**OPPORTUNEER (Explore to Excel)**

**7COM1039: Advanced Computer Science Masters Project**

Under the supervision of

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By

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**Section 1: Background Research and Literature Review**

* 1. **Introduction:**

The **Opportuneer - Explore to Excel** project is a job portal developed to address the difficulties faced by students seeking part-time jobs and skilled sponsorship opportunities. Most of the job portals advertise employment types generally, but Opportuneer is more narrow, targeting a specific area of job opportunities among students and graduates. Graduates as well as undergraduate students belong to two categories which experience so many challenges while at the universities or immediately after, in search of part-time job opportunities during their studies and qualified sponsorships after graduation.

This platform seeks to provide an interface between skilled individuals and employers who are looking for such workers seamlessly. Moreover, it gives users a community where they can be supported in their search for jobs and build their careers throughout their lives.

* 1. **Project Goals and Objectives:**

The ultimate purpose of Opportuneer is to make it easier for job seekers through the prevention of mismatches between wanting ads and competitive candidates. Furthermore, this kind of platform concentrates very helpful tools for self-marketers with the possibility to receive consultations, tips, and business opportunities, all of which improve their prospect. At the center of Opportuneer's value proposition, it is stated that this organization concentrates on giving its users the ability to be employed enhancing their career perspective. The major objectives include:

* Let job seekers and employers easily find and interact about part-time student jobs and sponsorships for graduates and various professionals expanding employment alternatives.
  + Raiding the capabilities of algorithms and user preference, increases the precision of job matching so that users can find work satisfying their skills, interests, and employment objectives.
  + Increase the volume of part-time and sponsorship opportunities to the wide range of students and fresh graduates who will benefit by having flexible jobs while looking for jobs.
  + Prompt users to widen their horizons with regards to the available jobs and the jobs that they intend to do which promote skill enhancement and career growth resulting in total transformation of skills.
  + Establish an online platform where members can post their stories, upload suggestions and search for opportunities in the field of part-time job and sponsorship opportunities in support of members.
  1. **Background Research:**

The Opportuneer project builds upon the existing body of work in algorithmic job matching, UX and, community participation. While focusing on case studies in this project, an attempt is made to achieve a synthesis between theoretical models and empirical investigations in building a platform that is not only a marketplace for job seekers and employers, but also a space for professional development. I will now proceed to consider four significant pieces of work addressing the issue, their embedding in the project, and the use they will make of in theoretical and empirical work.

*Usability and UX Design (Nielsen, 2016)*

Nielsen’s (2016) research on usability principles provides a foundational understanding of how to design effective and user-friendly platforms. Nielsen's "10 Usability Heuristics" emphasize key aspects such as consistency, user control, and system feedback. These principles are integral to **Opportuneer**, where ease of use and a seamless experience are paramount.

In practice, these usability principles have been applied to the design of the Opportuneer platform’s user interface (UI). For instance, the platform’s dashboard is designed to be intuitive, with clear navigation for both job seekers and employers. Icons and buttons are consistently placed across the platform, ensuring that users can quickly perform actions like searching for jobs or posting job listings. The feedback mechanism, such as confirmation messages and progress indicators, provides users with constant updates on their actions (e.g., submitting an application or editing their profile). By applying Nielsen’s guidelines, the project addresses the critical need for simplicity and user satisfaction, avoiding the complexity often found in traditional job portals.

*User Engagement and Retention in Digital Platforms (Hassan et al., 2019)*

Hassan et al. (2019) examine factors that contribute to user engagement and retention on digital platforms, including social interaction, personalized experiences, and consistent value delivery. They argue that platforms that foster a sense of community and provide users with continuous value—such as up-to-date job postings, networking opportunities, and personalized alerts—are more likely to retain users over time.

In **Opportuneer**, user engagement and retention are critical components, especially since many students and graduates rely on the platform for both immediate part-time opportunities and long-term career development. By offering tools such as job alerts, email notifications for relevant posts, and career tips, **Opportuneer** aims to create a dynamic experience for users. Hassan et al.’s framework guided the development of these features, ensuring that **Opportuneer** not only attracts users but keeps them engaged over the long term by providing valuable content and ongoing job opportunities.

