VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"Jnana Sangama", Belagavi-590018, Karnataka

A Mini Project Report on

"SOCIAL MEDIA DATABASE"

Submitted in partial fulfillment of the requirement for the award of degree of

Bachelor of Engineering

In

Computer Science and Engineering

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ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be incomplete without the mention of the people who made it possible, whose consistent guidance and encouragement crowned our efforts with success.

We consider ourselves proud to be a part of **NIE Institute of Technology Mysuru** family, the institution which stood by our side in all our endeavors.

We wish to express our gratitude to **Dr. Rohini Nagapadma,** Principal, **NIE Institute of Technology Mysuru,** for providing a congenial working environment.

We express our sincere thanks to **Dr. Usha M S**, Associate Professor and Head, Department of Computer Science and Engineering, for her support and encouragement.

We would like to thank our guide**, Smt. Janhavi Nandish.** Assistant Professor, Department of Computer Science and Engineering, for her inspiration, guidance, constant supervision, direction and discussions in the successful completion of this project work.

We are thankful to the Department of Computer Science and Engineering staff members and non-staff members for their co-operation extended towards this work.

Finally, our heartfelt gratitude to our **family members, relatives** and **friends** for their constant support, motivation and encouragement throughout this project. Above all we would like to thank God Almighty, for having showered his blessings on us.

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ABSTRACT

AIM: The project **Social Media Database** aims to manage the users records in social media.

Social media marketing has emerged as a cornerstone of modern digital marketing strategies, offering unprecedented opportunities for brands to connect with their target audiences, build relationships, and drive business growth. This abstract provides an overview of the key components, strategies, and trends shaping the landscape of social media marketing:

Platform Diversity: Social media marketing encompasses a wide array of platforms, including but not limited to Facebook, Instagram, Twitter, LinkedIn, TikTok, Pinterest, and Snapchat. Each platform presents unique demographics, content formats, and engagement dynamics, necessitating tailored strategies for maximum impact.

Content Strategy: A compelling content strategy lies at the heart of successful social media marketing campaigns. Brands must create engaging, relevant, and shareable content that resonates with their audience's interests, preferences, and aspirations. Visual content such as videos, infographics, and memes often garners higher engagement rates and encourages virality.

Audience Targeting and Segmentation: Effective audience targeting is essential for reaching the right people with the right message at the right time. Social media platforms offer sophisticated targeting options based on demographics, interests, behaviors, and psychographics. Marketers can leverage data analytics and audience insights to refine their targeting strategies and maximize ROI.

Community Engagement: Building and nurturing a vibrant online community is crucial for fostering brand loyalty and advocacy. Brands should actively engage with their followers through comments, messages, polls, and user-generated content. Authenticity, transparency, and responsiveness are key principles that underpin successful community management efforts.

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Chapter 1

INTRODUCTION

1.1 Introduction to Database Management System

A database is an organized collection of data. A relational database, more restrictively, is a collection of schemas, tables, queries, reports, views, and other elements. Database designers typically organize the data to model aspects of reality in a way that supports processes requiring information, such as (for example) modelling the availability of rooms in hotels in a way that supports finding a hotel with vacancies.

A database-management system (DBMS) is a computer-software application that interacts with end-users, other applications, and the database itself to capture and analyze data. A general-purpose DBMS allows the definition, creation, querying, update, and administration of databases. Well-known DBMSs include MySQL, PostgreSQL, EnterpriseDB, MongoDB, MariaDB, Microsoft SQL Server, Oracle, Sybase, SAP HANA, MemSQL, SQLite and IBM.

A database is not generally portable across different DBMSs, but different DBMSs can interoperate by using standards such as SQL and ODBC or JDBC to allow a single application to work with more than one DBMS. Sometimes a DBMS is loosely referred to as a "database".

Applications:

Databases are used to support internal operations of organizations and to underpin online interactions with customers and suppliers.

Databases are used to hold administrative information and more specialized data, such as engineering data or economic models. Examples of database applications include computerized library systems, flight reservation systems, computerized parts inventory systems, and many content management systems that store websites as collections of webpages in a database.

1.2 Introduction to JAVA:

Java is a general-purpose computer programming language that is concurrent, class-based, object-oriented, and specifically designed to have as few implementation dependencies as possible. It is intended to let application developers "write once, run anywhere" (WORA), meaning that compiled Java code can run on all platforms that support Java without the need for recompilation.[17] Java applications are typically compiled to byte code that can run on any Java virtual machine (JVM) regardless of computer architecture.

Swing is a GUI widget toolkit for Java. It is part of Oracle's Java Foundation Classes (JFC) – an API for providing a graphical user interface (GUI) for Java programs.

Swing was developed to provide a more sophisticated set of GUI components than the earlier Abstract Window Toolkit (AWT). Swing provides a native look and feel that emulates the look and feel of several platforms, and also supports a pluggable look and feel that allows applications to have a look and feel unrelated to the underlying platform. It has more powerful and flexible components than AWT. In addition to familiar components such as buttons, check boxes and labels, Swing provides several advanced components such as tabbed panel, scroll panes, trees, tables, and lists.

