

7SENG013C.Y Software Development Project

Project Proposal (PP)

Gig Work Marketplace Software Project

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1 Introduction to the project

Gig work spans across a wide range of tasks, from handyman work, babysitting to online freelancing (De Stefano and Aloisi, 2018). Gig work representation in today's global workforce is elevating with technological advancement, emergence of the Gen Y and Gen Z workforce and the Covid-19 pandemic (Ray, Sengupta and Varma, 2024).

In this rapidly evolving gig economy, both employers and part-time workers struggle to find suitable matches efficiently. Employers face challenges in task outsourcing, while workers struggle to find flexible gigs that suit their requirements. Technology is called for in the gig economy for efficient work allocation.

This software development project intends to bridge this gap by developing a web application that connects employers with part-time workers. This digital platform will facilitate job posting, job picking by gig workers, and seamless communication between employers and workers. This solution enhances gig economy participation by narrowing its focus on gig work, unlike platforms that caters to both full-time and flexible jobs. Employers will benefit from efficiently sourcing reliable part-time talent. They can utilize this platform to outsource tasks, from household work to short-term professional work. Gig employees will pick those tasks to earn additional income by rendering the posted service.

This application will serve the needs of below users.

- 1) Employers: Businesses and individuals requiring reliable part-time workers for various tasks.
- 2) Gig Workers: Individuals, including students, freelancers seeking short-term job opportunities that fit their schedules.

This platform will be designed to be user-friendly, ensuring that both parties can easily navigate and utilize the application's functionalities.

This solution will address the below challenges faced by both employers and workers in the current job market.

- Inefficiencies in traditional methods of finding part-time work or hiring part-time workers. A digital platform streamlines the gig work allocation process, saving time for both employers and part-time workers.
- Less flexible arrangements in conventional job seeking methods that require payments for job postings and commissions for successful matches. This platform does not rely on payments from either party for the maintenance of it.
- Communication issues between employers and workers result in inefficient work allocation. The platform's in-app messaging system facilitates seamless communication between employers and gig workers.
- Other available platforms for job seeking caters to a wide range of job opportunities, from full-time, contractual jobs to flexible part-time jobs. By narrowing down the target market, this platform enables employers to access a manageable amount of suitable candidates and workers to efficiently access job opportunities that suit their requirements.

This gig work intermediary platform will include the following core features.

- Allow employers to post part-time jobs with skills required and payment offered.
- Enable gig workers to search for gigs and apply for suitable opportunities.
- Facilitate in-app messaging for clear communication between employers and workers.
- Send notifications to users about job offers, application statuses, and messages.

2 Project aims and objectives

The purpose of this digital platform is to streamline the flexible work hiring process by connecting employers looking for part-time workers and individuals seeking part-time employment. This project will address the current inefficiencies in the part-time job market by achieving the following aims and objectives.

The aims of the project are:

Aim 1 (PA1) – Design and develop a user friendly, simple and intuitive digital platform that enables seamless task outsourcing for employers.

Aim 2 (PA2) – Design and develop a user friendly, simple and intuitive digital platform that facilitates efficient job seeking for part-time workers.

Aim 3 (PA3) - Enhance communication between employers and part-time workers to improve task outsourcing.

The objectives for PA1 are as follows.

- (PO1.1) Implement a responsive user interface that allows employers to easily post jobs.
- (PO1.2) Develop a database using PostgreSQL to manage employer data and job postings securely and efficiently.
- (PO1.3) Ensure the application is scalable and can handle a growing number of employer profiles and job postings without performance degradation.

The objectives for PA2 are as follows.

- (PO2.1) Implement a responsive user interface that allows part-time workers to easily search and apply for jobs.
- (PO2.2) Develop a database using PostgreSQL to manage employee data and applications securely and efficiently.
- (PO2.3) Ensure the application is scalable and can handle a growing number of worker profiles and applications without performance degradation.

The objectives for PA3 are as follows.

- (PO3.1) Implement an in-app messaging system to facilitate seamless communication between employers and part-time workers.
- (PO3.2) Develop a notification system to notify users about application statuses and messages.