*Job Portal Development and User-Centric Design (Chung et al., 2018)*

Chung et al. (2018) explore the evolution of online job platforms, emphasizing the importance of a user-centric design for improving engagement and retention. They argue that a well-designed job portal can reduce user frustration by offering intuitive navigation, clear job categories, and customizable user profiles. This directly relates to Opportuneer, where the focus is on creating a seamless, easy-to-navigate platform that allows both job seekers and employers to interact effectively.

In my project, the design principles outlined by Chung et al. were applied during the development of Opportuneer to ensure that both job seekers and employers can easily access job listings, manage their profiles, and navigate the platform. Simple filters, clear job categories, and the ability to save job REASEAuser satisfaction and increase engagement. This user-centric approach aims to minimize the cognitive load on users and enhance their overall experience.

The combination of theoretical research and practical problem-solving has been integral to the development of **Opportuneer**. The platform’s design and functionality are informed by key academic frameworks on usability, user engagement, job portal design, and community-building. By translating these theories into concrete solutions, such as simplified navigation, personalized features, and social interaction opportunities, **Opportuneer** provides a platform that is both user-friendly and effective in connecting job seekers with opportunities. This integration of scholarly ideas into the practical design and development of the platform ensures that the **Opportuneer** is well-positioned to meet the needs of students and graduates while delivering an engaging and efficient user experience.

**Section 2: Summary of Progress to Date**

**2.1 Literature Review and Research:**

The first phase of the project involved conducting a detailed literature review to guide the design and functionality of the platform. The literature review focused on key areas such as usability principles (Nielsen, 2016), user engagement and retention (Hassan et al., 2019), and the evolution of job portals (Chung et al., 2018).

***Progress***:

* **Completed**: A comprehensive analysis of these theories and frameworks has shaped the project’s approach to platform design, with particular attention to usability, user-centric features, and community building. Insights from these studies helped establish the foundation for Opportuneer, ensuring that it would meet the needs of students and graduates while adhering to industry best practices.
* **Alignment with Goals**: The literature review directly contributed to understanding how to balance simplicity and complexity in design, creating a user-friendly platform that engages users through community interaction and personalized job alerts, ultimately increasing retention rates.

**2.2 Defining Requirements and Planning:**

Following the literature review, I defined the project requirements, which included key functionalities like user registration, job posting, job search, and profile management. I also mapped out the user flow, designed initial wireframes, and established success factors for user engagement and retention.

**Progress:**

* **Completed**: The project requirements were clearly defined, focusing on the core features required for job seekers and employers. User stories were created to understand the needs of both job seekers and employers, which informed the design process.
* **Alignment with Goals**: These requirements align to make job search easy and efficient for students and graduates. The design of clear, consistent user interfaces (UIs) and streamlined features ensures that users can easily navigate the platform to find suitable opportunities.

**2.3 Platform Development:**

The development of Opportuneer began with the creation of the platform’s basic architecture, followed by the integration of core features such as registration, login, job search, and dashboard functionalities. I used ReactJS for the frontend, Spring Boot for the backend, and MySQL for database management.

**Progress**:

* **Completed**: The initial setup of the platform’s frontend and backend was successfully completed. The registration and login system allows users to create accounts and securely log in to their profiles. The job search functionality was implemented, allowing job seekers to search for relevant part-time and sponsorship job listings based on their preferences. The dashboard was designed for both job seekers and employers to manage their profiles, view job listings, and track applications.
* **Ongoing**: Currently, the focus is on adding features for job alerts, career advice, and user interactions through community forums.
* **Alignment with Goals**: The development of these features directly supports the project’s goal of providing a seamless job search experience. The personalized job search and dashboard functionalities ensure that users are connected with the right opportunities.

**2.3.1 Tools and Technologies:**

* **Frontend (ReactJS):** ReactJS was chosen for its flexibility and scalability in building interactive user interfaces. Its component-based architecture allows for reusable UI components, making development more efficient and maintainable.
* **Backend (Spring Boot):** Spring Boot was selected for its ease of use and integration capabilities. It provides a robust framework for building secure and scalable RESTful APIs, which are essential for handling user authentication, job postings, and profile management.
* **Database (MySQL):** MySQL is used for storing user profiles, job listings, and application data. Its relational nature ensures that data can be efficiently structured and queried to support dynamic job search and profile management.