.1.4 Introduction to JDBC:

Java Database Connectivity (**JDBC**) is an application programming interface (API) for the programming language Java, which defines how a client may access a database. It is Java based data access technology and used for Java database connectivity. It is part of the Java Standard Edition platform, from Oracle Corporation. It provides methods to query and update data in a database, and is oriented towards relational databases.

1.5 Introduction to SQL

Structure Query Language (SQL) is a programming language to request data from a database, to add, update, or remove data within a database, or to manipulate the metadata

of the database. SQL was the first commercial language introduced for E.F Codd's **Relational** model. Today almost all RDBMS (MySql, Oracle, Infomix, Sybase, MS Access) uses **SQL** as the standard database language. SQL is used to perform all type of data operations in RDBMS. Commonly used statements are grouped into the following categories:

- **Data Query Language (DQL)**

- SELECT - Used to retrieve certain records from one or more tables.

- **Data Manipulation Language (DML)**
- INSERT - Used to create a record.
- UPDATE - Used to change certain records.
- DELETE - Used to delete certain records.
- **Data Definition Language (DDL)**
- CREATE - Used to create a new table, a view of a table, or other object in database.
- ALTER - Used to modify an existing database object, such as a table.
- DROP - Used to delete an entire table, a view of a table or other object in the database
- **Data Control Language (DCL)**
- GRANT - Used to give a privilege to someone.
- REVOKE - Used to take back privileges granted to someone.

1.6 Introduction to MySQL:

MySQL is an open-source relational database management system(RDBMS). Its name is a combination of "My", the name of co-founders Michael Widenius's daughter, and "SQL", the abbreviation for Structured Query Language. The MySQL development project has made its source code available under the terms of the GNU General Public License, as well as under a variety of proprietary agreements. MySQL was owned and sponsored by a single for-profit firm, the Swedish company MySQL AB, now owned by Oracle Corporation. For proprietary use, several paid editions are available, and offer additional functionality.

SQLyog

SQLyog is a GUI tool available in free as well as paid versions. Data manipulations (e.g., insert, update, and delete) may be done from a spreadsheet-like interface. Its editor has syntax highlighting and various automatic formatting options. Both raw table data and a result set from a query can be manipulated. Its data search

feature uses Google-like search syntax and translates to SQL transparently for the user. It has a backup tool for performing unattended backups. Backups may be compressed and optionally stored as a file-per-table as well as identified with a timestamp.

1.7 Introduction to Social Media Database

Purpose:

A social media database serves as the foundation for storing and managing various types of data generated and utilized within a social networking platform.

It facilitates the storage of user profiles, posts, comments, likes, follows, media content (such as photos and videos), and other relevant information.

The database enables efficient retrieval, updating, and deletion of data to support user interactions and platform features.

Structure:

A social media database typically consists of multiple interconnected tables designed to represent different entities and their relationships.

Common entities in a social media database include users, posts, comments, likes, follows, media content, hashtags, and more.

These entities are organized into tables, with each table containing columns representing attributes of the entity and rows representing individual instances of that entity.

Relationships between entities are established using foreign key constraints, ensuring data integrity and enforcing referential integrity rules.

Key Components:

Users: The users table stores information about registered users, including their usernames, email addresses, profile photos, bios, and creation timestamps.

Posts: This table holds data related to user-generated content, such as posts, captions, media URLs, locations, and creation timestamps.

Comments: Comments table records user comments on posts, including the comment text, post ID, user ID, and creation timestamp.

Likes: Likes table tracks user engagements with posts or comments, storing information about which user liked which post or comment and when the like was made.

Follows: This table maintains relationships between users, indicating who follows whom on the platform.

Media Content: Tables like photos and videos store URLs or references to media content uploaded by users, along with metadata like file size and creation timestamps.

Hashtags: Hashtags table stores unique hashtags used in posts or comments, along with creation timestamps.

Relationships and Associations: Additional tables like post_tags, hashtag_follow, and bookmarks are used to establish associations between posts, hashtags, and users, enabling features like tagging, following hashtags, and bookmarking posts.

In summary, a social media database plays a vital role in storing, organizing, and managing the diverse data generated and consumed within a social networking platform. Its design and structure are tailored to support the platform's functionalities while ensuring data integrity, scalability, and performance.

Objective and Scope

a. Data Storage: The primary objective of a social media database is to securely store various types of data generated and consumed by users on the platform, including user profiles, posts, comments, likes, follows, media content, and more.

b. Data Management: The database aims to provide mechanisms for efficiently managing data, including insertion, retrieval, updating, and deletion operations. This ensures that users can interact with the platform seamlessly while maintaining data consistency and integrity.

c. Performance Optimization: Another objective is to optimize database performance to handle large volumes of data and user interactions. This involves implementing appropriate indexing, query optimization techniques, and database caching strategies to minimize response times and enhance user experience.

d. Scalability: The database should be designed to scale gracefully as the platform grows, accommodating an increasing number of users, data, and interactions. Scalability ensures that the platform remains responsive and available even under high loads.

e. Data Security: Ensuring the security and privacy of user data is a critical objective. The database should implement robust authentication, authorization, and encryption mechanisms to protect sensitive information from unauthorized access, data breaches, and cyber threats.

f. Analytics and Insights: The database may support analytics and reporting functionalities to derive insights from user data, such as user engagement metrics, trending topics, demographic trends, and content performance analysis. These insights can inform decision-making and improve platform features.