3 Project system architecture diagram

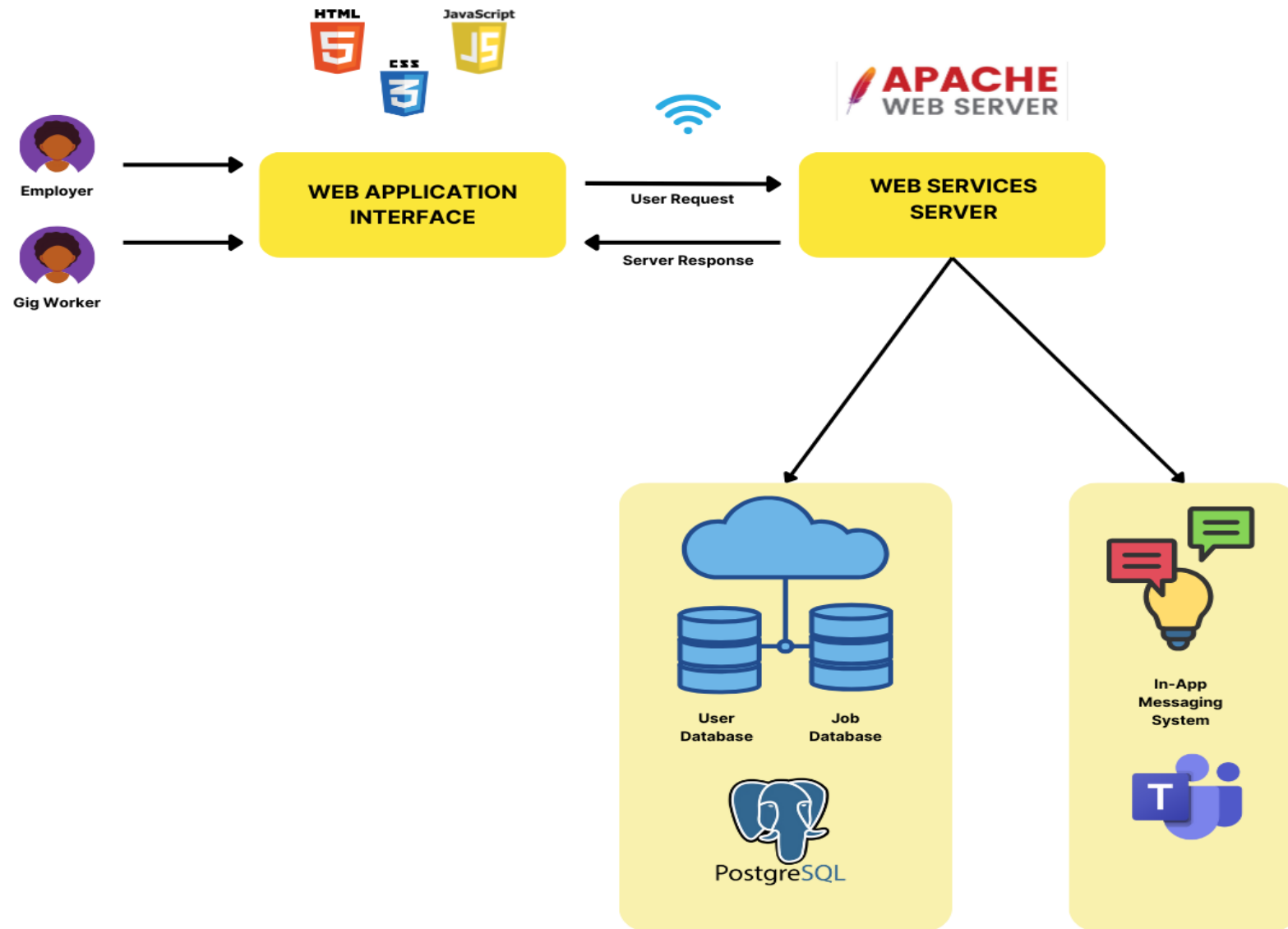
Figure 1 shown below represents the high-level components of this digital platform and the types of links between them.

