EUROPEAN UNIVERSITY OF LEFKE

FACULTY OF ENGINEERING

Graduation Project 2

Job Search System

Chidera Maria-Goretti Uzoeshi-Gerald

20140238

Based on how versatile and relevant the business world is to society, I chose the topic, “Job Search System” for my graduation project. This is an online web application designed to discover various jobs uploaded on a website by its employees. The system will be similar to a “Glassdoor” sort where users will be able to search for jobs online by job title or location and also apply for these jobs on the website.

The companies involved can post available jobs and see who has applied for certain jobs. They can also create, edit and delete jobs. I will be using JavaScript for both frontend and backend. The objective of the system is focused on the enhancement of job profiling using technology in its progression.

Supervisor

DR. CEM BURAK KALYONCU

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# Introduction

## Problem definition

A job search system is simply a digital platform specifically designed for the enhancement of job performance. It aims to improve entrepreneurship by making the job search process easier for both job seekers and the employers. Users can employ this system to simply search for jobs listed by employers. The key features will include job discovery, smart matching, interactive profiling and real-time communication.

I have chosen the title “JobHub” for the logo of this job search system project as every web application requires a name to increase growth and personalization. The working logic of the project involves its features and system architecture. There will be a frontend and a backend which I will be working on majorly with JavaScript. The system will require designs with software like React.js, Visual Studio Code and Adobe Illustrator. Basically, it is a project similar to other job search platforms like LinkedIn and Glassdoor.

The "JobHub" platform is designed to overcome the common challenges faced by both job seekers and employers in the traditional job search process. For job seekers, one of the principal hurdles is the overwhelming number of job postings, which often leads to difficulty in identifying suitable roles that align with their skills and career aspirations. To address this, "JobHub" will implement a personalized recommendation engine that analyses user profiles and behavioural data to suggest jobs that are most relevant to their skills and previous search behaviours. This feature not only enhances user engagement by providing tailored job suggestions but also improves the chances of employers attracting the right candidates for their vacancies.

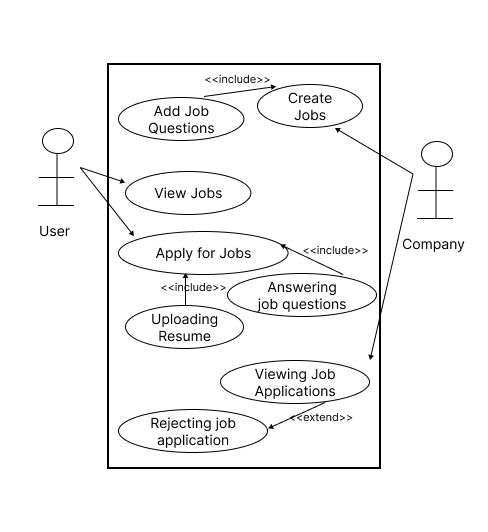
For employers, the challenge lies in effectively managing and filtering the influx of applications to quickly identify the most promising candidates. "JobHub" aims to simplify this process through the integration of an advanced applicant tracking system (ATS). This system will automate the initial screening of applications based on predefined criteria set by the employer, such as educational qualifications, experience, and skill sets. Furthermore, the platform will offer analytics tools that provide insights into recruitment patterns, candidate engagement, and the effectiveness of job postings. These tools will help employers optimize their recruitment strategies, reduce hiring time, and lower recruitment costs by focusing efforts on the most effective channels and techniques. By enhancing both the job seeking and recruiting experiences through intelligent automation and data-driven insights, "JobHub" will serve as a pivotal tool in the modern employment landscape, fostering a more dynamic, efficient, and user-centric approach to job matching. You can explain the some of the problems about the similar project it will support your project benefits and goals

