorized user must Be eliminate	**Avoid:** Unauthorized access.

Figure B.1: Idea Matrix

Annexure C

Laboratory assignments on Project Quality and Reliability Testing of Project Design

It should include assignments such as

- Use of divide and conquer strategies to exploit distributed/parallel/concurrent processing of the above to identify object, morphisms, overloading in functions (if any), and functional relations and any other dependencies (as per requirements). It can include Venn diagram, state diagram, function relations, i/o relations; use this to derive objects, morphism, overloading
- Use of above to draw functional dependency graphs and relevant Software modeling methods, techniques including UML diagrams or other necessities using appropriate tools.
- Testing of project problem statement using generated test data (using mathematical models, GUI, Function testing principles, if any) selection and appropriate use of testing tools, testing of UML diagram's reliability. Write also test cases [Black box testing] for each identified functions. You can use Mathematica or equivalent open source tool for generating test data.
- Additional assignments by the guide. If project type as Entreprenaur, Refer [?],[?],[?], [?]

Annexure D

Project Planner

Using planner or alike project management tool.

Annexure E

Reviewers Comments of Paper Submitted

(At-least one technical paper must be submitted in Term-I on the project design in the conferences/workshops in IITs, Central Universities or UoP Conferences or equivalent International Conferences Sponsored by IEEE/ACM)

1. Paper Title:
2. Name of the Conference/Journal where paper submitted :
3. Paper accepted/rejected :
4. Review comments by reviewer :
5. Corrective actions if any :

Annexure F

Plagiarism Report

Plagiarism report

Annexure G

Term-II Project Laboratory Assignments

1. Review of design and necessary corrective actions taking into consideration the feedback report of Term I assessment, and other competitions/conferences participated like IIT, Central Universities, University Conferences or equivalent centers of excellence etc.

2. Project workstation selection, installations along with setup and installation report preparations.

3. Programming of the project functions, interfaces and GUI (if any) as per 1 st Term term-work submission using corrective actions recommended in Term-I assessment of Term-work.

4. Test tool selection and testing of various test cases for the project performed and generate various testing result charts, graphs etc. including reliability testing.
   Additional assignments for the Entrepreneurship Project:

5. Installations and Reliability Testing Reports at the client end.

Annexure H

Information of Project Group Members

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