Employers and part-time workers interact with the web application through a web browser. When a user performs an action on the interface (e.g., logging in, posting a job, searching for jobs, picking a task), a request is sent from their device to the web services server over the Internet.

The web services server receives the user's request and processes it. Depending on the action, the server may need to interact with various components like the user database, job database, or in-app messaging system to retrieve or store data. The server processes the request and determines the necessary actions. If the request involves data retrieval or storage, the server queries the appropriate database. For example, if a user searches for jobs, the server queries the job database to find matching job listings. After processing the request and retrieving the necessary data, the web services server prepares a response. This response contains the requested information or confirmation of the action performed (e.g., successful login, job posting confirmation, search results).

The server sends the response back to the user's device over the Internet. The user's web browser receives the response and displays the relevant information or confirmation to the user.

Figure 1



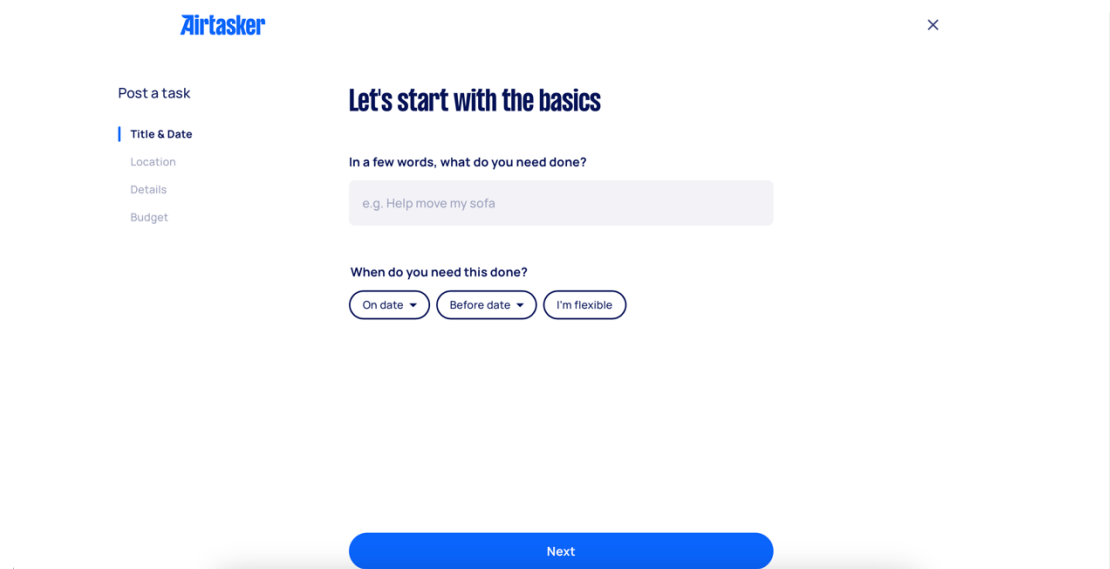
4 Project research

4.1 Review of similar systems

Existing applications that connects employers with part-time workers include GigSmart (GigSmart, no date), Airtasker (Airtasker, 2023) and Indeed (Indeed, no date). The core functionalities these platforms offer, that helps employers connect with on-demand workers are given below (Airtasker, no date; GigSmart, no date; Indeed, no date).