## Goals

* Increase in Employment: “JobHub” aims to increase employment in the society by making job search easy and convenient. It can also achieve this increase through its diverse nature. Job seekers tend to find jobs of their preference whilst employers get to advertise their available jobs on a versatile scale. "JobHub" is strategically designed to catalyse employment rates by addressing key barriers in the job search and recruitment processes. By creating a user-friendly and inclusive platform, "JobHub" facilitates a more dynamic interaction between job seekers and employers, which is crucial for enhancing employment opportunities across various sectors and demographics.
* Expansion on Accessibility and Convenience: One of the core strengths of "JobHub" lies in its commitment to accessibility and convenience. This is not just about having an easy-to-navigate website or a smooth user interface; it's about creating a system that accommodates the diverse needs of its user base. For job seekers, this means providing a seamless experience from the moment they enter the platform to the moment they submit an application. Features such as saved job searches, personalized job recommendations based on AI algorithms, and instant notifications about new postings relevant to their skills and preferences, ensure that job seekers can stay updated without constant manual searches. For individuals who may be less familiar with digital platforms, "JobHub" offers a guided experience with interactive tutorials and customer support. This lowers the entry barrier for using the platform and ensures that even those who are not tech-savvy can benefit from the services offered. Additionally, the platform is designed to be accessible on multiple devices, including smartphones, tablets, and desktop computers, allowing users to access job listings and application features from anywhere at any time.
* Diverse Job Listings: "JobHub" also sets itself apart by providing a diverse range of job listings that cater to various industries, experience levels, and employment types (such as freelance, part-time, and full-time positions). This diversity is crucial because it reflects the real needs and opportunities within the job market, making the platform a valuable resource for a broader audience. Whether someone is looking for entry-level positions or executive roles, "JobHub" provides relevant listings that can meet these varied demands.
* Scaling Up Employment: The ultimate goal of "JobHub" is to scale up employment by making the job search process more efficient and less time-consuming. By streamlining the application process and reducing the time it takes for employers to fill vacancies, the platform significantly speeds up the hiring cycle. This efficiency can lead to higher job turnover and greater opportunities for employment, especially in fast-growing industries where the demand for qualified candidates is high
* Convenience in Job Listings: Users can easily access jobs on the platform without much stress. They get to choose various jobs based on their skills, apply for these jobs and take up positions in preferred organisations. Employers also find it easy to break down jobs listed based on certification and location. The goal of enhancing convenience in job listings on "JobHub" is foundational to transforming how job seekers interact with the employment market and how employers connect with potential candidates. This convenience is not merely about making the job search easier but is about creating a more efficient and responsive experience that can dynamically adapt to the needs of both job seekers and employers. Here's a deeper exploration of how "JobHub" achieves this through its innovative platform features.
* Efficiency in Job Matching: This platform aims to develop an algorithm that can match employee qualifications to the necessary job requirements. One can easily discover available jobs and prioritise skills to learn to get those jobs. Time is also saved when this algorithm is used.
* Security in User Data: This is a major goal of any online job search system. People like to know their privacy is never compromised. This gives them the trust required to indulge in these platforms. Data will be managed properly and there will be no breach of confidential information.
* Enhanced User Experience and Interface Customization:“JobHub” aims to revolutionize the user experience by providing a highly intuitive and customizable interface (Roberts, 2019). A major goal of the platform is to allow users to personalize their dashboard and job search settings according to their individual preferences and job-seeking strategies. This customization capability includes adjustable filters for job type, salary expectations, geographic location, and industry sector. By enabling users to tailor their experience, "JobHub" reduces the time spent on navigating through irrelevant job listings, thereby making the job search more targeted, efficient, and user-friendly. In addition, the platform will incorporate adaptive user interfaces that respond to the device being used, whether it is a mobile phone, tablet, or desktop, ensuring optimal accessibility and functionality across all devices. This approach not only enhances user engagement but also improves accessibility for users with disabilities, demonstrating "JobHub’s" commitment to inclusivity. “JobHub” aims to serve all these and more benefits to the business world, thereby inspiring more people to use their skills successfully to improve their lives. The world, as we know it, is a versatile world; And the one thing that is constant is change. “JobHub” will follow trends as they come up to keep proving a stable and reliable platform for job seekers and employers.
* Integration of Continuous Learning and Development:Another significant goal for “JobHub” is to integrate continuous learning and career development opportunities into the job search ecosystem. Recognizing the rapid pace of industry changes and the need for ongoing professional development, the platform will offer tailored learning recommendations based on the job seeker’s career goals and the emerging skills demanded by the job market. This will include partnerships with leading educational platforms and access to training modules, certification programs, and webinars directly through the "JobHub" interface. By facilitating easy access to learning resources, "JobHub" not only aids in closing the skills gap but also supports career progression, making it a comprehensive tool for career advancement. This integration aims to empower users to enhance their employability actively and stay competitive in their respective fields.
* Sustainability and Social Responsibility: JobHub commits to sustainability and social responsibility in its operations and business practices. This goal involves implementing eco-friendly practices in the technology infrastructure, promoting remote and flexible work options to reduce commuting, and encouraging companies to engage in socially responsible hiring practices. The platform will highlight job opportunities from companies that demonstrate a commitment to sustainability and ethical business practices, aligning with the values of environmentally conscious job seekers. Additionally, "JobHub" will actively participate in community outreach programs and partnerships that support workforce development in underserved communities, thereby contributing to economic inclusivity and reducing employment disparities.

Through these expansive and detailed goals, "JobHub" aspires not only to transform the job search process but also to impact broader societal challenges, demonstrating a forward-thinking approach to business and technology.

## Use Case Diagram



# Literature Survey

A literature survey basically deals with the extensive examination of projects and studies similar to employment systems and job portals with their functions. Online job search systems are mostly similar in their purpose and development. “JobHub” aims to create a job search system that is not just efficient but adaptable to the current growing market.

Take for example, “Glassdoor” and “LinkedIn” which are similar websites to “JobHub”, this project aims to single-handedly create a vast platform for job seekers all over the world to not just attain reputable jobs in person but also digitally. With “JobHub”, one can sit in the comfort of their homes and apply for any job of their choice, take an interview and become part of an organisation.

LinkedIn is a popular job search system, but it also integrates some social media features like posts and followers (in the form of connections). JobHub, on the other hand, will be strictly for job seeking (Micro, 2017)**.**According to a survey by Glassdoor, 76% of job seekers use social media to search for jobs, but only 36% of employers use social media to post job openings (GlassDoor, 2021). This highlights the potential for JobHub to fill a gap in the market by providing a dedicated job search platform that is not cluttered with social media features.

Many job seekers find LinkedIn's social media features to be distracting or unnecessary for their job search needs. As one job seeker noted in a survey by CareerBuilder, "I just want to find a job, I don't need to see what my friends are posting about their weekend" (Juliano, 2016)**.** JobHub's focus on job searching can help to eliminate these distractions and provide a more streamlined user experiences a popular job search system but it also integrates some social media features like posts and followers (in the form of connections). “JobHub” will be strictly for job seeking (Micro, 2017).

