truemate: A Socio-Academic Networking System and Open Resource Repository

BY
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under the guidance of

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in the partial fulfilment of the requirements
for the award of the degree of

Bachelor of Technology
(a part of Five-Year Dual Degree Course)
in
Computer Science & Engineering

School of Engineering
Jawaharlal Nehru University, New Delhi
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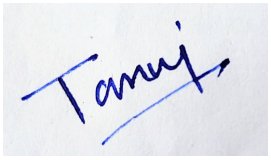
JAWAHARLAL NEHRU UNIVERSITY
SCHOOL OF ENGINEERING

DECLARATION

I declare that the project work entitled **"truemate: A Socio-Academic Networking System and Open Resource Repository"** which is submitted by me in partial fulfillment of the requirement for the award of degree B.Tech. (a part of Dual-Degree Programme) to School of Engineering, Jawaharlal Nehru University, New Delhi comprises only my original work and due acknowledgement has been made in the text to all other material used.



Tanuj Raghav
19-11-EC-027

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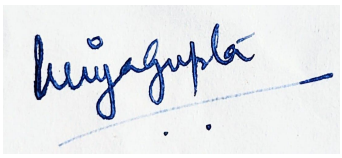
CERTIFICATE

This is to certify that the project work entitled **"truemate: A Socio-Academic Networking System and Open Resource Repository"** being submitted by **Mr. Tanuj Raghav** (Enrollment No.- **19/11/EC/027**) in fulfillment of the requirements for the award of the **Bachelor of Technology** (part of Five-Year Dual Degree Course) in **Computer Science & Engineering**, will be carried out by him under my supervision.

In my opinion, this work fulfills all the requirements of an Engineering Degree in respective stream as per the regulations of the School of Engineering, Jawaharlal Nehru University, Delhi. This thesis does not contain any work, which has been previously submitted for the award of any other degree.



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SCHOOL OF ENGINEERING

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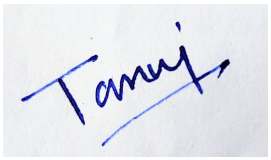
I would like to extend my sincere appreciation to my family and friends for their unwavering support, encouragement, and motivation. Their constant support and encouragement have been the driving force behind my success.



Tanuj Raghav
19/11/EC/027

ABSTRACT

The use of social networking sites and open educational resources has gained popularity in recent years, and has the potential to transform the way people communicate and learn. **truemate** aims to provide a platform for academic and social networking, as well as a repository for open educational resources. The development of truemate have significant benefits for the academic community, and could promote lifelong learning and knowledge sharing.

It is a promising project with useful features for the institutionalized academic community. Presently, providing a public resource pool with restricted updates is a great way to enable collaboration and knowledge-sharing among users. The multiple field sorting and fuzzy search features would make it easier for users to find the resources they need.

The project is still under development, and additional services like instant messaging and event management, and others, will be provided in the future.

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Chapter 1. Introduction and Project Objectives

1.1 Introduction

In recent years, the use of social networking sites has increased significantly, and it has become a popular medium for communication and knowledge sharing. **truemate** is a socio-academic networking system and open resource repository, which aims to provide a platform for academic and social networking, as well as a repository for open educational resources.

1.2 Problem Statement

As a member of an organized academic community, such as an institution or a university, one uses a number of different services to enhance their day-to-day socio-academic activities. The hassle of using such a plethora of services is that, while being efficient in their specific purpose, they do not support seamless integration with one another. For example, event management software like Whova and planner software like Todoist are excellent on their own but do not provide integration. One has to manually sync their socio-academic activities, even if they are using high-efficiency tools.
This statement can be further justified by considering cloud storage services, which are used to share resources. While they work fine for a small amount of data, for maintaining a database of non-traditionally available resources like notes, articles, and question papers, one has to use some sort of front-end system like a website or blog post to provide ease-of-access.