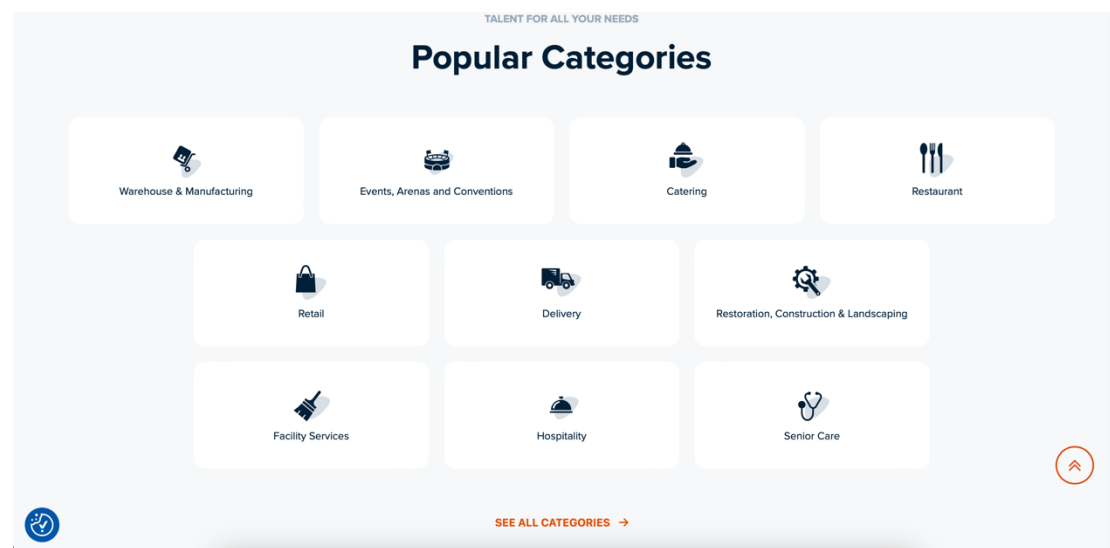
- Job posting: Employers can post tasks, with details such as task description, location, budget and required skills. Both GigSmart and Indeed require employers to create employer accounts to post jobs, while Airtasker allows job posting without business accounts, as shown in Figure 2.

Figure 2

The image shows a screenshot of the Airtasker website's 'Post a task' form. The Airtasker logo is in the top left corner. On the left side, there is a vertical navigation menu with the following items: 'Post a task' (highlighted with a blue bar), 'Title & Date', 'Location', 'Details', and 'Budget'. The main content area is titled 'Let's start with the basics'. It contains a text input field with the placeholder 'In a few words, what do you need done?' and an example text 'e.g. Help move my sofa'. Below this is another section titled 'When do you need this done?' with three radio button options: 'On date', 'Before date', and 'I'm flexible'. At the bottom of the form is a large blue button labeled 'Next'.

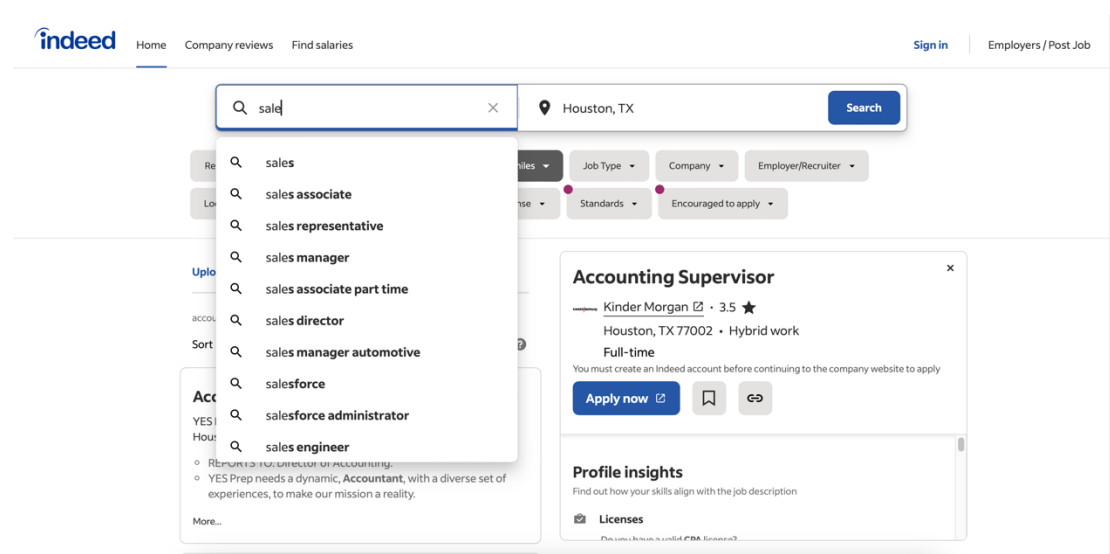
- Categorizing tasks: There are different categories of tasks ranging from handyman services, delivery, babysitting to online freelancing. GigSmart provides a clean and organized interface to view the available job categories as shown in Figure 3.