In addition, LinkedIn's algorithm has been criticized for prioritizing posts from certain users over others, which can make it difficult for job seekers to get their profiles and applications seen by potential employers. JobHub's focus on job searching can help to mitigate this issue by providing a more transparent and equitable platform for job seekers and employers to connect. Implications of this difference:

Simplified user experience: By focusing solely on job searching, JobHub can provide a more streamlined user experience, without the distractions of social media features.

Targeted functionality: JobHub can dedicate more resources to developing features that are specifically designed to facilitate job searching, such as advanced search filters, resume parsing, and interview scheduling tools.

Less noise, more signal: Without the noise of social media posts and updates, JobHub can help job seekers focus on their job search goals and provide more relevant job listings and resources.

The JobHub application has more customizable job application questions. When posting jobs on LinkedIn, Indeed, or Glassdoor, these platforms only allow employers to select from already defined questions, limiting their ability to tailor the application process to their specific needs. In contrast, JobHub will allow employers to create their own custom questions that applicants can answer, providing a more personalized and effective hiring process.

According to a survey by TalentWorks International, 76% of employers believe that customizing the application process is essential for finding the right candidates, but only 22% of employers are currently able to do so (TalentWork, n.d.). JobHub's customizable question feature can help bridge this gap, enabling employers to gather more relevant information from applicants and make more informed hiring decisions.

Moreover, a study by Glassdoor found that 58% of job seekers believe that the application process is too generic and doesn't allow them to showcase their skills and experiences (Chamberlain, 2015). By allowing employers to create custom questions, JobHub can provide a more engaging and relevant application experience for job seekers, which can lead to higher quality applications and better candidate fit.

By allowing employers to create custom questions, JobHub can help them gather more relevant information from applicants, leading to more informed hiring decisions.

Customizable questions can provide a more engaging and relevant application experience for job seekers, leading to higher quality applications and better candidate fit.

By providing employers with the flexibility to tailor the application process to their specific needs, JobHub can increase employer satisfaction and loyalty. Posting jobs on LinkedIn, Indeed or Glassdoor, these platforms only allow you to select from already defined questions, JobHub will allow you create your own questions that the applicants can answer (Indeed, 2020).

Unlike many job search platforms, such as LinkedIn, Indeed, or Glassdoor, where the posting and management of job listings are somewhat rigid, "JobHub" offers a more dynamic and self-directed approach for employers. On platforms like LinkedIn, Indeed, or Glassdoor, job postings typically have a set visibility period or remain active until manually taken down by the employer, which can lead to outdated listings lingering on the site.In contrast, "JobHub" provides employers with the autonomy to not only post but also meticulously manage their job listings, including setting precise expiration dates and start dates for each job (Indeed, 2023).

"JobHub" introduces an innovative feature that allows job postings to automatically become invisible to users once the set expiration date is reached or as the job start date approaches. This functionality ensures that job seekers only see current and relevant opportunities, thereby streamlining their search process and reducing the frustration of applying for positions that are no longer available. Furthermore, employers have the option to toggle the visibility of a job posting on or off at their discretion. This is particularly useful for controlling the influx of applications or pausing the recruitment process without permanently removing the job post.

By allowing expiration and start dates to dictate job visibility, "JobHub" ensures that listings are only shown when they are most relevant. This helps employers manage their recruitment timelines more effectively and reduces the administrative burden of managing outdated or irrelevant listings.

This feature reduces the clutter of old listings, ensuring that job seekers have access to only the most timely and relevant job opportunities. It enhances the user experience by preventing frustration and confusion caused by applying for jobs that are no longer available.

Giving employers the ability to toggle job visibility provides them with flexibility in their recruitment strategy. For example, if a position is filled temporarily or if the recruitment needs to be paused due to unforeseen circumstances, the employer can simply toggle the job to be invisible without deleting the entire posting. This flexibility can also be useful in scenarios where a job may need to be reopened quickly if a new vacancy arises.

Overall, "JobHub" addresses a common pitfall of job search platforms by empowering employers with better tools for managing their job postings, thereby creating a more efficient and user-friendly experience for both employers and job seekers.

# Background Information

The programming language that will be used in the project is JavaScript which is relevant to its frameworks, frontend and backend development. I will also be using development tools like React.js, Visual Studio Code, Firebase, Adobe Illustrator and some others.

The required software tools for this project include React.js, a free and open-source frontend JavaScript library for building user interfaces for web and native applications; Visual Studio Code, a code editor specializing in the creation and debugging of modern cloud and web applications; and Node.js, a JavaScript runtime that allows developers to build web applications outside of the browser. Additionally, I will be using other software tools such as Figma, a design tool used for graphic design, and Bitbucket, a Git-based source code repository hosting service owned by Atlassian, to support the development process.

## Required & Used software

* React.js:

React.js is a free and open-source frontend JavaScript library that enables the development of user interfaces for web and native applications. This powerful library provides a flexible and efficient way to build dynamic and interactive user interfaces that can be used in a variety of applications (Deshpande, 2023).

One of the key benefits of React.js is its ability to enable the development of single-page, mobile, or server-rendered applications interfaces. This means that developers can use React to build fast, responsive, and scalable applications that provide a seamless user experience across different devices and platforms. Whether it's a web application, mobile app, or server-rendered interface, React.js provides the tools and functionality needed to bring the application to life.