1.3 Objective

Given the aforementioned problem statement, we propose to design and develop a novel collaboration of such services that would make one's socio-academic life easier by achieving the following sub-objectives, among others:

a. Access to an open database of resources, such as books and notes, with reviews and recommendations.

b. Ease of organizing and participating in events, ranging from large club events to small study groups.

c. Built-in payment wall for events requiring such a facility, hassle-free automated daily/weekly planner, including batch-based lectures/labs and participation in events.

d. Public wiki and gallery related to the institution, events, fests, etc. maintained by the students, for the students. A universal search engine to find anything, anyone, or any event held or associated with the institute.

Chapter 2. Literature Survey

2.1 Background

The potential for integrated social networking in academic endeavors has considerably increased in the past couple of years, primarily thanks to recent events that have endorsed the idea of e-learning. However, the potential development and use of a customized online networking platform specifically designed for academics and its outcomes remain relatively unexplored [1]. Although many educators are accepting and incorporating various services such as WhatsApp, Twitter for official announcements, and cloud storage services for resource sharing, among others, for learning and collaboration within the university, these services still largely remain independent of one another, serving specific purposes.

2.2 Literature Survey

The use of social networking sites has become increasingly popular, and has transformed the way people communicate and share knowledge. Several studies have examined the use of social networking sites in educational contexts, and the potential benefits they offer for academic networking and knowledge sharing. Social networking sites can be used to create and share open educational resources, facilitate peer-to-peer learning, and provide a platform for collaboration among students, teachers, and researchers.

In addition to social networking sites, open educational resources have also gained popularity in recent years. Open educational resources are educational materials that are freely available for use, reuse, and modification. These resources can be used to support teaching and learning, and can be shared and adapted by educators and students.

Several studies have examined the use of open educational resources in educational contexts, and have found that they have the potential to improve the quality of education, increase access to education, and promote lifelong learning. Truemate aims to provide a platform for sharing open educational resources, and to create a community of learners and educators who can collaborate and share knowledge.

Chapter 3. Work and Methodology

3.1 Work Done

The Open Resource Repository microservice has been developed and is running on a security-first cloud-based architecture. The public resource pool with restricted updates feature is very useful for collaboration and knowledge-sharing among users. The multiple field sorting and fuzzy search features should also make it easier for users to find the resources they need.

While it's unfortunate that only one of the project objectives has been met, it's not uncommon for projects to face unforeseen circumstances and complexity that can impact their completion.

I am looking towards the future and have identified further work that is to be done to complete the remaining objectives, as mentioned in 5.2 Future Scope.

3.2 Tools and Technologies

- **Programming Language**: Java, HTML/CSS + JS, SQL
- **Framework**: Spring Boot
- **Build System**: Gradle
- **Template Engine**: Thymeleaf
- **Version Control**: Git & GitHub
- **Containerisation Tool**: Docker
- **Cloud Services**: Relational Database, Simple Storage Service, Elastic Compute Cloud, Virtual Private Cloud, ft. **Amazon Web Services**
- **Content Delivery Network**: Cloudflare
- **Mail Service Provide**: Postale

- **Domain Registrar**: Google

Chapter 4. Results Discussion

4.1 Results

This project is meant to solve the aforementioned problem by providing users with a number of services intended for their day-to-day socio-academic activities.

The service currently being provided is an Open Resource Repository, where users registered

with a particular institution can easily pool resources in various formats, such as documents, images, videos, or even archives.

Salient Features of the Open Resource Repository services are:

- **Publicly Accessible**, anyone with an active internet connection can access the available resource pool.
- **Restricted Update**, only users with authorised email addresses can update the resource repository, as for the testing case, we have provided anyone with a *_soe@jnu.ac.in address the access to updation.
- **Multiple Field Sorting**, providing the end-user the ease of browsing the database, much helpful in case of large databases.
- **Fuzzy Search**, the end user can search the database on the basis of similar sounding words and similar spellings as well.
- **Multi-Metadata Support**, it supports all sorts of data ranging from documents, images, video files all the way to archives.
- **Multi-Field Search**, in order to match all the resources possible the query is searched across multiple fields.

