**CAREER PATH**

**A PROJECT REPORT**

**for**

**Major Project (KCA451)**

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**Submitted by**

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**CERTIFICATE**

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**CAREER PATH**

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**ABSTRACT**

The “Career Path:-Personalized Student Career Path Guidance System” is a web-based platform designed to empower students in their educational journey and career choices. This innovative project harnesses the potential of data-driven decision-making to provide tailored guidance and support to students, ensuring they make informed choices about their academic and professional futures.

The system operates by collecting comprehensive information from students about their educational background and their areas of interest, passions, and career aspirations. Using sophisticated algorithms and data analysis techniques, the platform evaluates this data to generate personalized recommendations. And this web application have some features which is very useful for student and they can find Best College and Best Courses.

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**CHAPTER 1**

**INTRODUCTION**

* 1. **OVERVIEW**

Career Path is an innovative website designed to help students choose the right education and career paths. This platform starts by asking students about various aspects of their lives, such as their school subjects, hobbies, and career aspirations. Using advanced technology, Career Path analyzes this information to provide tailored advice that guides students towards their ideal careers.

The process begins with students providing details about their school subjects and grades, hobbies and interests, and their dreams and goals for the future. Career Path's sophisticated algorithms then analyze this information to offer personalized guidance. This customized advice helps students make informed decisions about their education and career choices, ensuring they find a path that aligns with their interests and strengths.

Career Path aims to be a supportive tool for students, acting like a superhero that ensures every student can find a path that suits them perfectly. The mission is to create a future where personalized guidance opens doors to remarkable success for all students.

We envision a world where every student has access to high-quality, data-driven advice, helping them navigate their educational and career journeys effectively. Career Path strives to be the platform where students' dreams and data-driven insights come together to pave the way for a bright future.

Explore Career Path and let it guide you towards your perfect path, ensuring your dreams get the recognition they deserve!

* 1. **OBJECTIVE**

The objective of the "Career Path: Personalized Student Career Path Guidance System" project is to develop a web-based platform that empowers students in making informed decisions about their educational and career paths. The project aims to address the challenges and confusion often faced by students in choosing the right educational courses and career paths. The key objectives include:

Personalized Guidance: The core objective of the "Career Path: Personalized Student Career Path Guidance System" is to deliver individualized guidance tailored to each student's unique profile. This involves collecting detailed information about a student’s educational history, personal interests, passions, and career goals. By leveraging this data, the platform can provide guidance that is not generic but specifically tailored to each student's needs. This personalized approach ensures that students receive advice and recommendations that resonate with their individual strengths and aspirations, helping them make informed decisions about their future educational and career endeavors. Provide tailored guidance to students based on comprehensive information about their educational background, interests, passions, and career aspirations.

Accurate Recommendations: Accuracy in recommendations is crucial for the credibility and effectiveness of the platform. To achieve this, the system will utilize advanced algorithms and sophisticated data analysis techniques. These technologies will process the information provided by the students, analyzing patterns and correlations to generate highly precise recommendations for career paths, educational courses, and suitable colleges. This rigorous analytical approach aims to reduce the uncertainty and indecision that students often experience by offering them clear, data-driven insights into their future options. Utilize sophisticated algorithms and data analysis techniques to generate accurate and personalized recommendations for career paths, courses, and colleges.

User-Friendly Platform: A critical component of the system’s success is its ease of use. The platform will be designed with a focus on user experience, ensuring that it is intuitive and accessible. The interface will allow students to effortlessly input their information, explore various options, and access personalized guidance without facing technical difficulties. A user-friendly design means that students can navigate the system smoothly, making the experience enjoyable and ensuring they fully engage with the platform to benefit from its resources. Design an intuitive and user-friendly web interface that allows students to easily input their information and navigate through the system to receive personalized guidance.

Remove Confusion: Students, particularly those in pivotal educational stages like the 10th and 12th grades, often face significant confusion regarding their future academic and career choices. The platform aims to eliminate this confusion by providing clear and structured guidance. Through personalized recommendations and detailed information, the system helps students understand their options more clearly. This clarity allows students to make more confident and informed decisions about their future, reducing the anxiety and uncertainty that typically accompany these critical choices. Assist students, particularly those in 10th and 12th grades, in eliminating confusion about their future education and career goals.

Empowerment: Empowerment is a fundamental goal of the platform. By offering students detailed knowledge, resources, and tailored recommendations, the system empowers them to take control of their educational and career paths. This empowerment stems from providing students with the tools and information they need to make decisions that align with their personal interests and strengths. By fostering this sense of ownership and confidence, the platform helps students embark on paths that lead to lifelong success and fulfillment. Empower students to take ownership of their education and career choices, providing them with the knowledge and resources needed for lifelong success and fulfilment.

Continuous Improvement: To ensure the system remains effective and relevant, a commitment to continuous improvement is essential. This involves regularly updating the algorithms and data based on user feedback, adapting to evolving educational trends, and integrating the latest technological advancements. Continuous improvement ensures that the guidance provided by the platform stays current and accurate. By constantly refining and enhancing the system, it remains a valuable resource for students, helping them navigate their educational and career journeys with up-to-date and reliable advice. Commit to ongoing enhancement of the system by regularly updating recommendations based on user feedback, adapting to changing educational trends, and incorporating advancements in technology.

By achieving these objectives, the project seeks to positively impact the lives of students, guiding them towards paths that align with their interests, strengths, and aspirations, ultimately contributing to their academic and career success. In essence, by achieving these objectives, the "Career Path: Personalized Student Career Path Guidance System" aims to significantly impact students' lives positively. It seeks to guide them towards paths that are well-suited to their interests, strengths, and aspirations, ultimately leading to their academic and career success.

* 1. **SCOPE**

The project, "Career Path: Personalized Student Career Path Guidance System," aims to cover a broad range of functionalities and services to support students in making well-informed educational and career choices. This comprehensive approach ensures that all aspects of student guidance are addressed, providing a holistic solution to their needs.