Scope:

a. User Profiles: The scope includes storing and managing user profiles, including personal information, profile photos, biographies, and account settings.

b. Content Management: This encompasses storing user-generated content such as posts, comments, photos, videos, and other media assets, along with metadata like timestamps, locations, and engagement metrics.

c. Social Interactions: The database supports social interactions between users, including likes, comments, follows, mentions, and direct messages. It maintains relationships between users and their interactions with content.

d. Content Discovery: The scope extends to features related to content discovery and exploration, such as hashtagging, search functionalities, trending topics, recommendations, and personalized feeds.

e. Platform Administration: The database may include features for platform administration, such as user management, moderation tools, content flagging, and analytics dashboards for monitoring platform performance and user activity.

f. Integration with External Services: Depending on the platform's requirements, the database may integrate with external services for tasks such as authentication, content delivery, advertising, and analytics.

Chapter 2

REQUIREMENTS SPECIFICATION

2.1 Hardware Requirements

- Processor: Intel(R) Core(TM) i3 CPU @1.70Ghz
- Installed memory (RAM): 4.00GB
- System type: 64-bit Operating System, x64-based processor
- Graphics: NVIDIA (R) GEFORCE(R)
- Total size of Hard disk: 1TB

2.2 Software Requirements

- Operating System: Microsoft windows 8.1 and above.
- Integrated Development Environment:

1. Front-end tool:- phpMyAdmin
2. Back-end tool:- MYSQL, Node Js

- Programming Language: HTML,CSS,JAVASCRIPT

Chapter 3

SYSTEM DESIGN

System design is the process of defining the elements of a system such as the architecture, modules and components, the different interfaces of those components and the data that goes through that system. It is meant to satisfy specific needs and requirements of a business or organization through the engineering of a coherent and well-running system.

System designing in terms of software engineering has its own value and importance in the system development process as a whole. To mention it may though seem as simple as anything or simply the design of systems, but in a broader sense it implies a systematic and rigorous approach to design such a system which fulfils all the practical aspects including flexibility, efficiency and security.

Before there is any further discussion of system design, it is important that some points be made clear. As it goes without saying that nothing is created that is not affected by the world in which it's made. So, the systems are not created in a vacuum.

They are created in order to meet the needs of the users. They are not only intended to solve the existing problems, but they also come up with acceptable solutions to the problems that may arise in the future. The whole process of system development, from blueprint to the actual product, involves considering all the relevant factors and taking the required specifications and creating a useful system based on strong technical, analytical and development skills of the professionals.

Let's get back to our discussion about what the system design phase is and the importance of system design in the process of system development. Being another important step in the system development process, system designing phase commences after the system analysis phase is completed. It's appropriate to mention that the output or the specifications taken through the phase of system analysis become an input in the system design phase which in turn leads to workout based on the user defined estimations.

The importance of this phase may be understood by reason of the fact that it

involves identifying data sources, the nature and type of data that is available. For example, in order to design a salary system, there is a need for using inputs, such as, attendance,

leave details, additions or deductions etc. This facilitates understanding what kind of data is available and by whom it is supplied to the system so that the system may be designed considering all the relevant factors. In addition, system designing leads to ensure that the system is created in such a way that it fulfils the need of the users and keep them at ease being user-oriented. In terms of the flexibility, one of the main objectives of this phase is that it is intended to design such a system which can be dynamic in nature and responsive to the changes if required. Another important objective is that the phase of system designing is concerned with creating the system which can work efficiently providing the required output and being responsive to the time within a given time limit. The aspect of reliability and physical security of data cannot be ignored. With this respect, the system designing phase ensures security measures of the system effectively and efficiently.

3.1 E-R Diagram

An entity–relationship model (ER model) describes inter-related things of interest in a specific domain of knowledge. An ER model is composed of entity types (which classify the things of interest) and specifies relationships that can exist between instances of those entity types.