By using React.js, developers can also take advantage of its component-based architecture, which allows for the creation of reusable UI components that can be easily composed together to build complex interfaces. This approach makes it easier to manage and maintain large codebases, and enables developers to focus on building new features and functionality rather than worrying about the underlying infrastructure. With its flexibility, scalability, and ease of use, React.js is an ideal choice for building modern web and native applications.

* Visual Studio Code:

Visual Studio Code (VS Code) is a code editor that specializes in the creation and debugging of modern cloud and web applications. As a lightweight and open-source editor, VS Code provides a flexible and customizable development environment that is ideal for building complex applications like JobHub. Its intuitive interface and robust feature set make it an attractive choice for developers who need to work on a wide range of projects (Gordon, 2023).

One of the key benefits of VS Code is its extensive library of extensions, which can be easily installed to add new functionality to the editor. These extensions can provide everything from syntax highlighting and code completion to debugging tools and project management features. For JobHub, VS Code's extensions for JavaScript, HTML, and CSS will be particularly useful, as they will enable developers to write, debug, and optimize their code with ease.

In addition to its extensions, VS Code also provides a range of built-in features that make it an ideal choice for developing and debugging JobHub. Its code navigation and debugging tools, for example, will enable developers to quickly identify and fix errors in their code. Its version control integration will also make it easy to manage different versions of the code base and collaborate with other team members. Overall, VS Code's combination of flexibility, customizability, and robust feature set make it an ideal choice for developing and debugging JobHub (Gordon, 2023).

* Node.JS:

Node.js is a JavaScript runtime that allows developers to build web applications outside of the browser. This means that Node.js enables developers to use JavaScript to create the server-side logic of a web application, rather than just the client-side logic that runs in the browser. This approach provides a number of benefits, including improved performance, scalability, and security (What is Node.js and How it Work?, 2023).

One of the key benefits of using Node.js is its ability to handle high levels of concurrency, making it an ideal choice for building scalable web applications. Node.js achieves this through its event-driven, non-blocking I/O model, which allows it to handle multiple requests simultaneously without blocking or waiting for responses. This makes it well-suited for building the backend of JobHub, which will need to handle a large volume of requests and data.

Node.js will be used to create the backend of JobHub, which will provide the server-side logic and database integration needed to power the application. This will include creating RESTful APIs, handling user authentication and authorization, and integrating with databases and other backend services. By using Node.js, the JobHub development team will be able to build a fast, scalable, and secure backend that can handle the demands of a large and growing user base.

## Other software

* Figma:

Figma is a design tool that has revolutionized the way designers’ approach graphic design. As a cloud-based UI design tool, Figma provides a collaborative and intuitive platform for designers to create, prototype, and test user interfaces. With its robust feature set and user-friendly interface, Figma has become the go-to design tool for many designers and teams. For JobHub, Figma will be utilized to sketch out the initial design of the user interface, providing a solid foundation for the development team to build upon.

One of the key benefits of using Figma is its ability to facilitate collaboration and feedback. With Figma, designers can easily share their designs with stakeholders and team members, and receive feedback and comments in real-time. This allows for a more iterative and refined design process, ensuring that the final product meets the needs and expectations of its users. Additionally, Figma's cloud-based nature means that designers can access their designs from anywhere, at any time, making it easy to work on the go or in distributed teams.

For JobHub, Figma will be used to create high-fidelity prototypes of the user interface, which will be used to test and refine the design. By using Figma, the design team will be able to create a visually appealing and user-friendly interface that meets the needs of JobHub's users. The design process will involve creating wireframes, high-fidelity prototypes, and interactive designs that can be tested and refined based on user feedback. With Figma, the design team will be able to work efficiently and effectively, ensuring that the final product is of the highest quality and meets the needs of its users.

* Bit Bucket:

Bitbucket is a Git-based source code repository hosting service owned by Atlassian, a leading provider of software development and collaboration tools. As a cloud-based platform, Bitbucket provides a secure and scalable solution for managing and storing source code, enabling developers to collaborate on projects and track changes to their codebase over time. With its robust feature set and intuitive interface, Bitbucket has become a popular choice among developers and teams, and will be used to manage and store the code for JobHub.

One of the key benefits of using Bitbucket is its ability to enable version control and collaboration. By storing the code for JobHub in a central repository, developers will be able to track changes to the codebase over time, and collaborate on the development of new features and functionality. Bitbucket's version control system will also enable developers to roll back changes if something goes wrong, and to experiment with new ideas without affecting the production codebase. Additionally, Bitbucket's collaboration features will enable developers to work together on the same codebase, and to assign tasks and track progress over time.