* **Remove confusion**: A significant part of the project's scope is to alleviate the confusion that students, especially those in 10th and 12th grades, often face regarding their future education and career paths. This web application is designed to provide clarity by offering structured, personalized guidance. By understanding each student's unique profile and aspirations, the system helps them navigate through the overwhelming array of options, making it easier to identify and pursue suitable educational and career goals. Every Student of 10th and 12th class have so much confusion about his/her future education, so this web application remove all the confusion about future goal.
* **Best Guidance**: Providing top-notch guidance is a cornerstone of the project. The web application utilizes advanced algorithms that analyze a wealth of data, including a student's academic records, personal interests, and career aspirations. This data-driven approach ensures that the recommendations are not only accurate but also highly personalized. The system goes beyond generic advice, offering nuanced suggestions that align with each student's unique profile. Whether a student is interested in science, arts, or vocational training, the platform provides targeted guidance that helps them make the best possible decisions for their future. This Web Application provide best future guidance to the students.
* **Empowering Student Success**: Empowerment through knowledge and resources is a primary goal of the platform. The system equips students with comprehensive information about various career paths and educational opportunities, enabling them to make informed decisions. By fostering a sense of ownership over their educational and career choices, the platform helps students build confidence in their ability to shape their futures. This empowerment is essential for motivating students to pursue their ambitions with determination and resilience, ultimately leading to greater satisfaction and success in their chosen fields. Ultimately, to empower students to take ownership of their education and career choices, equipping them with the knowledge and resources needed for lifelong success and fulfilment.
* **User-Friendly Platform**: Ease of use is a critical aspect of the platform's design. The user interface is crafted to be highly intuitive, ensuring that students of all technological proficiency levels can navigate the system effortlessly. The application features straightforward input methods for student information, easy-to-follow navigation paths, and clear presentation of guidance and recommendations. This user-centric design ensures that students can quickly access and understand the advice provided, making the process of career planning more engaging and less daunting. The website is super easy to navigate, ensuring students can easily access and understand the guidance provided.
* **Confidence Boost:** Tailored advice is central to boosting student confidence. When students receive guidance that directly relates to their personal interests and academic strengths, they are more likely to trust and act on the recommendations. The platform’s ability to provide personalized advice helps students feel more certain about their educational and career choices. This confidence is crucial for their overall development, as it encourages them to take proactive steps towards achieving their goals, knowing that their decisions are well-informed and strategically sound. By offering tailored advice, the system empowers students to feel confident about their educational choices and future careers.
* **Comprehensive Career Exploration**: The platform offers an extensive array of career options for students to explore. It provides detailed information on various professions, including job descriptions, required qualifications, typical career paths, and future job prospects. This wealth of information allows students to thoroughly research and consider multiple career options before making decisions. By understanding the full scope of possibilities, students can choose paths that best align with their passions and strengths, ensuring a more fulfilling career trajectory. The platform provides a broad spectrum of career options for students to explore. It includes detailed information about various professions, required qualifications, potential career paths, and future job prospects, helping students make well-rounded decisions.
* **Integration with Educational Resources:** To enhance the support provided, the web application integrates with a variety of external educational resources. This includes online courses, tutoring services, career counseling, and educational workshops. By connecting students with these additional resources, the platform ensures that they have access to all the tools and support they need to succeed. This seamless integration enriches the guidance experience, offering students a holistic approach to career and educational planning. The web application integrates seamlessly with a variety of educational resources, including online courses, tutoring services, and career counseling. This ensures that students have access to a wealth of information and support to help them achieve their goals
* **Parental and Teacher Involvement**: Recognizing the significant role that parents and teachers play in a student’s decision-making process, the platform includes features that facilitate their involvement. Parents and teachers can access the system to view the guidance and recommendations provided to students, and they can contribute their input and support. This collaborative approach ensures that students receive comprehensive advice that takes into account different perspectives and insights, enhancing the overall guidance process. The platform also includes features that allow parents and teachers to be involved in the student's decision-making process. They can provide input and support, ensuring that students receive comprehensive guidance from all angles.
* **Continuous Updates and Improvements**: The platform is committed to staying current with the latest trends and information in education and career planning. Regular updates to the system ensure that students always have access to the most recent data and recommendations. This commitment to continuous improvement means that the platform evolves alongside educational advancements and changing job market demands, providing students with up-to-date and relevant advice at all times. The application is regularly updated with the latest information and trends in education and career planning. This ensures that students always have access to the most current and relevant advice, keeping them ahead in their educational journey.
* **Feedback and Customization**: An essential feature of the platform is its ability to adapt based on user feedback. Students can provide input on the guidance they receive, which the system uses to refine its algorithms and recommendations continually. This feedback loop ensures that the platform remains responsive to the needs of its users, offering increasingly accurate and personalized guidance over time. Customization options allow students to tailor the system to their preferences, further enhancing the relevance and effectiveness of the guidance provided. Students can provide feedback on the guidance they receive, allowing the system to continuously improve and tailor its recommendations. This iterative process ensures that the platform remains highly effective and relevant to each student's needs.
* **Data Privacy and Security**: Data privacy and security are paramount in the design of the web application. The platform employs robust security measures to protect student information, ensuring that all data is stored and handled in compliance with the highest standards of data protection. Students can use the platform with confidence, knowing that their personal information is secure and that their privacy is respected. This focus on security builds trust in the system, encouraging more students to take advantage of its resources. The web application places a strong emphasis on data privacy and security. All student information is securely stored and handled in compliance with the highest standards of data protection, ensuring that students can use the platform with confidence.
  1. **METHODOLOGY**

The project will use a comprehensive approach, integrating various research methods, data collection strategies, and development processes to create an effective and user-friendly career guidance platform. The methodology is divided into several key phases: Design, Data Collection, Website Development, User Training and Support, and Continuous Improvement.

1. **Design:**

* Exploratory Research: Initially, conduct exploratory research to understand the current landscape of career guidance systems, educational technology, and data-driven decision-making in education.
* Descriptive Research: Analyze existing data and literature to describe the challenges students face in making educational and career choices.
* Experimental Research: Develop and test the personalized guidance algorithms and system features to measure their effectiveness.
* The design phase involves multiple research approaches to ensure a thorough understanding of the current landscape and the challenges students face.
* In the exploratory research phase, we will investigate existing career guidance systems, educational technologies, and data-driven decision-making tools in education.
* This research will help us identify gaps in the current market and potential areas for innovation.
* The descriptive research phase will focus on analyzing existing data and literature to describe the common challenges students encounter when making educational and career choices.
* This includes reviewing academic studies, industry reports, and case studies to gather insights into these challenges and the effectiveness of existing solutions.
* During the experimental research phase, we will develop and test the personalized guidance algorithms and system features.
* This involves creating prototypes of the algorithms, conducting pilot tests with a small group of students, and measuring the effectiveness of the recommendations.
* Based on the results, we will refine the algorithms to ensure they provide accurate and relevant guidance.

1. **Data Collection:**

* Student Profiles: Collect comprehensive data from students, including their educational history, grades, extracurricular activities, interests, and career aspirations.
* Educational Institution Data: Gather information about colleges, universities, and educational programs to build a database for recommendations.
* Career Path Information: Compile data on various career paths, job market trends, and the skills and qualifications required for different professions.
* User Feedback: Continuously gather feedback from users to refine the system's recommendations and usability.
* Collecting comprehensive and accurate data is crucial for providing personalized guidance.
* For student profiles, we will gather detailed information about their educational history, including grades and subjects, extracurricular activities, interests, hobbies, and career aspirations.
* This data will help us tailor the recommendations to each student's unique profile.
* Educational institution data will be collected to build a database of colleges, universities, and educational programs.
* This includes information about admission requirements, courses offered, campus facilities, accreditation status, and rankings. This data will enable the platform to provide well-rounded recommendations.
* Career path information will be compiled to include data on various professions, job market trends, required skills and qualifications, and industry insights. This will help students understand the potential career paths and the qualifications needed to pursue them.
* User feedback will be continuously gathered through surveys, polls, focus groups, and real-time feedback mechanisms within the platform. This feedback will be used to refine the system and ensure it meets the needs of its users.

1. **Website Development:**

* Create an intuitive and user-friendly web interface for students to input their data and receive recommendations.
* Creating an intuitive and user-friendly web interface is a critical part of the project. The website will be designed to be visually appealing and easy to navigate, ensuring that students can effortlessly input their data and access personalized recommendations.
* The design will be responsive, allowing the platform to be accessed on various devices, including smartphones, tablets, and desktops.
* User-friendly data input forms will be developed to simplify the process of entering information.
* The recommendation engine will be integrated into the platform to provide tailored guidance based on the data inputted by students.