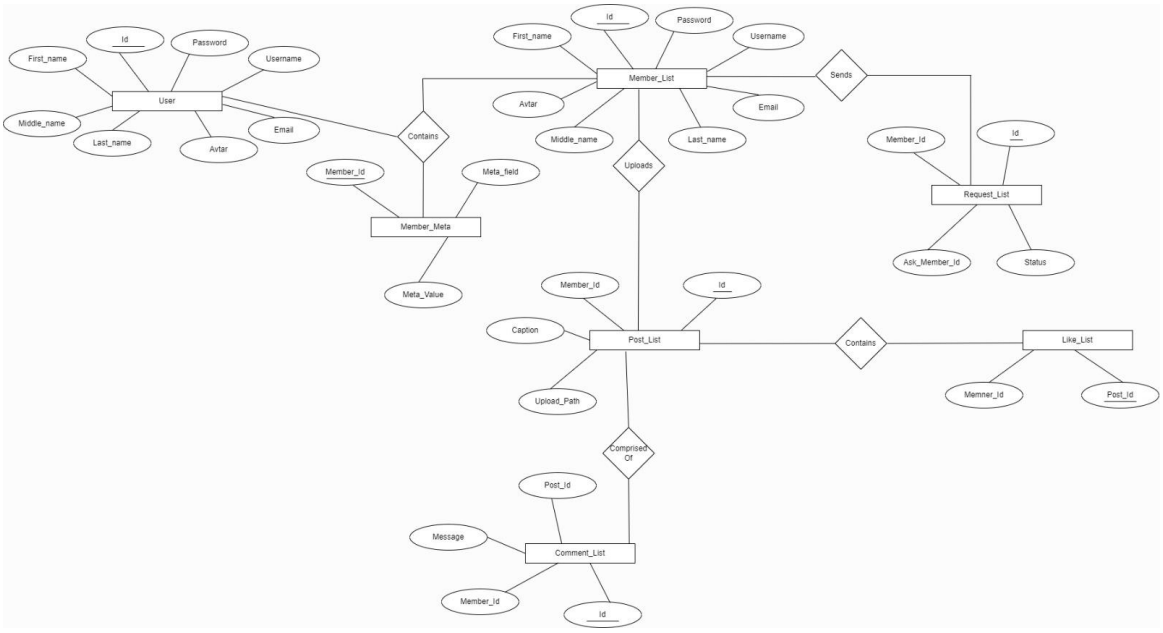


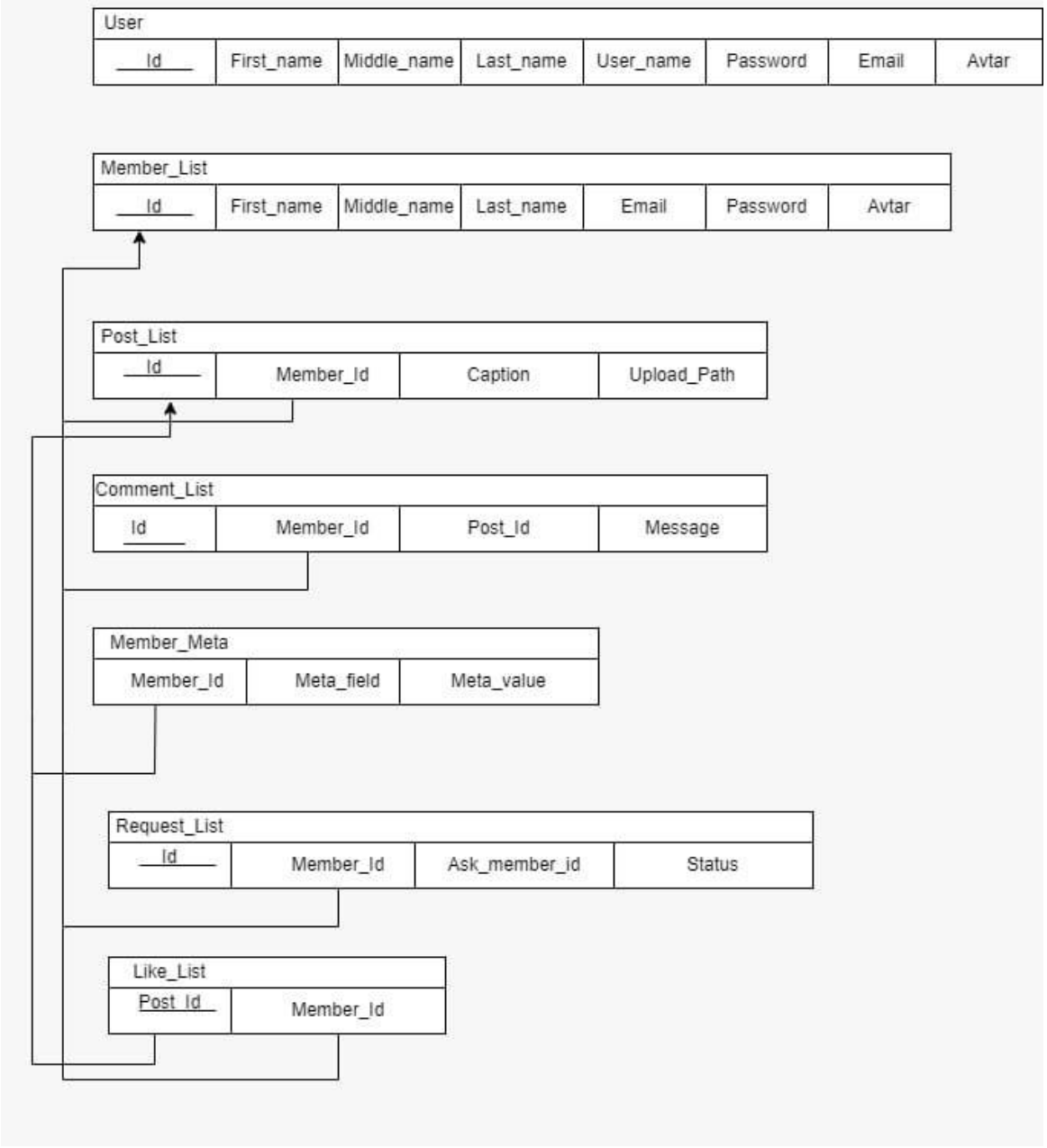
Fig 3.3. E-R diagram of Social Media Database