**2.4 Dataset Creation and Data Management:**

To support the job search and job posting features, datasets containing job listings, user profiles, and application data were created. Although this data is initially being populated manually for testing, plans are in place to automate the population of job listings from external sources in the future.

**Progress**:

* **Completed**: A dataset of job listings has been manually created for testing purposes. The dataset includes key attributes such as job title, location, salary range, and required skills. A user profile dataset was also developed to simulate job-seeker and employer interactions.
* **Alignment with Goals:** The creation of these datasets ensures that the platform can effectively display relevant job opportunities and allow job seekers to apply directly through the platform.

**2.5 Prototype Development and Testing:**

Initial prototypes of the user interface were created and tested to ensure that the platform was easy to navigate and met usability goals. User feedback was gathered through informal testing, and several changes were made to improve the design based on this feedback.

**Progress**:

* **Completed**: The prototype for the job search page and the employer dashboard has been developed. This includes features such as job listings, search filters, and profile management options.
* **Ongoing**: The platform’s usability is being tested through iterative user testing, with feedback informing further design adjustments.
* **Alignment with Goals**: Prototyping aligns to enhance user experience by ensuring that the platform’s interface is intuitive and easy to navigate. Continuous testing helps refine the design and improve user satisfaction.

**2.6 User Engagement and Retention Features:**

To enhance user engagement, features such as job alerts and email notifications have been planned. These features will notify users of relevant job opportunities based on their preferences, encouraging them to return to the platform.

**Progress**:

* **Ongoing**: The integration of job alerts and email notifications is in progress. These features are designed to provide continuous value to users and increase retention by keeping them informed about job opportunities and platform updates.
* **Alignment with Goals**: This directly supports the objective of improving job search outcomes by ensuring that users receive personalized job recommendations in real time.

**2.7 Challenges Encountered and Solutions**

**2.7.1 Technical Issues:**

***CORS Issues***

* ***Challenge***: The React frontend was blocked from communicating with the Spring Boot backend due to CORS policy.
* ***Solution***: Configured Spring Boot to allow requests from React (localhost:3000), resolving the issue.

***Authentication Issues***

* ***Challenge***: Implementing JWT authentication with Spring Security.
* ***Solution***: Created custom JwtTokenProvider and JwtAuthenticationFilter to manage JWT-based authentication.

***GET/POST Errors***

* ***Challenge***: Incorrect error handling and HTTP responses during registration and job search.
* ***Solution***: Implemented robust exception handling, returning user-friendly error messages and appropriate status codes.

**Section 3: Consideration of Ethical, Legal, Professional, and Social Issues**

**3.1** **Ethical Issues:**

Ethical considerations are crucial when developing a platform like Opportuneer that handles user data, especially as it pertains to personal and sensitive information such as names, emails, phone numbers, and resumes. While ethics approval is not required for this project at its current scope.  I still seek to adhere to ethical practices about privacy and data security. The project will be guided by principles of equity as all users will be treated equally and with transparency.

To mitigate any ethical risks, the platform will ensure that personal data is only collected when necessary and will provide clear consent forms to users during registration. Additionally, data access will be restricted to authorized individuals, and users will have the ability to manage or delete their profiles upon request. Future development may require a more comprehensive ethical review, especially if the platform grows to handle more sensitive data, such as interview recordings or background checks.

**3.2 Legal Issues**:

One of the primary legal considerations is data protection, particularly under regulations such as the General Data Protection Regulation (GDPR). The Opportuneer platform will collect and store basic personal data such as names, emails, phone numbers, and resumes. To comply with GDPR, the platform will implement the following practices:

**Data Minimization**: Only essential data will be collected.

**Transparency**: Users will be fully informed about the purpose of data collection, and consent will be explicitly obtained.

**Data Security**: Strong encryption and security protocols will be put in place to safeguard user information.

**User Rights**: Users will have the ability to access, modify, or delete their data upon request.

**3.3 Professional Issues:**

Professionally, the development of Opportuneer will adhere to industry standards for software development and user experience. This includes following secure coding practices, conducting regular code reviews, and ensuring that the platform is accessible and easy to use. Moreover, the platform will follow best practices in project management, ensuring clear documentation of all phases of development and maintaining transparency about progress and setbacks.