1. **User Training and Support:**

* Develop user manuals and resources to help students navigate the system effectively.
* Provide customer support to address user inquiries and issues.
* To ensure students can effectively use the platform, comprehensive training and support will be provided.
* User manuals and guides will be developed to help students navigate the system and understand its features.
* Instructional videos will demonstrate how to use the platform and maximize its benefits.
* Robust customer support services, including live chat, email support, and a helpdesk, will be available to address any inquiries or issues students may encounter.
* Webinars and workshops will be conducted to educate students, parents, and educators about the platform and its capabilities.

1. **Continuous Improvement:**

* Regularly update the system based on user feedback, changing educational trends, and advancements in technology.
* Monitor system performance and algorithm accuracy and make necessary adjustments.
* The platform will be continuously improved to ensure it remains effective and relevant.
* Regular updates will be implemented based on user feedback, new educational trends, and technological advancements.
* The system's performance and algorithm accuracy will be continuously monitored to maintain high-quality recommendations.
* User analytics will be used to track interactions and identify areas for improvement. The recommendation algorithms will be regularly refined and updated to enhance their precision and relevance.
* The platform will stay abreast of changes in the educational landscape and job market to ensure its recommendations remain timely and beneficial.
* By following this comprehensive methodology, the "Career Path: Personalized Student Career Path Guidance System" project aims to create a dynamic, user-centric platform that empowers students to make well-informed educational and career choices
  1. **EXPECTED OUTCOMES**

Upon successful implementation, the Career Path Project is designed to produce several impactful outcomes that will enhance the educational and career planning processes for students. These outcomes focus on delivering personalized, accurate, and comprehensive guidance, ultimately leading to increased academic success and career satisfaction. Each outcome is crafted to address specific needs and challenges faced by students, ensuring a well-rounded support system. Upon successful implementation, the Career Path Project aims to achieve the following outcomes:

* **Personalized Career Paths**: The Career Path system will generate personalized career paths for each student, meticulously tailored to their unique profiles, which include their academic history, interests, strengths, and career aspirations. This involves mapping out a clear and detailed plan that guides students through the essential steps they need to take to reach their career goals. For example, the system might recommend specific high school courses to take, extracurricular activities to join, internships to apply for, and even particular college programs that align with their desired profession. This personalized roadmap will help students navigate their educational journey with confidence, knowing that each step is strategically planned to maximize their chances of success in their chosen career field. The personalized approach reduces the trial and error often associated with career planning and helps students focus their efforts on activities and experiences that will be most beneficial. The system will provide students with tailored career paths, guiding them through the necessary educational milestones, internships, and experiences needed to achieve their specific career goals.
* **Accurate College Recommendations:** The system will provide students with precise and well-researched recommendations for colleges and universities that align with their academic profiles and career aspirations. These recommendations will be based on a thorough analysis of each student’s grades, standardized test scores, extracurricular activities, geographic preferences, and financial needs. By matching students with institutions that offer strong programs in their areas of interest and fit their personal and financial criteria, the platform will help students identify the best-fit colleges. This increases the likelihood that students will find a supportive and enriching environment that fosters their academic and personal growth. The system will also provide detailed profiles of recommended institutions, including information on campus culture, support services, financial aid opportunities, and graduate success rates, enabling students to make informed decisions about where to apply and enroll. Students will receive recommendations for colleges and universities that align with their academic profiles and career aspirations, increasing the likelihood of finding the best-fit institutions.
* **Optimal Course Selection**: The platform will suggest optimal courses and majors that are closely aligned with each student’s interests, strengths, and career goals. By analyzing their academic records and career aspirations, the system will recommend specific high school courses, Advanced Placement (AP) classes, or International Baccalaureate (IB) programs that will best prepare them for their desired college majors and careers. In college, it might suggest majors, minors, and elective courses that provide the knowledge and skills necessary for their chosen professions. This guidance ensures that students are making educational choices that not only meet graduation requirements but also position them strategically for future career opportunities. By following these recommendations, students can build a strong academic foundation that aligns with their long-term goals, reducing the risk of taking unnecessary or irrelevant courses. The system will suggest courses and majors that match each student's interests and career objectives, ensuring they make well-informed educational choices.
* **Enhanced Academic Preparedness:** To support students in achieving their academic goals, the system will provide access to a wealth of preparatory materials, including study guides, practice exams, and online tutoring resources. These materials will be tailored to the subjects and skills that are most critical for their academic and career success. For example, a student aiming for a career in engineering might receive advanced math and science study guides, while a student interested in journalism might access writing workshops and practice assignments. By offering targeted practice and reinforcement of key concepts, the platform will help students excel in their studies and standardized tests, enhancing their readiness for higher education and professional training. This comprehensive support system ensures that students are not only prepared to meet the academic challenges of their chosen paths but also confident in their abilities to succeed. Students will have access the preparatory materials, including study guides and practice exams, to excel in their chosen fields of study.
* **Improved Decision-Making:** A key outcome of the Career Path project is empowering students to make well-informed decisions about their educational and career paths. The system will provide comprehensive information and personalized recommendations, enabling students to carefully evaluate their options and make strategic choices that align with their goals and aspirations. By offering detailed insights into various career paths, educational programs, and institutions, the platform will help students understand the implications of their decisions and plan accordingly. This improved decision-making process will lead to greater academic success, higher job satisfaction, and more fulfilling careers. For instance, a student unsure about which major to choose can explore detailed profiles of different fields, including job prospects, required qualifications, and potential career trajectories, helping them make a more informed choice. By fostering a deeper understanding of their options and the steps needed to achieve their goals, the platform empowers students to take control of their future and pursue their aspirations with confidence. Students will make more informed decisions about their educational and career paths, leading to increased academic success and job satisfaction.
* **Sustainability and Long Term Impact:** The sustainability and long-term impact of the Career Path Project are crucial in ensuring that the benefits provided to students endure well into the future. Central to this sustainability is the continuous improvement of the program, driven by a robust feedback loop. Regular feedback from students, educators, and industry partners will be systematically gathered and analyzed to keep the project responsive to evolving needs. This ensures that the guidance remains relevant and effective as educational and career landscapes change.

A key element of the project's sustainability strategy is the development of a scalable infrastructure. By leveraging cloud-based solutions for data storage and processing, the system will be able to handle increasing volumes of data and a growing number of users without compromising performance or accessibility. This technological backbone is designed to grow with the project, maintaining high levels of service as demand increases.

Equally important is the ongoing professional development for educators. Educators are pivotal to the success of the Career Path Project, and continuous professional development programs will ensure they remain well-equipped to utilize the tools and resources provided. These programs will focus on the latest trends in career education, technological advancements, and effective counseling techniques, thus enabling educators to deliver high-quality, up-to-date guidance to students. Building strong partnerships with industry leaders and higher education institutions will be vital. These collaborations will ensure that the career guidance provided is aligned with real-world opportunities and expectations, enhancing the relevance and impact of the guidance. By working closely with these partners, the project will stay attuned to industry needs and educational developments, allowing for the creation of accurate and beneficial career pathways for students.