3.2 Logical Schema

A database schema is the skeleton structure that represents the logical view of the entire database. It defines how the data is organized and how the relations among them are associated. It formulates all the constraints that are to be applied on the data.

A database schema defines its entities and the relationship among them. It contains a descriptive detail of the database, which can be depicted by means of schema diagrams. It's the database designers who design the schema to help programmers understand the database and make it useful.

Logical Database Schema − This schema defines all the logical constraints that need to be applied on the data stored. It defines tables, views, and integrity constraints.



Logical Schema Fig 3.2. Logical Schema of Social Media Database

3.3 Data Flow Diagram

A picture is worth a thousand words. A Data Flow Diagram (DFD) is traditional visual representation of the information flows within a system. A neat and clear DFD can depict a good amount of the system requirements graphically. It can be manual, automated, or combination of both.

It shows how information enters and leaves the system, what changes the information and where information is stored. The purpose of a DFD is to show the scope and boundaries of a system as a whole. It may be used as a communications tool between a systems analyst and any person who plays a part in the system that acts as the starting point for redesigning a system

A data flow diagram (DFD) maps out the flow of information for any process or system. It uses defined symbols like rectangles, circles and arrows, plus short text labels, to show data inputs, outputs, storage points and the routes between each destination.

DFD for the Social Media Database:

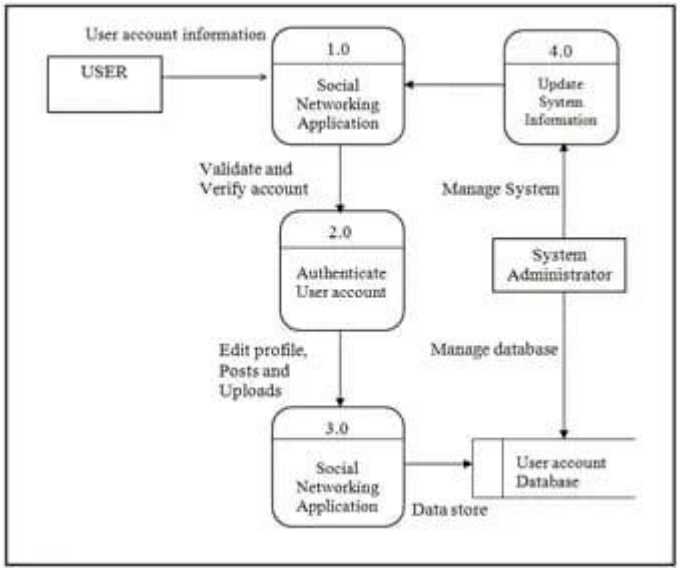


Fig.3.1 DFD for Social Media Database

Chapter 4

IMPLEMENTATION

The special methods used in the project are explained.

4.1Triggers

A trigger is a named database object associated with a table that activates when a specific event occurs for the table. Triggers are commonly used to perform checks on values being inserted into a table or to execute calculations on values involved in an update.
In the social media database project, an after-insert trigger is utilized. This trigger inserts a new row into the return_book table immediately after a new row is inserted into the issue table.

4.2 Stored Procedures

A stored procedure, also known as a procedure or a stored subroutine, is a subroutine stored in the database. It has a name, a parameter list, and SQL statements. Stored procedures are supported by most relational database systems, including MySQL. In MySQL, stored procedures were introduced in version 5.6.
In the social media database project, stored procedures are used for specific tasks. For example, a procedure named fn_discharge is defined to update the discharge date of an inpatient in the database.

4.3 Stored procedure and trigger used in the above application

```
DELIMITER $$

USE social_media_db$$
```

```
DROP PROCEDURE IF EXISTS fn_discharge$$

CREATE DEFINER=root@localhost PROCEDURE fn_discharge(IN userId INT, IN dt DATE)
BEGIN
   UPDATE users SET last_login = dt WHERE user_id = userId;
END$$

DELIMITER ;

DELIMITER $$
USE social_media_db$$
DROP TRIGGER /*!50032 IF EXISTS */ after_login_trigger$$
CREATE /*!50017 DEFINER = 'root'@'localhost' */ TRIGGER after_login_trigger AFTER INSERT ON login_logs
FOR EACH ROW BEGIN
   UPDATE users SET last_login = NEW.login_time WHERE user_id = NEW.user_id;
END;
$$
DELIMITER ;
```

Chapter 5

TESTING

5.1 Introduction to testing

Verification and validation is a generic name given to checking processes, which ensures

that the software confirms to its specifications and meets the demands of users.