**3.4 Social Issues:**

Socially, Opportuneer aims to address several issues, including employment inequality and access to opportunities for marginalized groups. By connecting students and graduates with part-time and skilled jobs, the platform could promote more equitable access to employment. However, care must be taken to avoid introducing bias into job matching algorithms or job recommendations. Ensuring fairness in how opportunities are presented and ensuring that the platform does not inadvertently disadvantage certain user groups will be a critical focus.

**Section 4: Project Plan**

**4.1 Project Management Approach:**

For the Opportuneer project, I am adopting a hybrid project management approach that combines Agile methodology for flexibility with aspects of Waterfall to ensure structured progression toward key milestones. This approach allows me to adapt priorities and manage iterative development, while still following a clear sequence for deliverables and deadlines. The Agile aspects help address scope changes and allow for continuous testing and feedback, especially when implementing new features or addressing unforeseen technical challenges.

* 1. **Completed Tasks:**

**4.2.1 Platform UI Design (Completed)**

* **Description**: Created a clean, user-friendly interface following UX best practices to ensure intuitive navigation for job seekers and employers.
* **Deliverable**: Prototype UI layout, including key components for the dashboard and registration process.

**4.2.2 Frontend Framework Setup (Completed)**

* **Description**: Established the React environment for the front end, including setting up routing, state management, and basic components.
* **Deliverable**: Initial component structure and environment setup for the React application.

**4.3 Remaining Tasks:**

**4.3.1 Backend API Development (Target Date: Nov 20)**

* **Description**: Develop RESTful API endpoints to manage user data, such as registration, login, profile updates, and job posting. Ensure secure handling of personal information.
* **Deliverable**: Documented API endpoints with tested functionality for CRUD operations on user and job data.

**4.3.2 Frontend Integration and Component Testing (Target Date: Nov 30)**

* **Description**: Complete integration of backend APIs with frontend components to enable live data interactions, including login, registration, job search, and job posting. Conduct component-level testing to identify and resolve bugs.
* **Deliverable**: Fully functional user interface connected to backend services, ensuring smooth user interactions.

**4.3.3 User Registration and Authentication (Target Date: Dec 5)**

* **Description**: Implement secure registration, login, and session management features, ensuring data validation and encryption. This will include mechanisms for password hashing and user session maintenance.
* **Deliverable**: Secure, tested authentication system for Opportuneer.

**4.3.4 Testing and Feedback Cycle (Target Date: Dec 15)**

* **Description**: Conduct usability and functionality testing on the integrated platform, collecting feedback from a sample user group. This will involve testing for ease of use, UI responsiveness, and identifying any remaining bugs.
* **Deliverable**: Tested, refined version of the application with feedback-informed adjustments.

**4.3.5 Documentation and Final Report Writing (Target Date: Dec 23)**

* **Description**: Write a comprehensive report documenting the project’s objectives, development process, technical challenges, ethical considerations, and evaluation. Include a final assessment of project findings and conclusions.
* **Deliverable**: Final project report, including technical documentation and relevant appendices.

**4.3.6 Presentation and Demonstration Preparation (Target Date: Dec 24)**

* **Description**: Prepare a presentation summarizing project goals, design, key features, challenges, and outcomes. Rehearse a demonstration of the platform’s key functionalities.
* **Deliverable**: Presentation materials (slides, demonstration notes) and rehearsed project demonstration

**4.4 Quality Evaluation Strategy:**

To keep progress on track, key considerations include:

* **Scope Management**: Defining clear desires for each level guarantees the mission stays within scope, aligned with our aim to connect college students with process opportunities whilst adhering to ethical and criminal suggestions.

• **Time Management**: Adherence to a based timeline, visualized in a Gantt chart, guarantees key duties are finished sequentially, building in the direction of a final, useful prototype.

• **Resource** **Allocation**: Efficiently the usage of sources inclusive of improvement equipment, frameworks, and datasets facilitates maintaining focus on middle deliverables without pointless expenses or delays.

• **Risk Management**: Regularly assessing ability dangers, like CORS troubles and integration mistakes, guarantees we address issues rapidly and keep away from setbacks.