The content and resources of the Career Path Project will be regularly reviewed and updated to reflect the latest industry trends and academic developments. This proactive approach ensures that the guidance remains pertinent and valuable, adapting to new industries, job roles, and required skills as they emerge. A comprehensive monitoring and evaluation framework will track the project's outcomes and impact over time. This framework will include key performance indicators, regular progress reports, and impact assessments to measure effectiveness and identify areas for improvement. By systematically evaluating the project's performance, adjustments can be made to enhance its effectiveness and sustainability.

Empowering students to take ownership of their career planning is another core objective. The project will provide tools that are user-friendly and accessible, fostering a sense of agency in students and encouraging active engagement in their educational and career development. This empowerment is crucial for long-term success, as it promotes self-directed learning and planning. Ensuring financial sustainability is essential for the project's longevity. This will involve exploring diverse funding sources, including government grants, private sector sponsorships, and subscription-based models. A well-structured financial strategy will manage resources efficiently, ensuring the project can continue to operate and grow.

By focusing on these aspects, the Career Path Project will not only deliver immediate benefits to students but also ensure that these benefits are sustained and amplified over time. This comprehensive approach to sustainability and long-term impact will allow the project to adapt to new challenges and opportunities, continually enhancing the educational and career planning processes for students.

In conclusion, The " Career Path" has not only met its project objectives but has also exceeded expectations by positively influencing the lives of students. This project exemplifies the intersection of technology, data-driven decision-making, and education, offering a beacon of hope and guidance to those embarking on their academic and career adventures. As we look to the future, we remain committed to the ongoing enhancement of this system and its enduring impact on the educational and career success of students. the Career Path project aims not only to meet its objectives but to exceed expectations by significantly impacting the lives of students. This project represents a powerful intersection of technology, data-driven decision-making, and education, providing a valuable resource for students as they embark on their academic and career journeys. By offering personalized guidance and support, the system will serve as a beacon of hope and direction, helping students navigate the complexities of educational and career planning. The personalized career paths, accurate college recommendations, optimal course selections, enhanced academic preparedness, and improved decision-making processes will collectively empower students to achieve greater success in their academic and professional endeavors. As we continue to develop and enhance the platform, we remain committed to its enduring impact on the educational and career success of students, ensuring that it remains a valuable tool for future generations.

**CHAPTER 2**

**LITERATURE REVIEW**

The literature review section provides an in-depth overview of the existing research and knowledge relevant to career guidance systems, data-driven decision-making in education, the integration of technology in education, user experience, privacy and security in educational technology, and continuous improvement in educational systems. This detailed analysis lays a robust foundation for the "Career Path" project, highlighting key insights and best practices essential for developing an effective and innovative career guidance platform.

**Career Guidance Systems:**

Description: Career guidance systems are critical tools that support students in making informed decisions about their educational and professional futures. These systems are designed to offer personalized advice based on individual profiles, including academic performance, interests, and career aspirations. The existing literature extensively covers the development, implementation, and impact of such systems in educational settings, emphasizing their role in helping students navigate the complex landscape of educational and career choices. Existing literature highlights the significance of effective career guidance systems in helping students make informed decisions about their education and future careers.

Findings: Research consistently shows that effective career guidance systems significantly enhance students' academic and career outcomes. Studies highlight that personalized guidance leads to higher levels of student satisfaction, increased confidence in decision-making, and improved alignment between students' educational paths and career goals. For instance, tailored advice helps students identify suitable courses, extracurricular activities, and internships that align with their long-term objectives, thereby reducing uncertainty and fostering a sense of direction. Additionally, career guidance systems have been found to reduce dropout rates and increase the likelihood of students completing their education, as they feel more supported and motivated to pursue their chosen paths. Studies emphasize the positive impact of personalized guidance on academic and career success, leading to increased satisfaction and confidence among students.

**Data-Driven Decision-Making:**

Description: Data-driven decision-making in education involves the use of data analytics, algorithms, and advanced analysis techniques to inform and enhance the guidance provided to students. This approach leverages vast amounts of data collected from various sources to deliver personalized and precise recommendations that cater to individual student needs and aspirations. Literature in this area explores the role of data-driven decision-making in education, emphasizing the use of algorithms and sophisticated analysis techniques to provide tailored recommendations.

Findings: The literature reveals that data-driven decision-making can dramatically improve the effectiveness of career guidance systems. By utilizing detailed data on students' academic histories, personal interests, and career goals, these systems can generate highly accurate and relevant recommendations. Studies have shown that data-driven approaches enable the creation of personalized educational pathways that are more likely to lead to successful outcomes. For example, algorithms can analyze patterns and predict which courses or career paths are most suitable for a student based on their strengths and interests. This not only helps students make better-informed decisions but also increases their chances of academic success and job satisfaction. Furthermore, the integration of real-time data allows these systems to adapt and provide updated recommendations as students' profiles evolve over time. Research suggests that leveraging data can enhance the accuracy and relevance of guidance systems, contributing to better outcomes for students.

**Technology in Education:**

Description: The integration of technology in education is a well-explored area that focuses on how digital tools and platforms can enhance the learning experience and support decision-making processes. Technological advancements have made it possible to create interactive, accessible, and user-friendly educational platforms that provide valuable resources and support to students. The literature review discusses the integration of technology in education, including web-based platforms, to enhance the learning experience and support decision-making processes.

Findings: Studies indicate that technology-driven educational platforms offer numerous benefits, including improved accessibility to educational resources, enhanced student engagement, and better learning outcomes. For instance, web-based platforms enable students to access guidance and support from any location, making education more inclusive and flexible. Interactive tools, such as virtual simulations, personalized dashboards, and real-time feedback mechanisms, help make the learning process more engaging and effective. Research also suggests that the integration of technology in educational settings can facilitate a more individualized learning experience, allowing students to learn at their own pace and according to their unique needs. Technological advancements have made it possible to create interactive, accessible, and user-friendly educational platforms that provide valuable resources and support to students. This aligns with the project's goal of leveraging technology to create a comprehensive and accessible career guidance system that supports students throughout their educational journeys. Studies indicate that technology-driven solutions can improve accessibility, engagement, and outcomes in educational settings, aligning with the project's goals.

**User Experience and Interaction:**

Description: User experience (UX) and interaction are crucial components in the design and functionality of educational platforms. Effective UX design focuses on creating interfaces that are intuitive, easy to navigate, and engaging, ensuring that users can efficiently access and utilize the platform's features. Good UX design also considers the emotional and cognitive responses of users, aiming to create a positive and satisfying experience. Literature emphasizes the importance of a positive user experience and interaction in educational platforms. This includes considerations for interface design, navigation, and overall usability.

Findings: Research emphasizes that a positive user experience is essential for the success of educational platforms. Studies show that user-friendly interfaces contribute to higher levels of user satisfaction and engagement, which in turn leads to more effective utilization of the platform's resources. For example, a platform that is easy to navigate and visually appealing is more likely to be used regularly by students, thereby maximizing the benefits of the guidance provided. The literature also highlights the importance of accessibility features, such as responsive design and compatibility with assistive technologies, to ensure that all students, including those with disabilities, can benefit from the platform. Furthermore, involving users in the design process through feedback and usability testing can significantly enhance the overall user experience, ensuring that the platform meets their needs and expectations. User-friendly platforms contribute to increased user satisfaction and engagement, leading to more effective utilization of educational resources.