## **Hardware**

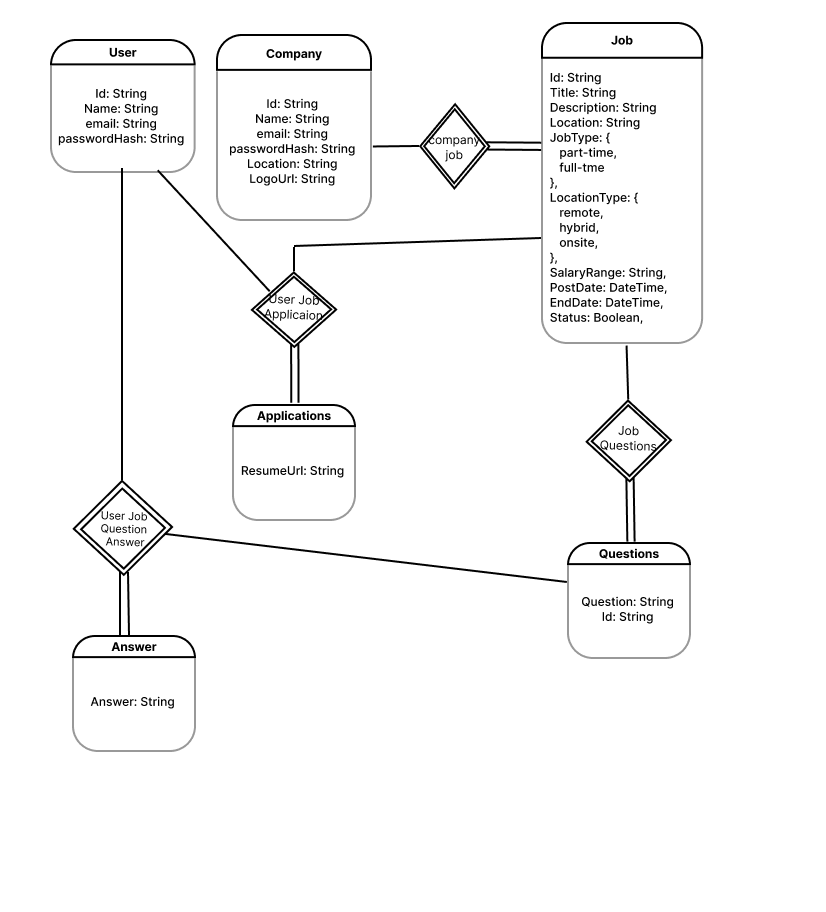
While "JobHub" is primarily a software-centric platform, efficient operation relies on adequate hardware support for hosting the application and ensuring smooth access for users. The backend, hosted on servers, requires a robust setup that can manage the intensive data operations and user traffic expected. Recommended server specifications might include a modern multi-core processor, sufficient RAM (scalable based on user load), and SSD storage for faster data retrieval and better performance.

On the user end, "JobHub" is designed to be accessible across a variety of devices including desktop computers, laptops, tablets, and smartphones. The application is optimized for both Android and iOS platforms to ensure a broad accessibility. Ensuring compatibility with the latest web browsers like Google Chrome, Mozilla Firefox, Safari, and Microsoft Edge is crucial for the seamless operation of "JobHub." This cross-platform, cross-browser compatibility helps in providing a consistent user experience regardless of the user’s hardware choices.

# Design Documents

## ER Diagram

The ER(Entity Relation) diagram is a graphical illustration of the relationship between entity in the database (Hanna, 2021).



# Methodology

Modules are independent units of any system that carry out distinct functions. A job search system has these components like the front end for customers and backend for workers. They contain features that maintain organization in the system. They also manage complex parts of the system, breaking them down for simpler development. This project will be split into a frontend and a backend.

## Frontend:

The frontend of the JobHub system is built using a combination of technologies to provide a fast, scalable, and maintainable user interface. The frontend technologies used in this project include:

### React.js

React.js is a JavaScript library used for building user interfaces and can be used for developing single-page applications, mobile applications, and desktop applications. It's an open-source library developed by Facebook and is widely used in the industry today. React allows developers to create reusable UI components, which makes it easy to maintain and update the application. This is because each component is a self-contained piece of code that represents a part of the user interface (Deshpande, 2023).

Creating Reusable UI Components

One of the key features of React is its ability to create reusable UI components. A component is a small piece of code that represents a part of the user interface, such as a button, a form, or a list. These components can be reused throughout the application, which makes it easy to maintain and update the code. For example, if you need to display a list of items in multiple places in the application, you can create a reusable list component that can be used throughout the application. This approach makes it easy to keep the code organized and reduces the amount of code that needs to be written (Chowdhury, 2024).

Managing the State of the Application

React also provides a way to manage the state of the application. The state of the application refers to the data that changes over time, such as the user's input, the application's settings, or the data retrieved from an API. React provides a way to manage this state using a concept called the "state" and "props". The state is an object that stores the application's data, and props are short for "properties" and are used to pass data from a parent component to a child component. This approach makes it easy to manage the application's state and ensures that the UI is always up-to-date.

Optimizing Rendering with the Virtual DOM

Another key feature of React is its virtual DOM, which is a lightweight in-memory representation of the real DOM. The virtual DOM is a JavaScript object that represents the application's UI, and it's used to optimize rendering and improve performance. When the state of the application changes, React updates the virtual DOM, and then efficiently updates the real DOM by comparing the two and only making the necessary changes. This approach reduces the number of DOM mutations, which can be slow and expensive, and improves the overall performance of the application. This is why React is known for its fast and seamless user experience, even with complex and dynamic user interfaces.

### Material-Tailwind

Material-Tailwind is a powerful combination of Material UI and Tailwind CSS, used to style and layout the UI components of JobHub. By leveraging Material Tailwind, we were able to create a consistent and visually appealing design that aligns with our brand identity. The pre-designed UI components and flexible layout system provided by Material Tailwind made it easy to create a cohesive and professional-looking interface (Material Tailwind - New Framework for Web Developers, 2021).