- **Validation**

  Validation involves checking that the program has implanted meets the requirement.

- **Verification**

  Verification involves checking that the program confirms to its specification.

5.2 Stages in the Implementation of Testing

- **Unit Testing**

  Each individual unit is tested for correctness. These individual components will be tested to ensure that they operate correctly.

- **Module Testing**

  A module is a collection of dependent components such as a function. A module encapsulates related components so can test without other system modules.

- **Sub-system Testing**

  This phase involves testing collection of modules, which have been integrated into sub-systems. Sub-systems may be independently designed and implemented.

- **System testing**

  The Sub-systems are integrated to make up the entire system. The errors that result from unanticipated interaction between sub-systems and system components are removed.

- **Acceptance testing**

  This is the final stage in the testing process before the system is tested for operational use. Any requirement problem or requirement definition problems revealed from acceptance testing are considered and made error free.

- **Test plan**

  Careful planning is needed to the most of testing and controlled testing cost.

5.3 Results

Several errors were detected and rectified and the whole project is working as it should with proper output and high efficiency. The several tests performed are as follows:

Test case id	Test case	Input data	Steps to execute the test case	Expected Result	Actual Result	Pass/Fail
1	Login screen.	Invalid username or password.	After entering the data click the sign button.	A proper message indicating the error should appear and the user should be redirected to login screen.	A message was displayed saying invalid username or password.	Pass
2	Profile screen	Input details of user	Click on notepad symbol	Storing the bio of the user	Manage users bio	Pass
3	Home screen.	Input the details of user activity with friends like likes and comments on uploaded posts .	Click on add like button and comment button to like and comment on uploaded posts	Likes and comments of post	Storing of posts information in database.	Pass
4	Posts screen	Input details to add photos as new post	Click on the upload photos button to upload	Post is uploaded	Post is uploaded and updated in home screen	Pass

			posts in social media and click on save button			
5	Friends screen	Display of Friends list	Click on the friends profile	Information on friends	Personal information of friend's profile	Pass.
6	Request screen	Input the details of friends in database	Click on the confirm button	Friend request has been confirmed	Friend request has been confirmed	pass