The project is still under development, as there are a number of services yet to be

provided, such as instant messaging and event management, to name a few.

4.2 Interface

The interface has been designed with a simple and intuitive UI/UX. The rule of three has been followed, which means that any user-accessible feature is available within three clicks or less. Below are the images of the interface:

fig. 4.2.1 The Microservice Interface

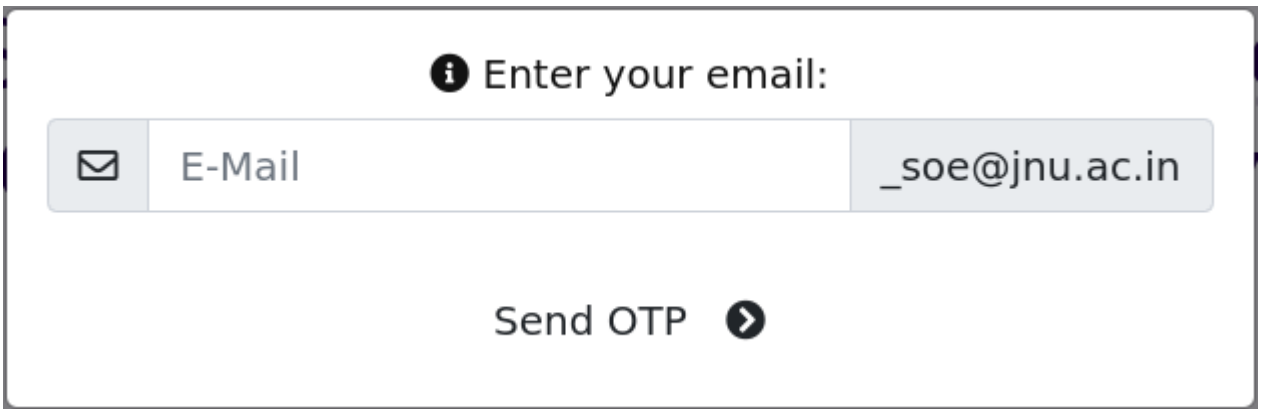

fig. 4.2.2 The OTP-requesting Prompt Interface