Figure 3



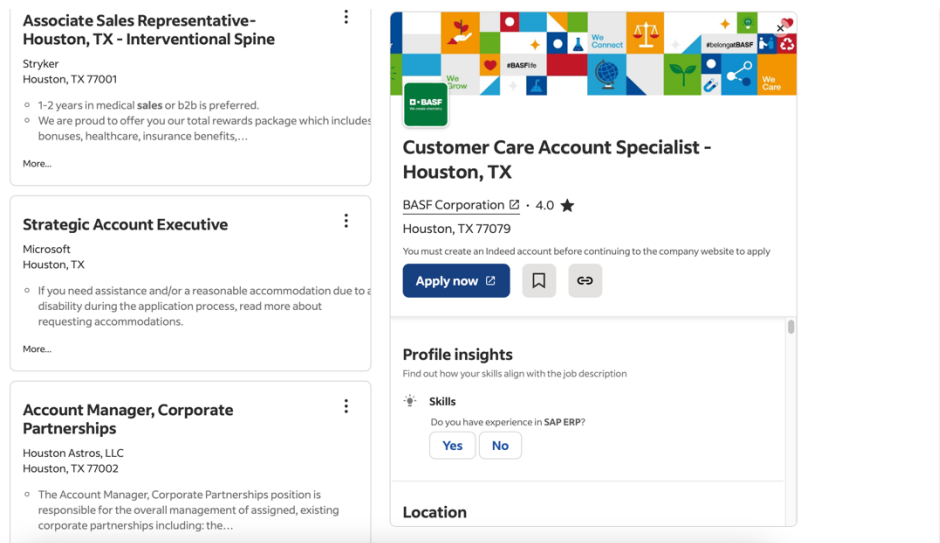
- Job search: Gig workers can search for jobs using keywords, job titles and locations in all 3 platforms. While Airtasker requires creating a user account to browse jobs, Indeed allows job searching without creating a user account as shown in Figure 4.

Figure 4



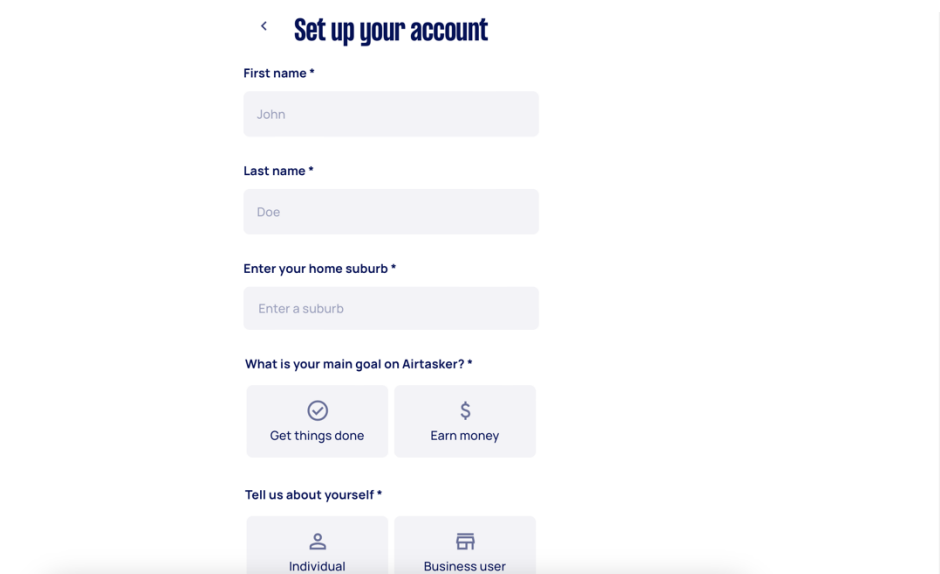
- Task picking: Gig workers can pick tasks that match their skills, experience, and availability. Indeed provides a user friendly option to apply directly for the position by logging in from the user account as shown in Figure 5.