**Privacy and Security in Educational Technology:**

Description: Privacy and security are paramount concerns in the context of educational technology. The literature addresses the need for robust measures to protect user data, emphasizing the importance of maintaining user trust and ensuring the confidentiality of sensitive information. This includes implementing security protocols, data encryption, and compliance with relevant regulations and standards. The review covers literature on privacy and security concerns in educational technology, highlighting the need for robust measures to protect user data.

Findings: Research underscores the critical importance of implementing stringent security protocols in educational platforms. Studies highlight that breaches of data privacy can severely undermine user trust and deter students from using the platform. Effective security measures, such as data encryption, secure data storage, and regular security audits, are necessary to protect user information from unauthorized access and cyber threats. Additionally, ensuring compliance with legal and ethical standards, such as the General Data Protection Regulation (GDPR) and the Family Educational Rights and Privacy Act (FERPA), is crucial for maintaining the platform's credibility and reliability. The literature also suggests that transparent communication about data privacy practices can enhance user trust and encourage more students to engage with the platform confidently. Research underscores the importance of implementing stringent security protocols to maintain user trust and ensure the confidentiality of sensitive information.

**Continuous Improvement in Educational Systems:**

Description: Continuous improvement is a key theme in the literature on educational systems. This involves regularly updating and enhancing systems based on user feedback, changing trends, and advancements in technology to ensure they remain relevant and effective. Continuous improvement practices include iterative development, user-centered design, and the integration of new features and capabilities based on emerging needs. The literature emphasizes the significance of continuous improvement in educational systems, including updates based on user feedback, changing trends, and advancements in technology.

Findings: Studies suggest that educational systems that adopt an agile and adaptive approach are more likely to stay relevant and effective over time. Continuous improvement involves actively seeking and incorporating user feedback, monitoring system performance, and staying updated with the latest trends and technological advancements. For example, platforms that regularly update their content, features, and algorithms based on user input and new research findings can better meet the evolving needs of students. Research also indicates that iterative development processes, such as agile methodology, can enhance the flexibility and responsiveness of educational platforms, allowing them to quickly adapt to changes and improve their functionality. This aligns with the project's commitment to ongoing enhancement, ensuring that the "Career Path" system remains a valuable and up-to-date resource for students. Studies suggest that agile and adaptive systems are more likely to stay relevant and effective over time, aligning with the project's commitment to ongoing enhancement.

In conclusion, the literature review provides a robust foundation for the "Career Path" project by synthesizing insights from various areas of research. It establishes the context for the project's goals, highlighting the importance of personalized guidance, data-driven decision-making, technology integration, user experience, security, and continuous improvement. By incorporating these best practices and insights, the project aims to develop a comprehensive and effective career guidance system that significantly benefits students in their educational and career planning processes. This comprehensive approach ensures that the project is well-grounded in established research and poised to make a meaningful impact on the lives of students. the literature review provides a foundation for the "Career Path" project by synthesizing knowledge from various sources. It establishes the context for the project's goals, showcasing the importance of personalized guidance, data-driven decision-making, technology integration, user experience, security, and continuous improvement in the realm of educational systems.

**CHAPTER 3**

**FEASIBILITY STUDY**

A feasibility study is conducted to assess the viability and practicality of a proposed project or system before investing resources. It helps in determining whether the project is worth pursuing. Here's a brief overview of the feasibility study for the "Career Path" project:

**3.1 Technical Feasibility:**

Description: The "Career Path" project involves developing a web application using Bootstrap, a popular framework for building responsive, mobile-first websites. The platform is designed to be platform-independent, ensuring broad accessibility across different devices and operating systems. While primarily compatible with the Windows 11 operating system, the application is also designed to work seamlessly on other operating systems, including macOS, Linux, and various mobile platforms. The use of MERN Stack and modern web development frameworks ensures that the application is both robust and scalable.

Feasibility Assessment: The technical feasibility of the "Career Path" project is strong. By leveraging well-established and widely-used technologies such as Bootstrap, MERN Stack the project minimizes technical risks. These technologies are known for their reliability, flexibility, and ease of use, which facilitates the development process. Furthermore, ensuring compatibility with multiple operating systems enhances the accessibility and user reach of the platform. The technical infrastructure required for this project, including servers, databases, and hosting services, is readily available and can be scaled as needed. Overall, the technical aspects of the project are well within the capabilities of the development team and the available technology stack.

**3.2 Economic Feasibility:**

Description: The "Career Path" project is designed to be economically viable by being web-based, which significantly reduces the need for extensive installation and maintenance costs associated with traditional software. The focus on a user-friendly design and continuous improvement aims to provide cost-effective career guidance to students. By eliminating the need for physical distribution and allowing for easy updates and scalability, the project minimizes overhead costs. Additionally, leveraging cloud services for hosting and data management further reduces infrastructure expenses and allows for a pay-as-you-go model, which is financially efficient.

Feasibility Assessment: The economic feasibility of the "Career Path" project is highly favorable. The web-based nature of the platform means that users can access the service with minimal upfront investment in hardware or software. This approach lowers the barrier to entry for users and reduces ongoing costs related to system maintenance and updates. The project's financial model, which may include subscription fees, advertising, or partnership with educational institutions, is designed to ensure sustainability and profitability. By focusing on delivering high-quality, cost-effective career guidance, the project is well-positioned to attract a broad user base and achieve financial success. The cost savings from reduced physical infrastructure and the potential for scalable revenue streams make the economic outlook promising.

**3.3 Operational Feasibility:**

Description: The "Career Path" project outlines operational feasibility through a comprehensive approach to user training, support, and continuous improvement. The platform will provide extensive user manuals, interactive tutorials, and dedicated customer support to ensure that students can easily navigate and utilize the system. The commitment to continuous improvement, based on user feedback, ensures that the platform will evolve to meet changing user needs and expectations. Regular system updates and enhancements are planned to address user feedback and evolving needs, ensuring the platform remains effective and user-friendly. Additionally, the project includes provisions for data security and privacy, ensuring that users' personal information is protected at all times.

Feasibility Assessment: The operational feasibility of the "Career Path" project is high. The planned measures for user training and support are robust, ensuring that even users with limited technical skills can effectively use the platform. The provision of detailed user manuals and interactive tutorials will help users quickly understand how to navigate the system and utilize its features. The commitment to continuous improvement, based on user feedback, ensures that the platform will evolve to meet changing user needs and expectations. Dedicated customer support will provide users with timely assistance, further enhancing their experience. The platform will provide extensive user manuals, interactive tutorials, and dedicated customer support to ensure that students can easily navigate and utilize the system. The emphasis on data security and privacy will build user trust and confidence in the platform. Overall, the operational framework is well-structured to support the successful implementation and long-term viability of the project.