• **Quality Assurance**: Incorporating checking out cycles and iterative comments from stakeholders to verify capability and consumer enjoyment.

• **Regular Updates & Adjustments**: Weekly review sessions ensure priorities and strategies are adjusted as needed to maintain steady progress towards the project goals.

**4.5 Project Tracking and Monitoring:**

To ensure the project stays on track and meets deadlines, I have utilized version control logs to manage code updates and track the progress of development tasks. These logs demonstrate the completion of critical milestones and provide insight into the overall development cycle.

* As detailed in Appendix 1, the Version Control Logs from Bitbucket illustrate key commits and changes made during the project lifecycle, such as the initial setup, API integrations, and frontend enhancements (Appendix 1).
* Appendix 2 presents the Gantt Chart, visually outlining the project timeline, task dependencies, and critical milestones. This chart is regularly updated to monitor the status of each task and ensure timely completion (Appendix 2).

**Section 5: Level of the Project**

The **Opportuneer** project presents an opportunity to address challenges in connecting job seekers with employers, specifically focusing on part-time and skilled job opportunities. This challenge is significant and relevant to my career aspirations to become a full-stack developer. I am drawn to this project as it combines both front-end and back-end development using advanced frameworks and methods that enhance my skills and offer practical experience in building a robust, real-world application. Additionally, the project requires a deep understanding of technical implementation and user experience design, aligning with my goal of developing holistic software solutions.

**5.1 Artefact and Solution:**

The artefact in development is a web application that streamlines the job search and recruitment process by providing a user-friendly platform for job seekers to connect with potential employers. The Opportuneer platform collects and manages basic user data (name, email, phone number, and resume) to create profiles and provide targeted opportunities. With secure login, registration, and profile management features, Opportuneer is being built as a dynamic system that responds to user actions in real time.

The application demonstrates MSc-level depth by implementing complex backend and frontend integrations, and secure data handling. This project is not merely a basic application; it is a sophisticated, user-centric platform with multiple interfaces, each requiring tailored development.

**5.2 Advanced Skills and Innovation:**

The project demands advanced skills in several areas:

* **Secure Coding Practices**: Ensuring data protection through backend validation, CORS configurations, and error handling such as 401 and 500 errors.
* **Frontend Dynamics:** ReactJS is used to create interactive, responsive components with dynamic state management, making the user experience seamless.
* **Database Management**: The backend relies on Spring Boot and MySQL to create a scalable architecture with secure CRUD operations, handling user data storage, retrieval, and updates efficiently.
* **Integration of Theoretical and Practical Knowledge**: Leveraging literature and best practices in web development, usability, and security to guide project decisions.

In comparison to existing recruitment platforms, Opportuneer brings a streamlined, simpler interface geared towards students and recent graduates, focusing on their unique needs without overcomplicated features. Unlike more extensive systems, Opportuneer is lightweight and built to scale, allowing employers to post jobs efficiently while targeting a specific, growing demographic.

**5.3 Depth of Investigation and Research Integration:**

This project is grounded in a detailed investigation of user experience principles, privacy regulations, and accessibility standards. Research and literature in these areas guide not only the design of the platform but also critical features like data handling and error resolution. For example, while CORS errors and 401 unauthorized errors were initially challenging, I researched solutions and implemented role-based access control to resolve these issues securely.

The research involved is both broad and detailed, encompassing data privacy, job-seeker engagement strategies, and the technical intricacies of implementing a secure and scalable system. This blend of research and application underpins the project and elevates it to an MSc-level endeavour.

**5.4 Justification of Methods and Tools:**

ReactJS, Spring Boot, and MySQL have been chosen for the **Opportuneer** project, basing on its demands in responsiveness, scalability, and performance. ReactJS can be used to create a truly dynamic, interactive user interface that can smoothly respond to changes in real-time data. Along with MySQL, Spring Boot presents a secure, efficient backend architecture which is practical to be used for effective data management and scaling.