One of the key benefits of using Material-Tailwind is its ability to simplify the design process. With a set of pre-designed UI components, we were able to focus on creating a unique design language for JobHub rather than starting from scratch. Additionally, the flexible layout system made it easy to adapt the design to different screen sizes and devices, ensuring a seamless user experience across all platforms.

By customizing the Material Tailwind theme, we were able to create a design that is truly unique to JobHub. Our design team worked closely with the development team to ensure that the design was not only visually appealing but also functional and user-friendly. The end result is a design that is both aesthetically pleasing and highly functional, providing a great user experience for our users.

### Figma

Figma is a design tool that we used to create and prototype the user interface of JobHub. By using Figma, our design team was able to create a collaborative and intuitive platform for designing and testing the UI. Figma provides a cloud-based design environment that allows multiple designers to work together in real-time, making it easy to collaborate and iterate on the design.

One of the key benefits of using Figma is its ability to create a design system that ensures consistency across the application. By creating a design system, we were able to establish a set of reusable design components and guidelines that ensure consistency across all parts of the application. This makes it easy to maintain and update the design over time.

By using Figma, our design team was able to create a design that is both visually appealing and highly functional. We were able to test and iterate on the design in real-time, making it easy to get feedback from stakeholders and users. The end result is a design that is both aesthetically pleasing and highly functional, providing a great user experience for our users.

The frontend is responsible for providing a fast and seamless user experience, with features such as:

* + Creating reusable UI components
  + Managing the state of the application
  + Optimizing rendering with the virtual DOM
  + Providing a consistent and visually appealing design
  + Simplifying state management
  + Improving code maintainability

## Backend:

The backend of JobHub serves as the core engine of our application, where all crucial data operations such as creation, retrieval, update, and deletion (CRUD) are managed. This backend is built using Node.js and MongoDB, ensuring a robust, scalable, and secure server-side environment.

### CRUD Operations:

Create: New data entries, such as job listings, user profiles, and applications, are created and stored in MongoDB. This is facilitated through POST requests handled by Node.js, which take the input from users and store it in the appropriate format within the database.

Read: Data retrieval is executed through GET requests. Our Node.js backend processes these requests and queries MongoDB to fetch and return the required data. This operation is crucial for displaying job listings, viewing user profiles, and checking application statuses on the frontend.

Update: Modifications to existing data are managed through PUT or PATCH requests. This allows users to update their profiles, employers to edit job postings, and updates to application statuses as needed.

Delete: Deletion operations are performed using DELETE requests, enabling the removal of job listings, user accounts, or applications from the database when necessary.

### Services and Repository Layer

The backend is structured into distinct layers, enhancing maintainability and scalability. The service layer abstracts the business logic of the application, handling the operations defined by the CRUD methods. It interacts with the repository layer, which directly manages the lower-level database operations. This separation ensures that the service layer remains clean and focused on business logic, while the repository layer deals with data persistence and retrieval.

Implementation of Endpoints:

Endpoints are implemented in Node.js to handle various actions triggered from the frontend. Each endpoint corresponds to specific functionalities such as registering a user, posting a job, applying for a job, etc. These endpoints are defined within the route handlers, where each route is mapped to a specific function in the service layer that executes the required business logic.

Routing Method:

Routing in JobHub is managed by Express, a web application framework for Node.js. It helps in defining routes based on the HTTP methods and URLs. For instance, routes are set up to handle different paths such as /api/jobs for job operations or /api/users for user-related operations. Each route is associated with middleware functions that execute the operations, such as authentication checks, before the final service function is called.

This structured approach not only ensures clarity and organization in handling HTTP requests but also enhances the performance and security of the JobHub platform, making it capable of supporting a large user base and handling significant data volumes efficiently.

# Risk Analysis:

The ethics of an online job search system, such as JobHub, are crucial in ensuring a trustworthy and inclusive platform for both job seekers and employers. These principles guide the operation of the system to maintain fairness, transparency, and accountability. Below are some essential ethics to be upheld:

Transparency and Accuracy

* Job seekers and employers should provide honest and accurate information about their experiences, skills, and job requirements.
* Employers should ensure that their company profiles and job postings are up-to-date and accurately reflect the work environment and job responsibilities.
* Job seekers should provide honest and unbiased feedback about their experiences, without exaggerating or downplaying them.
* JobHub should ensure that its algorithms and matching systems are transparent, fair, and unbiased.

Fair and Honest Reviews

* Users should strive to provide fair and honest reviews, without bias or malice.
* Job seekers should not use the platform to settle personal scores or vent frustrations, but rather to provide constructive feedback.
* Employers should not retaliate against employees who provide negative reviews, but rather use them as opportunities for growth and improvement.
* JobHub should have a clear policy and procedure for addressing and removing fake or fraudulent reviews.

Anonymity and Confidentiality

* Anonymity is essential to encourage honest feedback and protect users from retaliation.
* Job seekers should be cautious not to reveal confidential information about their previous employers or colleagues.
* Employers should respect the anonymity of reviewers and not attempt to identify them.
* JobHub should ensure that its data storage and protection measures are robust and compliant with relevant regulations.

Privacy and Data Protection

* Both job seekers and employers should respect the privacy of others and not share personal or confidential information without consent.
* JobHub should ensure the secure storage and protection of user data, in accordance with relevant data protection laws and regulations.
* JobHub should be transparent about its data collection and usage practices, and provide users with clear opt-out options.
* JobHub should have a clear policy and procedure for addressing data breaches and notifying affected users.