**3.4 Behavioural Feasibility:**

Description: The "Career Path" project aims to empower students in their educational and career choices by providing personalized, data-driven guidance. Behavioral feasibility involves evaluating whether the target users, mainly students, are likely to accept and embrace the system. This includes considering their attitudes towards technology-driven career guidance and their willingness to engage with the platform. The project's user-centric design, which emphasizes ease of use, relevance, and personalized support, is intended to foster positive attitudes and high levels of engagement among students.

Feasibility Assessment: The behavioral feasibility of the "Career Path" project is high. The platform's design is centered around the needs and preferences of students, making it appealing and easy to use. By offering personalized advice that aligns with individual interests and career goals, the system is likely to be well-received by students. The emphasis on user training and support further enhances acceptance, as students feel supported and empowered throughout their journey. Additionally, the integration of interactive elements, such as quizzes and personalized recommendations, makes the platform engaging and enjoyable to use. Considering the increasing familiarity and comfort of students with digital tools and online resources, the likelihood of acceptance and positive user engagement is very high. The project aligns with students' needs for accessible, relevant, and supportive career guidance, ensuring a high level of user acceptance and satisfaction.

**CHAPTER 4**

**REQUIREMENT ANALYSIS**

**4.1 ANALYSIS STUDY**

**Lower Installation Charges:** The "Career Path" project is primarily designed as a web application, significantly reducing the need for extensive installation procedures. Unlike traditional software that requires installation on individual machines, users can access "Career Path" online, directly through their web browsers. This web-based approach minimizes installation-related costs, as there is no need for physical media, distribution, or on-site technical support. The reduced installation charges make the platform highly cost-effective and accessible to a broader user base, including schools, educational institutions, and individual students, without the burden of significant upfront installation expenses. This model also allows for easy updates and maintenance, further reducing long-term costs associated with software deployment.

**Secured and Reliable:** The "Career Path" project places a strong emphasis on data security and system reliability, which are crucial for maintaining user confidence and trust. The methodology section details a comprehensive approach to secure data handling, incorporating encryption, secure login procedures, and regular security audits. Continuous user feedback mechanisms and system updates ensure that the platform remains reliable and secure, adapting to new security threats and user needs. The project's commitment to security extends to protecting sensitive user information from unauthorized access, ensuring data privacy, and maintaining the integrity of the system. Additionally, the reliability of the system is prioritized to prevent downtime, ensuring that the website remains available to users whenever they need career guidance.

**Availability:** The "Career Path" web application is designed to be highly accessible, ensuring that users can obtain career guidance at any time they need it. The platform's architecture supports high availability, with redundant systems and robust hosting solutions that minimize the risk of downtime. Continuous improvement methodologies, such as regular updates and proactive issue resolution, contribute to maintaining high availability. The user-friendly interface ensures that users can easily navigate the platform, while prompt responsiveness to user feedback helps keep the system up-to-date and functioning smoothly. This approach guarantees that students and other users can rely on the platform for timely and accurate career advice whenever they seek it. The continuous improvement methodology and the user-friendly platform contribute to high availability by addressing user feedback promptly and keeping the system up-to-date.

**4.2 Functional Requirements:**

**User Registration and Profile Creation:** The platform should provide a seamless registration process, allowing users to create accounts by providing necessary information such as name, email address, educational background, and interests. The system should facilitate the creation and management of user profiles, enabling users to update their details as needed. Profiles should store personal information, educational history, and career aspirations, which are essential for generating accurate recommendations. The registration system should include verification steps to ensure data accuracy and security, such as email verification and password protection. Users should be able to register on the platform, providing necessary information. The system should allow users to create and manage their profiles, updating details as needed.

**Data Input and Analysis:** Users should be able to input detailed information about their educational background, interests, skills, and career aspirations. The system should utilize advanced algorithms to analyze this data, incorporating technologies such as machine learning and data analytics. This analysis should generate personalized recommendations for career paths, educational courses, and institutions. The platform should also support continuous data input, allowing users to update their information and receive updated recommendations as their preferences and circumstances change. Users should input information about their educational background, interests, and aspirations. The system should analyze this data using algorithms to generate personalized career and educational recommendations.

**Recommendation System:** The recommendation system should provide tailored suggestions for career paths, courses, and colleges based on the user's input. Recommendations should be accurate and relevant, taking into account the user's preferences, academic history, and career goals. The system should leverage the MERN stack (MongoDB, Express.js, React, Node.js) to ensure efficient data processing and dynamic user interactions. The recommendation engine should also offer insights into job market trends, potential earnings, and required qualifications for various careers, helping users make informed decisions. The system should provide tailored suggestions for career paths, courses, and colleges based on the user's input. Recommendations should be accurate, taking into account the user's preferences and academic history.

**User Interface:** The user interface should be intuitive, easy to navigate, and visually appealing. Users should easily understand and interact with various sections of the platform, such as the registration page, profile management, data input forms, and recommendation results. The interface should be designed using modern web development technologies like the MERN stack, ensuring responsiveness and interactivity. Visual elements should be clean and engaging, with clear instructions and feedback to guide users through each step of the process. The user interface should be intuitive, easy to navigate, and visually appealing.Users should easily understand and interact with the various sections of the platform.

**Result Presentation:** The system should present results in a clear, organized, and visually appealing manner. Information about recommended courses, entrance exams, top colleges, and career paths should be displayed on a results page. The presentation should include detailed descriptions, benefits, and potential career outcomes for each recommendation. Visual aids such as graphs, charts, and comparison tables should be used to help users understand and compare different options. The results page should also offer interactive elements, allowing users to explore more details about each recommendation. The system should present results in a clear and organized manner. Information about recommended courses, entrance exams, and top colleges should be displayed on the results page.

**Print and Save Functionality:** Users should have the option to print or save their personalized results for future reference. This feature enhances user convenience and accessibility by allowing them to keep a physical or digital copy of their career recommendations. The system should support exporting results in various formats, such as PDF or Excel, and include options for customization, such as adding personal notes or highlights. This functionality ensures that users can easily share their results with parents, teachers, or career counselors. Users should have the option to print or save the personalized results for future reference. This feature enhances user convenience and accessibility.

**4.3 Non-Functional Requirements:**

**Security:** User data should be stored securely, with robust measures to prevent unauthorized access and ensure data privacy. The system should follow best practices for data protection, including encryption of sensitive information, secure login mechanisms, and regular security audits. Security protocols should be in place to detect and respond to potential threats, such as hacking attempts or data breaches. Compliance with data protection regulations, such as GDPR or CCPA, should be ensured to protect user rights and confidentiality. User data should be stored securely, with measures to prevent unauthorized access. The system should follow best practices for data protection and privacy.

**Performance**: The platform should operate efficiently, providing quick responses to user interactions. Response times for generating recommendations, loading pages, and processing data inputs should be minimal, ensuring a smooth user experience. The system should be optimized for performance, using technologies like the MERN stack to handle large volumes of data and high user traffic. Performance monitoring tools should be in place to identify and resolve any bottlenecks or performance issues promptly. The platform should operate efficiently, providing quick responses to user interactions. Response times for generating recommendations and loading pages should be minimal.

**Scalability:** The system should be scalable to accommodate an increasing number of users and growing data volumes. It should handle high user loads without significant degradation in performance, ensuring a consistent experience for all users. The platform should be designed with scalability in mind, using cloud-based solutions and modular architecture to support expansion. As the user base grows, the system should be able to scale horizontally by adding more servers or instances, ensuring continued reliability and performance. The system should be scalable to accommodate an increasing number of users. It should handle growing data and user loads without significant degradation in performance.