Figure 5



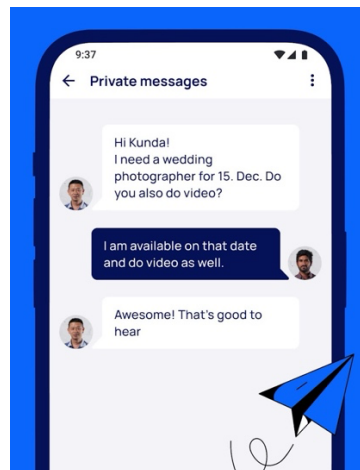
- User profiles: Both employers and gig workers can create and maintain accounts, where worker profiles include their skills, experience, reviews and preferences. The sign up process in Airtasker is easy to follow with a limited number of manual steps as Figure 6 demonstrates.

Figure 6



- Communication Tools: Employers and workers can communicate using the in-app messaging systems about tasks. Airtasker allows employers and workers to maintain 1-1 communication via private messages as shown in Figure 7.

Figure 7



Based on the above comparison of similar applications, users of a gig work intermediary platform would benefit from the following features.

- 1) Job Posting: Employers can post jobs quickly without the hassle of creating a user account. The risk of fraudulent job postings will be minimized by enabling workers and employers to communicate with each other via the in-app messaging system.
- 2) Categorizing tasks: Tasks in the platform are categorized based on the nature of the service to enable employers to easily post their jobs and workers to efficiently find suitable opportunities. The interface should be visually appealing and easy to navigate.
- 3) Job search: Gig workers can search for jobs using keywords, job titles and locations without creating a user account.
- 4) Task picking: Gig workers can pick tasks that match their skills, experience, and availability by logging in from a user account.
- 5) User Profiles: Both employers and gig workers can create user accounts, where worker profiles include details on skills, ratings, and completion rates to help employers make informed decisions.
- 6) Communication Tools: Both employers and workers can maintain clear and efficient communication with an in-app messaging system.

4.2 Research topics

By researching the following topics, knowledge and insights needed to develop a robust, user-friendly, and secure digital platform can be gained.

- User experience (UX) design - Studying how users interact with digital platforms, focusing on usability and overall satisfaction.
- Database Management Systems (DBMS) - Studying the systems used to store, retrieve, and manage data in databases. Understanding DBMS is essential for managing user data, job postings, and application information securely and efficiently.
- Security and data privacy – Examining methods and best practices for securing digital platforms and protecting user data.

- Waterfall Project Management Methodology - Exploration of Waterfall methodologies for managing software development projects. This methodology will assist in managing the development process more effectively, allowing linear and sequential development where each phase of the project must be completed before the next stage begins.
- Regulatory frameworks - Some digital platforms merely intermediate gig work while others maintain more managerial control over gig workers (Stewart and Stanford, 2017). These workers are entitled to benefits and rights based on the control these digital platforms exercise on them. Study of this regulatory context will ensure that the web application complies with relevant laws and regulations to avoid regulatory issues.

5 Initial list of requirements

This web application intends to connect employers with part-time workers to ensure efficient work allocation. A list of requirements for the web application, categorized into essential desirable and luxury, are as follows.

Essential Functional Requirements

- 1) User Registration and Authentication
 - Employers and workers can create accounts.
 - Secure login and password maintenance.
- 2) Profile Management
 - Employers can create and manage company or individual profiles.
 - Workers can create and update personal profiles, including skills and experience.
- 3) Job Posting and Management
 - Employers can post jobs with details such as job description, requirements, and budget.
 - Employers can manage and edit job postings.
- 4) Job Search and Application
 - Gig workers can search for jobs based on various filters (location, pay, job type).
 - Workers can apply for jobs directly through the platform.
- 5) Communication Tools
 - In-app messaging between employers and workers.
 - Notifications for job postings, applications, and messages.
- 6) Application Tracking
 - Employers can track applications and manage the hiring process.
 - Workers can track the status of their applications.