Respect and Inclusivity

* The platform should promote respect and inclusivity, discouraging discriminatory or offensive language and behaviour.
* Job seekers and employers should refrain from posting content that is harmful, offensive, or discriminatory.
* JobHub should have a clear policy and procedure for addressing and removing inappropriate content.
* JobHub should promote diversity, equity, and inclusion in the workplace, and provide resources and support for underrepresented groups.

Constructive Feedback and Continuous Improvement

* Job seekers should use the platform to provide constructive feedback and suggestions for improvement.
* Employers should encourage and support employees in providing feedback and ideas for growth and development.
* JobHub should use user feedback to continuously improve the platform and services, ensuring a better experience for all users.
* JobHub should have a clear process for addressing and resolving user complaints and concerns.

Accountability and Responsibility

* Job seekers and employers should take responsibility for their actions and postings on the platform.
* Employers should be accountable for the accuracy and fairness of their job postings and company profiles.
* JobHub should be accountable for ensuring the platform is fair, transparent, and free from bias.
* JobHub should have a clear policy and procedure for addressing and resolving ethical concerns and complaints.

Fair Labour Practices

* Employers should adhere to fair labour practices, including providing equal opportunities, fair compensation, and safe working conditions.
* Job seekers should be aware of their rights and responsibilities as employees, including fair compensation, benefits, and working conditions.
* JobHub should promote fair labour

# Conclusion:

## Benefits

### Benefits to users:

* Saving Costs: For employers, "JobHub" offers substantial cost savings over traditional job advertising methods. By leveraging the platform, companies can reach a wider audience more efficiently, reducing the need for expensive job ads in multiple media outlets. This streamlined approach not only cuts direct advertising costs but also enhances the return on investment through access to a larger pool of qualified candidates. The ability to target advertisements to specific user profiles ensures that each job posting is viewed by potential applicants who meet the required criteria, thereby increasing the effectiveness of each ad.
* Efficiency and Accessibility: "JobHub" revolutionizes the job search process by enhancing both efficiency and accessibility. The platform's design ensures that all necessary job information is readily accessible, making the job search and application process swift and straightforward. This accessibility is crucial for job seekers who need to quickly adapt to job market changes and apply for opportunities as soon as they become available. Moreover, the online nature of "JobHub" allows users to access the platform from any location at any time, significantly improving the job search experience by eliminating geographical and temporal barriers.
* Customization: One of the standout benefits of the "JobHub" platform is its deep customization capabilities. Users can precisely define their job preferences within their profiles, which allows the system to tailor job listings to their specific needs and desires. This personalized approach not only enhances the user experience but also significantly increases the relevance of job matches. By enabling users to filter jobs based on criteria such as location, industry, and job type, "JobHub" ensures that job seekers are only presented with opportunities that closely align with their career goals and personal circumstances.
* Job Reviews: A critical feature of "JobHub" is the inclusion of job reviews, which provide invaluable insights into potential employers and work environments. This feature allows applicants to read reviews from current and former employees before applying, giving them a clearer understanding of what to expect in various roles and companies. These reviews help solidify interest in specific jobs and employers by providing transparent, first-hand accounts of workplace culture and job satisfaction. This transparency not only aids job seekers in making informed decisions but also encourages employers to maintain high standards, knowing that their organization’s reputation is openly accessible.

## Benefits to me:

* Experience and Technical Skills: This project on the "JobHub" job search system serves as a vital stepping stone into the professional world. By developing and implementing this platform, I am poised to significantly enhance my software development skills, including programming, database management, and interface design. This hands-on experience not only solidifies my technical capabilities but also provides a practical understanding of complex system architectures and user-centric design principles. As I work through the various stages of development, from initial design to final deployment, I will acquire a robust skill set that is directly applicable to a wide range of technology and engineering roles.
* Problem-Solving Skills: Engaging in this project inherently involves navigating numerous challenges, from debugging code to optimizing user experience. Each obstacle presents a unique opportunity to enhance my problem-solving skills. By addressing these challenges head-on, I will strengthen my ability to think critically and apply logical solutions under pressure. This process will not only increase my programming expertise but also prepare me for future projects where efficient problem resolution is key. Learning to troubleshoot effectively in this context will prove invaluable across all areas of my future professional endeavours.
* Management and Data Analysis: Throughout the development of "JobHub," I will gain first-hand experience in managing and analysing large datasets, including user information and job listings. This aspect of the project will teach me the intricacies of data handling, ensuring privacy and security while also making the data actionable for business insights. Skills in data protection and analysis are critical in today’s data-driven landscape and will be tremendously beneficial as I navigate future roles that require managing sensitive information and deriving strategic insights from complex datasets.
* Career Development: By leading this project, I am setting a strong foundation for my career in engineering. Managing a project from conception to launch teaches invaluable leadership and project management skills that are crucial for any engineering career. Additionally, completing this ambitious project will significantly enhance my portfolio, showcasing my capabilities to potential employers. The experience and skills gained through "JobHub" will not only elevate my professional profile but also boost my confidence in my ability to lead and execute complex projects in the future.