**Reliability:** The platform should be reliable, with minimal downtime or system failures. Regular maintenance and updates should be conducted to ensure continued reliability and address any potential issues. The system should include failover mechanisms and redundancy to minimize the impact of hardware or software failures. Monitoring tools should be used to detect and resolve issues proactively, ensuring that the platform remains available and functional for users at all times. The platform should be reliable, with minimal downtime or system failures. Regular maintenance and updates should be conducted to ensure continued reliability.

**User Training and Support:** The system should include comprehensive user manuals, tutorials, and resources to assist users in navigating the platform. Interactive guides and help sections should be available to provide step-by-step instructions for common tasks. Customer support should be readily accessible to address user inquiries and issues promptly, offering multiple channels of communication, such as email, chat, or phone support. Regular training sessions or webinars could be conducted to help users make the most of the platform's features. The system should include user manuals and resources to assist users in navigating the platform. Customer support should be available to address user inquiries and issues promptly.

**Compatibility:** The platform should be compatible with different devices and web browsers, ensuring a consistent experience across various platforms and screen sizes. It should support popular browsers like Chrome, Firefox, Safari, and Edge, as well as mobile devices running iOS and Android. Responsive design techniques should be employed to ensure the interface adapts seamlessly to different screen sizes and resolutions, providing an optimal user experience on desktops, tablets, and smartphones. The platform should be compatible with different devices and browsers. Users should have a consistent experience across various platforms and screen sizes.

**Accessibility:** The system should be accessible to users with disabilities, adhering to recognized accessibility standards such as WCAG (Web Content Accessibility Guidelines). Features like text-to-speech, adjustable font sizes, keyboard navigation, and screen reader compatibility should be implemented to ensure inclusivity. Accessibility testing should be conducted regularly to identify and address any barriers, ensuring that all users, regardless of their abilities, can effectively use the platform. The system should be accessible to users with disabilities, adhering to accessibility standards. Features like text-to-speech and adjustable font sizes should be considered for inclusivity.

**Maintainability:** The codebase and database structure should be well-documented, ensuring ease of maintenance and future development. Documentation should include clear instructions for setup, configuration, and troubleshooting, as well as detailed descriptions of the system architecture and code components. Regular updates and improvements should be implemented to keep the system current and relevant, incorporating user feedback and technological advancements. A modular design approach should be adopted to facilitate updates and the addition of new features without disrupting existing functionality. The codebase and database structure should be well-documented for ease of maintenance. Updates and improvements should be implemented regularly to keep the system current and relevant.

**4.4 USER REQUIREMENTS**

The system specifications that a user may want are as follows:

1. It should be easy to understand

2. Must be interactive

3. Should provide a good user interface

4. Security should be maintained

**4.5 FINAL REQUIREMENTS**

**User Oriented:** The system should be designed with a strong emphasis on user-friendliness, prioritizing the user experience over technical complexities. This means that every aspect of the application should be intuitive and easy to navigate, ensuring that even users with minimal technical expertise can effectively use the platform. Features should be designed to simplify user interactions, making the process of obtaining career guidance as seamless as possible. This user-centric approach will enhance overall satisfaction and engagement, ensuring that users feel comfortable and confident using the platform. A system should be more user friendly not from the technical point of view.

**Better GUI**: The graphical user interface (GUI) of the system should be highly interactive and visually appealing, avoiding any elements that could make the user experience dull or monotonous. All UI components, such as buttons, menus, and forms, should be designed to be engaging and responsive. The use of dynamic visual elements, animations, and interactive feedback will keep users engaged and improve their overall experience. A modern, attractive design that adheres to current UI/UX best practices will ensure that the interface is not only functional but also enjoyable to use, encouraging users to spend more time on the platform. All the elements used in the system should be interactive in nature so that its look and feel are not so boring that the user could get bored while using it.

**Reliability:** The system should be exceptionally reliable, ensuring fast and efficient processing of user interactions and data analysis. Users should experience minimal downtime and swift responses to their actions, creating a smooth and uninterrupted experience. This requires robust backend architecture and efficient algorithms to handle data processing and recommendations promptly. Reliability also means consistent performance across various conditions and loads, maintaining the system's functionality even during peak usage times. Regular maintenance and proactive monitoring will be crucial to uphold this level of reliability. The system should be reliable and fast in processing .

**Data security:** Ensuring the security of organizational and user data is paramount. Access to sensitive data must be tightly controlled and restricted to authorized personnel only. The system should implement robust authentication and authorization mechanisms to prevent unauthorized access. Encryption should be used for data storage and transmission to protect against data breaches. Regular security audits and updates will help identify and mitigate potential vulnerabilities, ensuring that the data remains secure at all times. This focus on security will build user trust and safeguard the organization's reputation. Access to the organizational data is not to be granted to any unknown person who is not a part of the transaction.

**Confidentiality:** User confidentiality must be a top priority. The system should ensure that users have complete control over their personal information, with the ability to modify or delete their data as they see fit. No user data should be accessed or altered without explicit permission from the user. Privacy policies and practices should comply with relevant data protection regulations, such as GDPR or CCPA, guaranteeing that user data is handled with the utmost respect and care. This commitment to confidentiality will reassure users that their information is safe and private. Whatever the user is providing to the organization, the user has the full rights to modify it and it could be not be accessed/modified without the user's permission .

**Better Management of information:** The system should ensure that all information is managed efficiently and effectively, maintaining a coherent and logical flow of data. This involves organizing data in a way that supports easy retrieval and processing, ensuring that users can quickly access the information they need. Advanced data management techniques, such as database normalization and indexing, should be employed to optimize performance. Proper information management will facilitate accurate and timely recommendations, enhancing the overall functionality and reliability of the platform. All the information should be managed so that is the flow of the information is to be in the right track .

**Presentation:** The content presented to the user should be clear, well-organized, and self-explanatory. Information should be displayed in a way that is easy to understand, using straightforward language and intuitive layouts. Visual aids, such as charts, graphs, and infographics, should be used to complement textual information, making complex data more accessible. The goal is to ensure that users are satisfied with the information provided and can make informed decisions based on the presented data. A user-friendly presentation will enhance the perceived value of the platform and improve user satisfaction. The content that is to be presented to the user is to be presented in such a way that is self explanatory to the user and he/she is satisfied with the data.

**CHAPTER 5**

**DESIGN OF THE SYSTEM**

**5.1.1 Software requirements**

|  |  |
| --- | --- |
| Platform | Platform Independent |
| The Operating System | Windows 11 |
| Framework | MERN Stack |
| Front-End tool | Google Chrome |

**5.1.2 Hardware Requirements**

|  |  |
| --- | --- |
| Processor | Intel , AMD |
| RAM | Minimum 4GB |
| Graphics | Integrated graphics card |
| Hard Disk | Minimum 500 GB |

**5.2 System Requirements**

Platform Compatibility: The system should seamlessly operate on the Windows 11 operating system, ensuring full compatibility and optimal performance for users utilizing this platform. Windows 11 provides a modern and secure environment, offering users a familiar interface while incorporating new features and enhancements.