Desirable Functional Requirements

- 1) Ratings and Reviews
 - Employers can rate and review workers.
 - Workers can rate and review employers.
- 2) Advanced Search Filters
 - More detailed filters for job searches (e.g., remote/on-site, date posted).
- 3) Calendar Integration
 - Integration with calendar apps for scheduling interviews and job start dates.

Non-Functional Requirements

- 1) Performance
 - Fast load times and responsive design.
 - Scalability to handle a large number of users.
- 2) Security
 - Data encryption for sensitive user information.
 - Regular security audits and updates.
- 3) Usability
 - Intuitive and user-friendly interface.
 - Organized, visually appealing, and easy to navigate.

Background reading of literature and review of existing gig work intermediary platforms is the most suitable methodology for requirements gathering, to finalize the features of this application. Literature review will involve reading journal articles, industry case studies and reports on gig work platforms. In depth research on existing platforms provides a deeper understanding and useful insights to develop a well rounded application. By reviewing similar applications, industry best practices can be identified. Background reading of literature will be highly useful to understand the common pitfalls of similar systems, which will improve the user friendliness of the application I am planning to develop. Also, reviewing literature will help generating innovative ideas to differentiate this application from similar systems in the market.

6 Tools and skills

For frontend development, the following tools are required.

- HTML – Required to structure the content of the web application (AppMaster, 2023).
- CSS - To style the application to make it visually appealing and responsive (Abramowski, 2023).
- JavaScript - Add interactivity to the web application, such as form validations, dynamic content updates, and handling user events (Joshi, 2023).

If there are issues with HTML, CSS, or JavaScript, using frontend frameworks like React.js (Copes, 2020) or Vue.js (Vue, no date) can be considered for more structured development.

PostgreSQL is needed for backend development. This is a relational database management system that is used to store and manage data (Roach, 2024). User authentication, job postings, user profiles, and messaging data can be handled within PostgreSQL. Understanding of SQL for managing data in PostgreSQL is needed for backend development of this application. If PostgreSQL is not accessible, MySQL or SQLite can be considered as alternative relational databases (Roach, 2024).

In addition, knowledge on waterfall project management methodology will become useful for the successful delivery of the project. Knowledge and skills in designing user-friendly interfaces and experiences is crucial to develop an intuitive interface for this web application. Furthermore, knowledge of secure authentication methods like OAuth and JWT is essential to handle user authentication. Moreover, the ability to design and integrate RESTful APIs is needed. Skills to integrate third-party services like messaging services is crucial to develop the core functionalities of this application. Also, skills in documenting requirements, processes, and design decisions are essential to successfully deliver this project.

7 Challenges

There will be several challenges when working on this project. Enhancing my current knowledge in areas such as frontend and backend development, database management, and version control will be challenging during the limited time available for the project execution. This can be mitigated by continuous learning through online courses, tutorials, and hands-on practice. Also, acquiring new technical skills in technologies and tools that I am not yet familiar with, such as frontend frameworks and API integration will pose difficulties. To minimize this risk, it is essential to refer documentation on these areas and gain expertise.