Fig.5.3.testing results

Chapter 6

SNAPSHOTS

Fig.6.1: Login screen

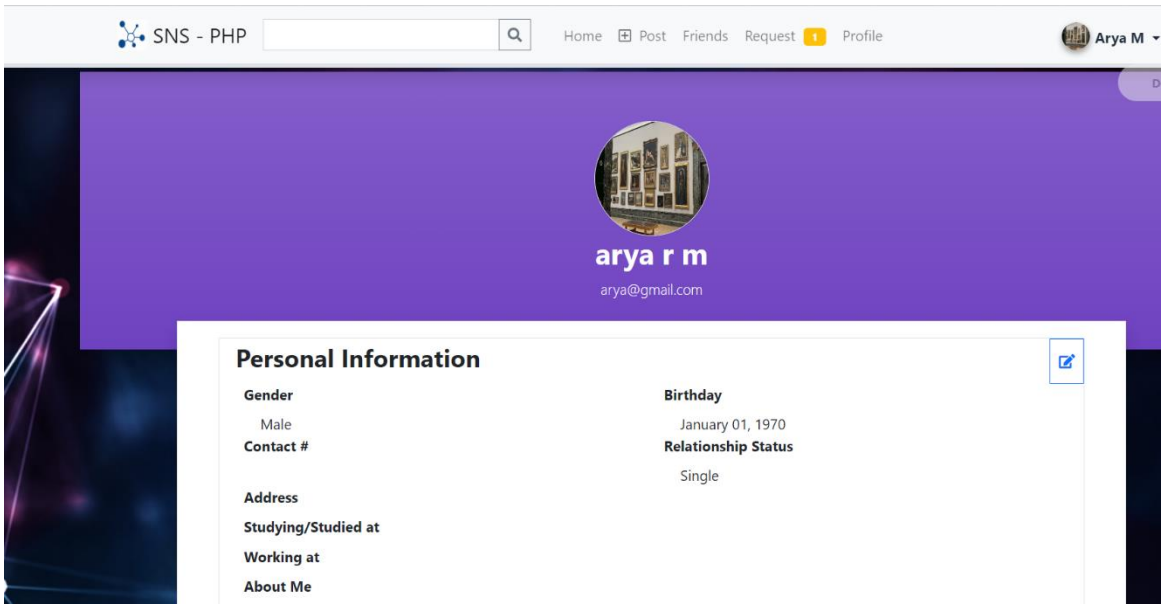


Fig 6.2:Profile screen

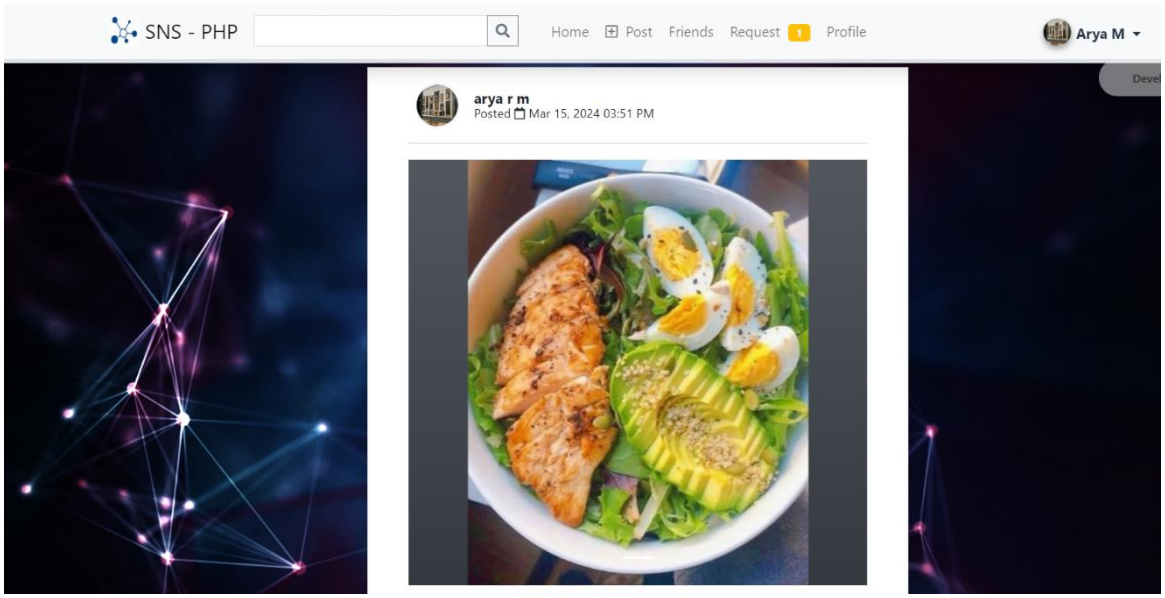


Fig 6.3: Home screen

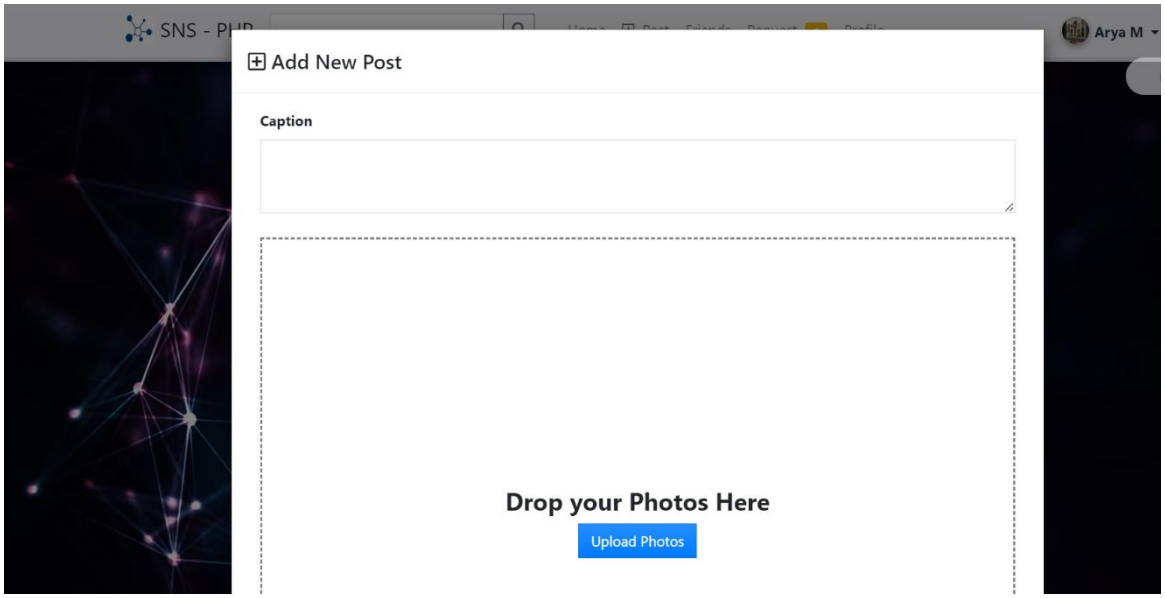


Fig 6.4:Posts screen

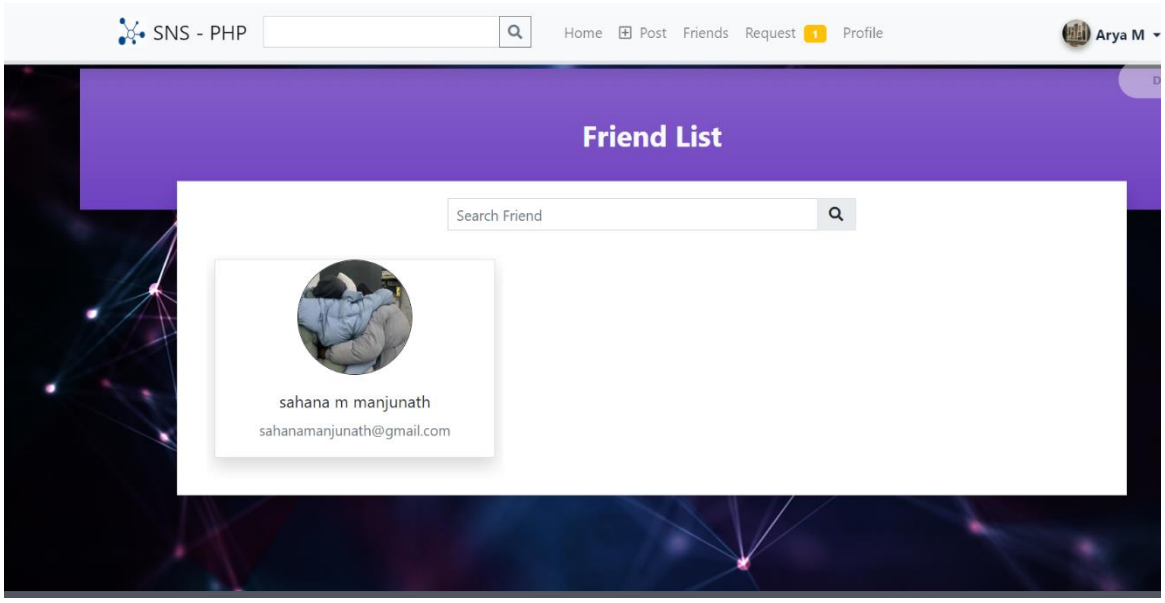


Fig 6.5:Friends screen

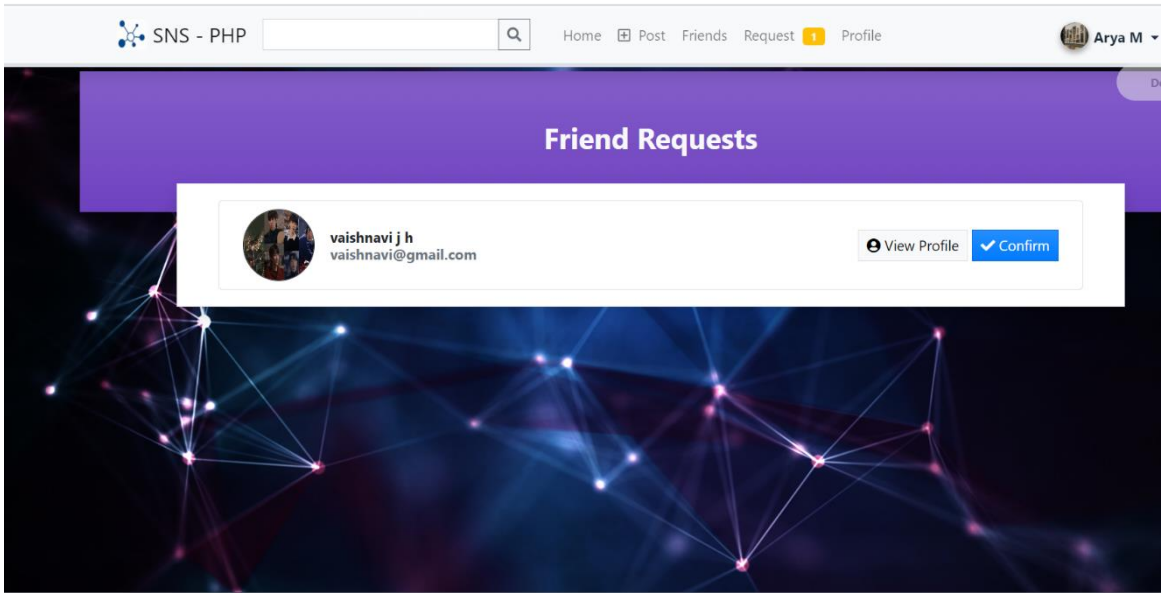


Fig 6.6:Request screen

Chapter 7

CONCLUSION AND FUTURE ENHANCEMENT

The social media database mini-project report outlines the development and implementation of a database system tailored for managing social media interactions. Throughout the project, various components such as user profiles, post management, engagement tracking, and analytics have been designed and implemented. The database schema has been structured to efficiently store and retrieve data related to users, posts, comments, likes, shares, and other relevant metrics.

Overall, the social media database mini-project has achieved its objectives by providing a foundation for managing social media interactions effectively.

In future, this application can be enhanced in following ways:

-Implement real-time analytics to provide instantaneous insights into user engagement and post performance.
-Improve the user interface and experience by incorporating modern design principles and interactive features.
-Extend platform support to include emerging social media platforms and integration with popular third-party tools.
-Design the system to be scalable, capable of handling increasing user volumes and data loads efficiently.

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