## Ethics

* Transparency and Accuracy: An ethical cornerstone of any job search platform is the commitment to transparency and accuracy from both job seekers and employers. Job seekers should provide honest and objective feedback about their experiences, avoiding exaggeration or understatement of their previous roles or the quality of their engagements. Employers, on their part, must ensure that the information about their company and available positions is up-to-date and accurately reflects the current state of the workplace. This commitment to authenticity helps maintain a reliable environment where all participants can make informed decisions based on trustworthy data.
* Fair and Honest Reviews: it is imperative that all platform users engage in fair and honest reviewing practices. Job seekers should use the review feature to provide constructive feedback based on actual experiences, rather than personal grievances or unrelated issues. This approach supports a culture of meaningful and helpful feedback, which benefits all users by providing real insights into companies and positions. Conversely, employers should respect diverse employee experiences and refrain from penalizing employees for providing critical but fair reviews. This openness not only enhances the credibility of the platform but also fosters a more transparent job market.
* Privacy and Anonymity: Maintaining user anonymity and privacy is critical in fostering an environment where job seekers feel safe to share genuine experiences without fear of retaliation. Job seekers should avoid disclosing confidential information that could violate privacy agreements or legal boundaries. Employers, similarly, must handle the information shared in reviews with confidentiality, ensuring that responses to reviews do not inadvertently disclose employee identities. This respect for privacy solidifies the platform’s integrity and protects individuals' rights.
* Constructive Feedback and Improvement: Job search platforms should encourage a feedback loop that promotes continuous improvement and constructive criticism. Job seekers should focus on providing feedback that is actionable and beneficial, steering clear of unproductive criticism. Employers should view this feedback as valuable insights that can drive organizational improvements and enhance employee satisfaction. Facilitating a platform where constructive dialogue is encouraged can lead to positive changes and a healthier work environment.
* Diversity and Inclusivity: Ethical job search platforms must actively promote diversity and inclusivity within their listings and company cultures. This involves providing equal opportunities for all job seekers, regardless of background, and ensuring that job listings and recruitment practices are free from discriminatory bias. Employers should strive to create inclusive workplace environments that welcome diverse perspectives and talents, reflecting these values in their job postings and company policies.
* Responsible Data Usage: Both job seekers and employers must handle data responsibly. For job seekers, this means being mindful of the personal information they share on the platform. For employers, it involves securing the data provided by users and using it ethically to improve workplace practices without infringing on privacy. The platform itself must ensure robust data protection measures are in place, adhering to relevant data protection laws and ethical standards to safeguard user information from misuse or unauthorized access.
* Through these expanded ethical standards, job search platforms like "JobHub" can foster a trustworthy, inclusive, and respectful environment that benefits both job seekers and employers, enhancing the overall efficiency and effectiveness of the job market.

Why did I choose this project?

Choosing the "JobHub" job search system as my graduation project was driven by a combination of personal interest and a keen awareness of the current challenges in the job market. As someone who is about to step into the professional world, I recognized the pivotal role technology plays in bridging gaps between job seekers and employers. The idea of developing a platform that could make the job search process more intuitive, efficient, and user-centric was highly appealing. This project not only aligns with my career aspirations in software development and data management but also offers a chance to impact a fundamental aspect of human resources—the job search process.

The main attraction to this project stemmed from observing the inefficiencies and frustrations common with traditional job search methods. Current platforms often feel impersonal, overwhelming, and inefficient, failing to adequately match job seekers with roles that fit their unique skills and career goals. By integrating advanced technologies such as AI for personalized job recommendations and robust data analytics for employers, "JobHub" aims to address these pain points. This innovative approach to job matching is designed to enhance user engagement and satisfaction, ensuring that job seekers find suitable employment faster and employers connect with the right candidates more effectively.

Moreover, this project offered a challenging yet rewarding opportunity to delve deeply into both front-end and back-end development processes, pushing the boundaries of my technical skills while also allowing me to explore the significant social impact of effective job matching platforms. The combination of technical challenge and potential societal benefit solidified my decision to undertake this project, aiming to contribute meaningfully to the evolution of the digital job search landscape**.**

## Future Works

Continuing the development of "JobHub" beyond graduation is a prospect filled with potential and opportunity. The foundational system set up through this project provides a robust platform, but the dynamic nature of the job market and continuous advancements in technology offer numerous pathways for further enhancement and expansion.

One of the primary improvements I plan to focus on is the integration of machine learning algorithms to refine the personalization features of the platform. By leveraging user data more effectively, "JobHub" can evolve to predict and recommend job opportunities with greater accuracy, based on user behaviour, preferences, and historical success rates. This will involve not only enhancing the algorithmic backbone of the platform but also ensuring strict adherence to privacy and ethical standards in data handling.

Additionally, expanding the platform's capabilities to include more diverse job markets and industries is crucial. This would involve scaling the system to handle multiple languages and cultural norms, making "JobHub" a truly global job search platform. Alongside this, developing partnerships with educational and training institutions could allow the platform to offer targeted training recommendations that help users close the skill gaps for desired jobs, thereby increasing their employability.

Finally, I aim to explore the potential for block chain technology to secure user data and manage transactions within the platform, such as application submissions and the handling of sensitive personal information. This could significantly enhance the security and transparency of "JobHub," setting it apart in a competitive market. Each of these future developments not only aims to enhance the functionality and reach of "JobHub" but also to continually adapt to the evolving needs of both job seekers and employers in the ever-changing landscape of employment.

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# Screenshots