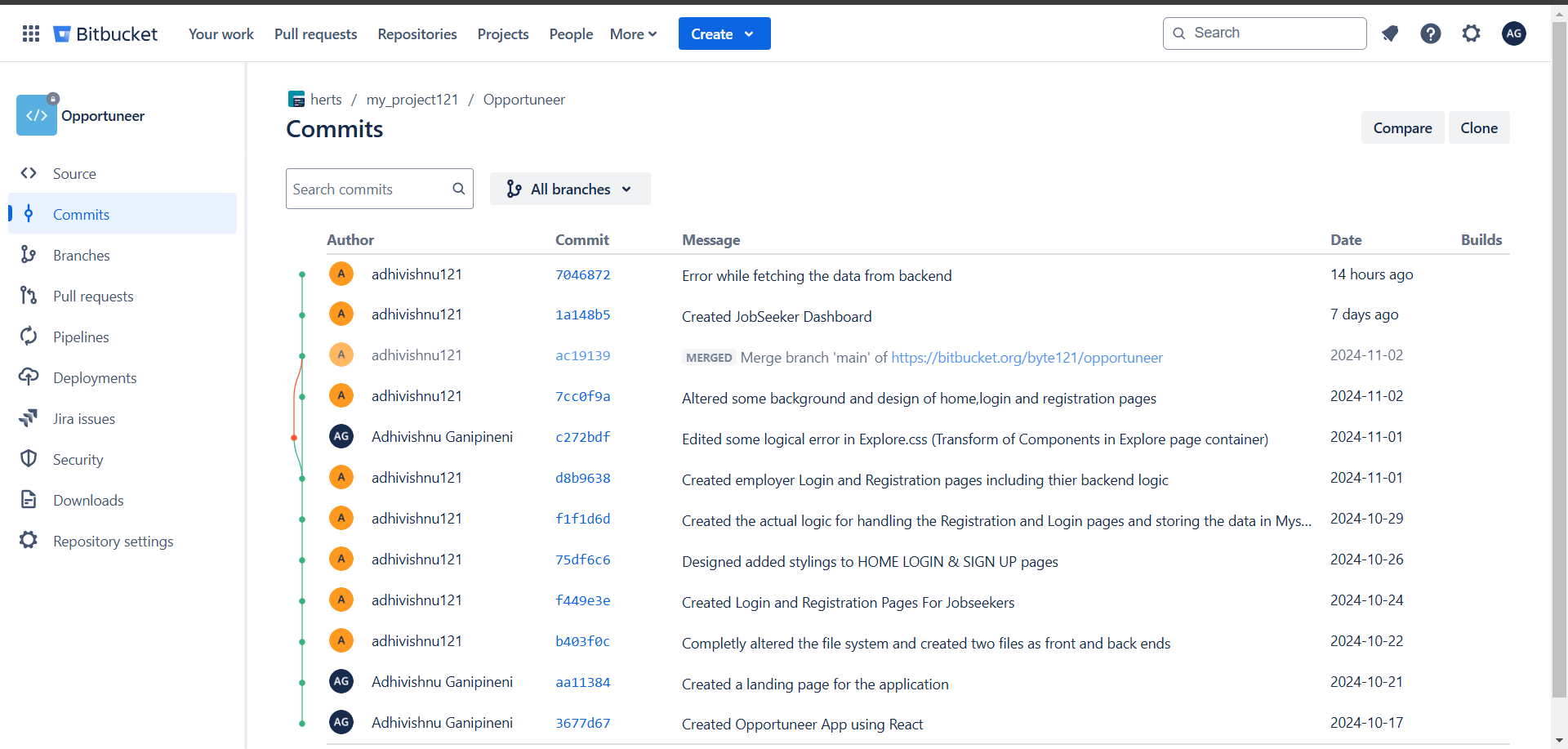
Security mechanisms such as JWT authentication and encryption of data storage will be integrated to protect data privacy. With these tools and procedures, it is guaranteed that the platform will function in an efficient manner while meeting the strict security, dependability, and usability standards for the execution of MSc level work.

**Section 6: Appendices**

**Appendix 1: Version Control Logs (Commits from Bitbucket)**

This section includes the commit logs from the Bitbucket repository, demonstrating the progress and development of the project. The logs showcase important updates, additions, and fixes implemented throughout the project.

The attached screenshot below represents all the commit messages made so far in this project using the version control (Bit Bucket):



**Appendix 2: Gantt Chart**

This section presents the project’s timeline and key tasks, highlighting the overall schedule and critical milestones. Below are screenshots of the Gantt chart representing the planned tasks.