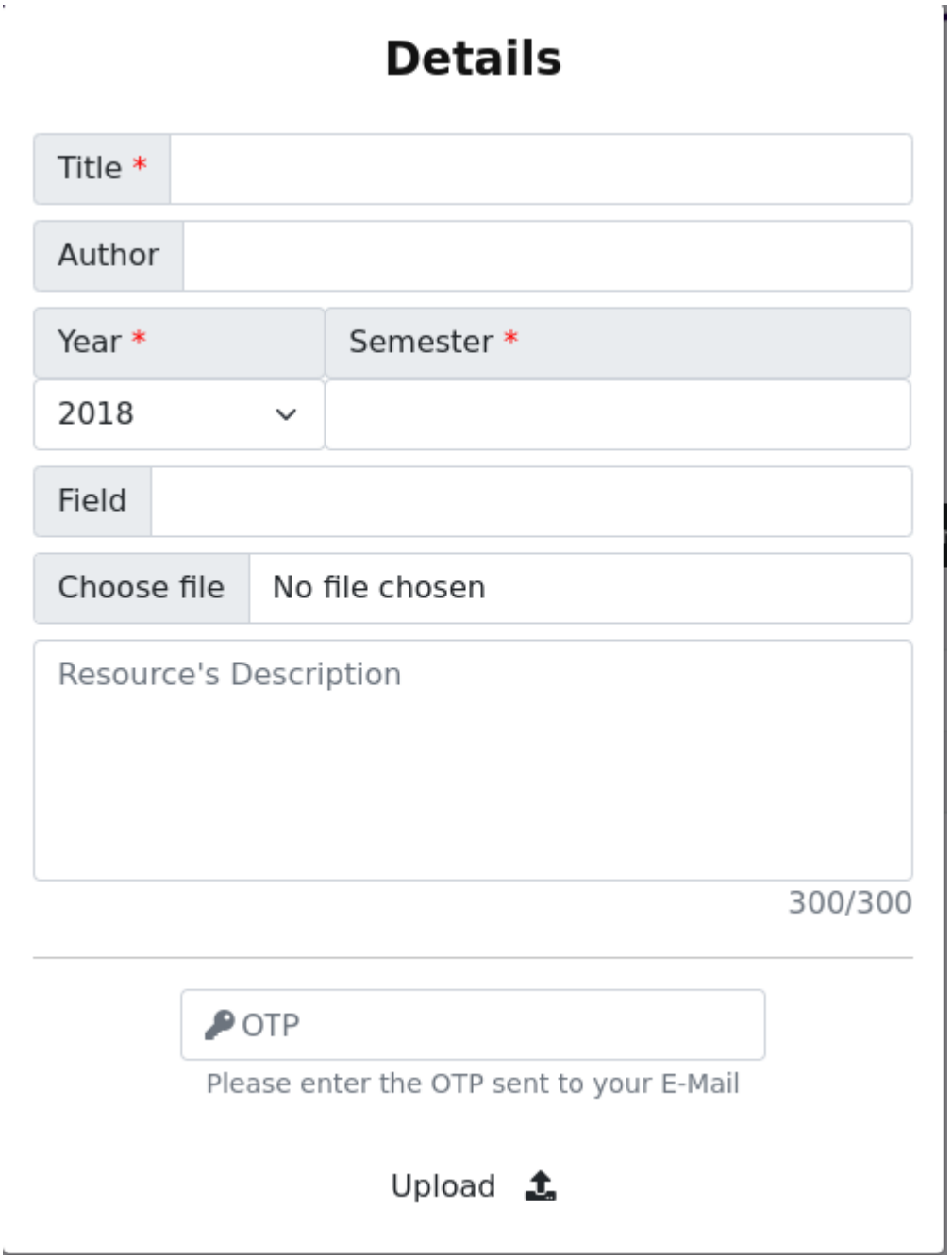

fig. 4.2.3 The File Uploading Interface

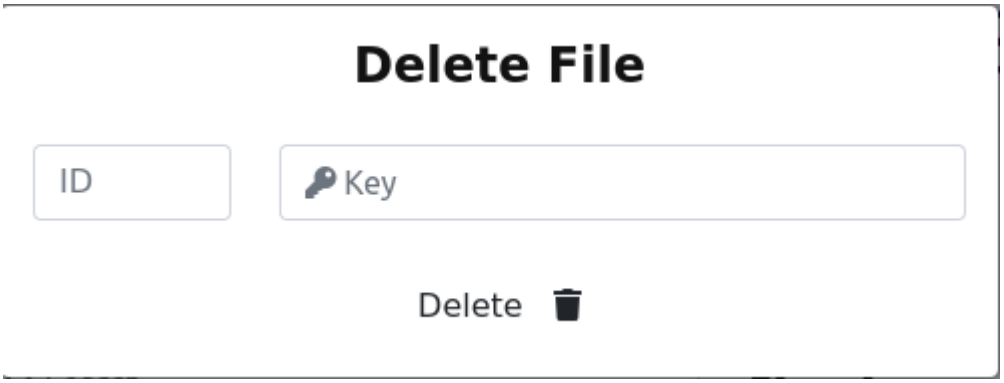

fig. 4.2.4 The Resource Deletion Prompt Interface

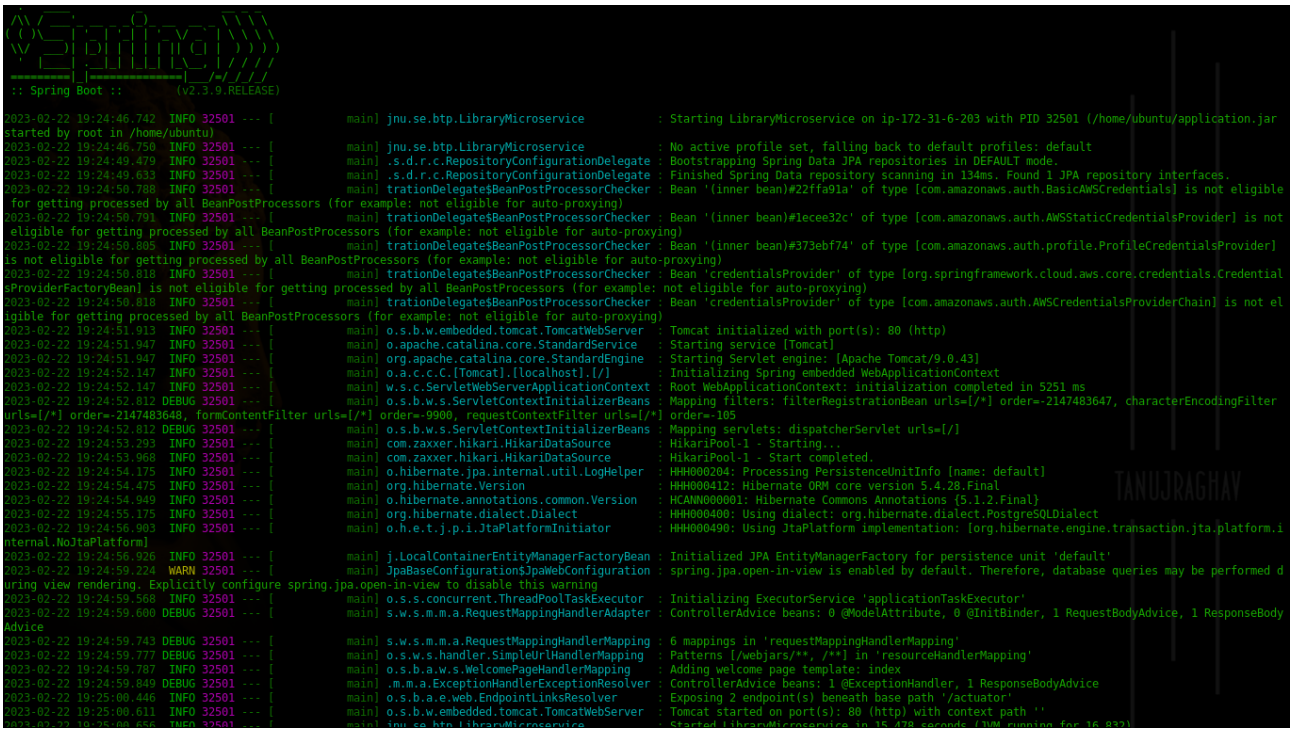

fig. 4.2.5 The Microservice being hosted on the AWS EC2 Instance

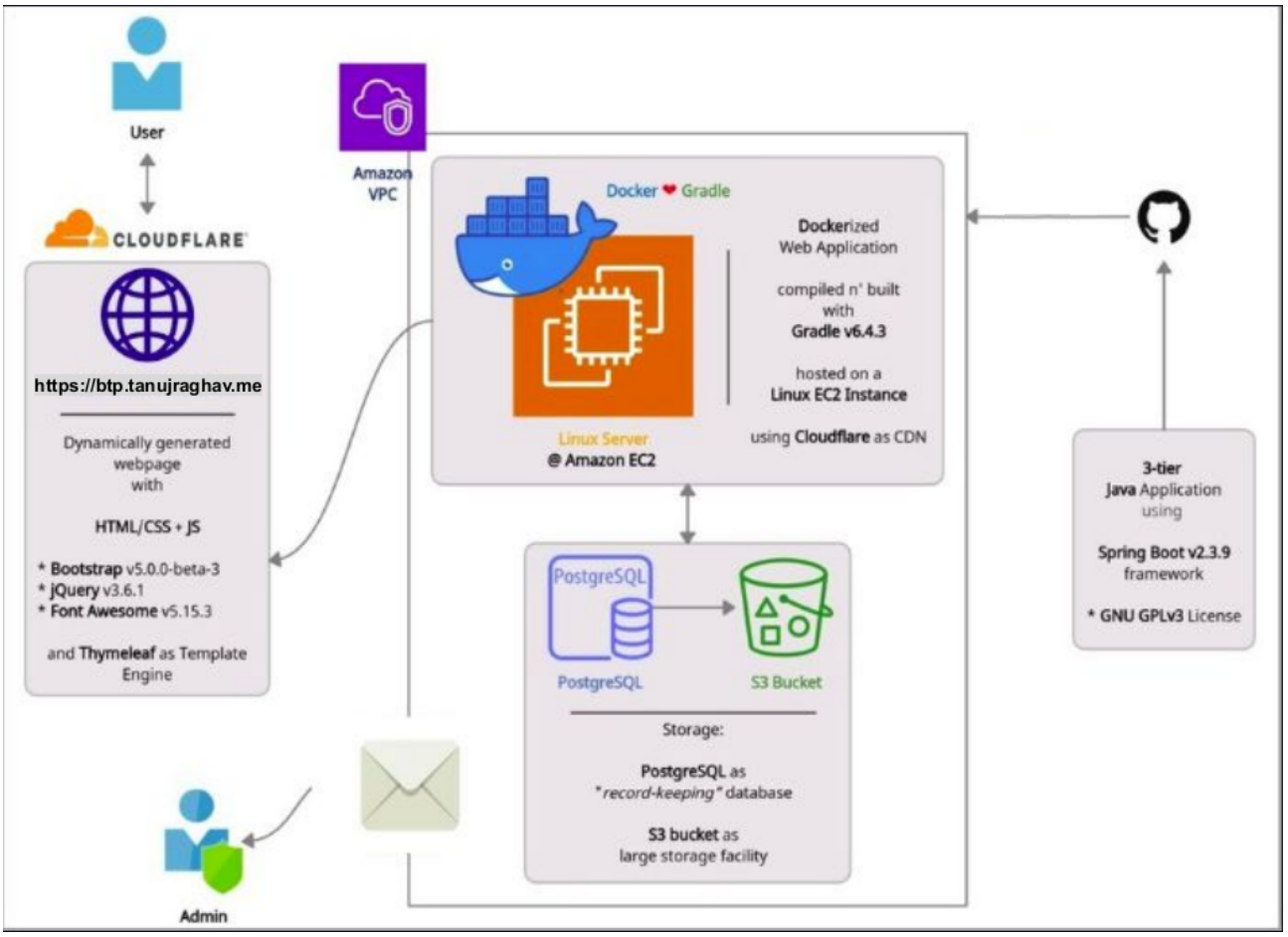

fig. 4.2.6 A Visualisation of Microservice Architecture

Chapter 5. Conclusion and Future Scope

5.1 Conclusion

This project has been partially successful, at least as far as architecture is concerned. I was able to solve the problem of having a publicly available resource pool with restricted inbound storage. Given the current atmosphere of privacy concerns, I implemented the best available and understood privacy tools, from designing my own Virtual Private Cloud Networks at the very base to using a SSL/TLSv1.3 secure CDN at the user-front.
In addition to this, I implemented a proper SDLC that meets most of the industry standards.

5.2 Future Scope

I have high hopes for the future of development, as I have already completed all the necessary groundwork. All that remains is essentially pseudo-cloning. I will continue working on this project in the next semester under the guidance of Dr. Priya Gupta. My primary objective for the next semester will be to develop other microservices within the same architecture, to complete the web-application, namely Events Manager, Planner, Messenger, Announcement Wall, and others.
My secondary objective will be to implement a zero-trust architecture to maintain the highest standards of security.

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