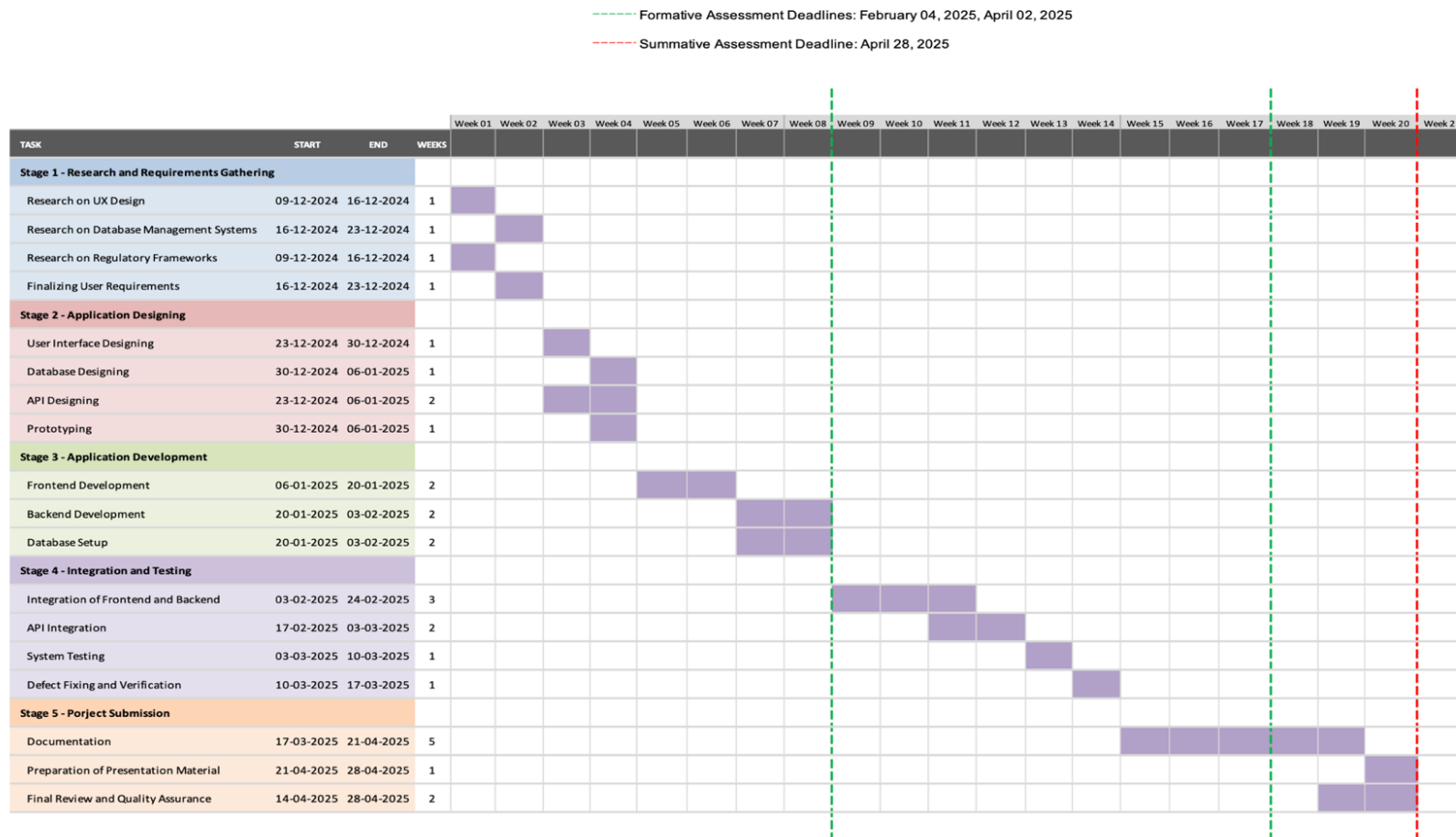
Furthermore, creating an intuitive and user-friendly interface that meets the needs of both employers and workers will be challenging. This challenge can be overcome by improving the knowledge and skills in designing user-friendly interfaces and experiences. Moreover, adhering to legal and regulatory requirements related to data protection and employment laws is crucial in the implementation of this project. This can be achieved by being attentive to relevant regulations and ensure that the application complies with them.

In addition, there will be difficulties in balancing the project with other commitments and ensuring the project stays on schedule. This challenge can be mitigated by realistic planning, continuously tracking the velocity of project deliverables and adjusting plans as needed to stay within constraints.

8 Project timeline

A Gantt chart outlining the project tasks and milestones over the project duration is given in Figure 8 below. This includes the deadlines for the formative and summative assessments of this software development project module.

Figure 8



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