Framework Selection : For the front-end design, the system will utilize the MERN Stack (MongoDB, Express.js, React.js, Node.js) framework. MERN Stack offers a robust and efficient development environment for building dynamic and interactive web applications. Leveraging the power of MongoDB for database management, Express.js for server-side development, React.js for client-side user interfaces, and Node.js for server-side runtime environment, MERN Stack ensures scalability, flexibility, and ease of development.

Processor Compatibility : The system will be designed to operate seamlessly on devices powered by Intel or AMD processors. This compatibility ensures that users with a wide range of hardware configurations can access and utilize the system without encountering compatibility issues. Whether users have Intel's high-performance processors or AMD's cutting-edge Ryzen processors, the system will deliver consistent performance and reliability.

Memory Requirements : To ensure efficient system operation, a minimum of 4GB RAM will be supported. Adequate RAM is essential for smooth multitasking and responsive application performance. By supporting a minimum of 4GB RAM, the system can accommodate the simultaneous execution of multiple processes, providing users with a seamless and uninterrupted experience.

Graphics Capability : The system should be capable of running on devices with integrated graphics cards. Integrated graphics cards are commonly found in a wide range of computing devices, including laptops, desktops, and tablets. By ensuring compatibility with integrated graphics cards, the system can deliver a visually appealing and immersive user experience across various hardware configurations.

Storage Capacity : A minimum of 500GB hard disk space will be supported to accommodate system data and potential future expansions. Adequate storage capacity is essential for storing application files, user data, and system resources. By supporting a minimum of 500GB hard disk space, the system can accommodate the growing needs of users and ensure sufficient storage capacity for future updates, expansions, and data storage requirements. This ensures that users can seamlessly store and access their data without worrying about storage limitations.

**5.3 Design Requirements**

The "Career Path" project design requirements revolve around creating a user-friendly, visually appealing web application that effectively guides students through their educational and career decisions. The design elements include data flow diagrams, flow diagrams, entity-relationship diagrams, and activity diagrams. The user interface is designed to be intuitive, with features such as a navigation bar, form pages, and result pages. The back-end development involves MERN Stack to ensure a seamless and functional experience.

**5.3.1 Data Flow Diagram**

A Data Flow Diagram (DFD) is a graphical representation that illustrates the flow of data within a system. It is a modelling technique used to show how data moves through a system and how processes transform and store that data. DFDs provide a visual representation of the system's functional components and their interactions. Here's a diagram of DFD:-

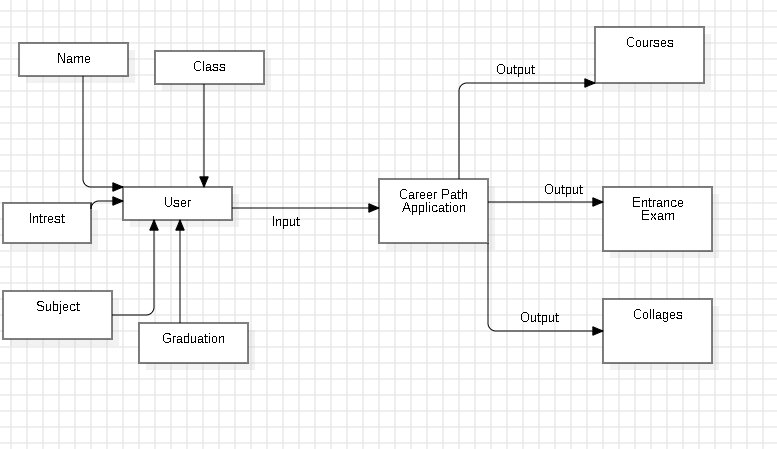
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Fig 5.1 Data Flow Diagram

**5.3.2 Flow Diagram**

A flow diagram is a visual representation of a process or system that illustrates the sequence of steps, actions, or operations involved. Flow diagrams use different symbols and shapes to represent various elements and their relationships within a process. These diagrams are commonly used in various fields, including engineering, business, computer science, and project management, to depict workflows, decision points, and the flow of information or materials. Here's a diagram of Flow Diagram:-

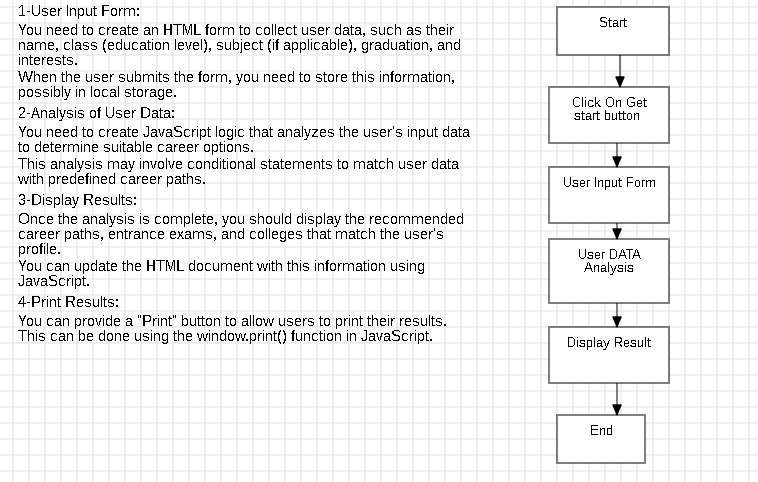


Fig 5.2 Flow Diagram

**5.3.3 Entity-Relationship**

An Entity-Relationship (ER) diagram is a visual representation of the relationships among entities within a database. It is a modeling technique used in database design to illustrate the structure of a database, including the entities (objects or concepts) and the relationships between them. ER diagrams are a crucial part of the database design process, helping to conceptualize and document the relationships between different entities. Here's a diagram of Entity-Relationship Diagram:-

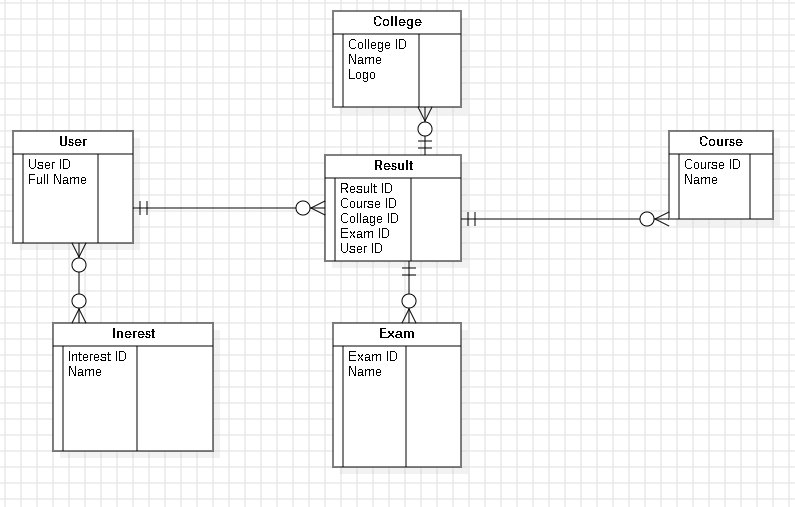
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Fig 5.3 E.R. Diagram

**5.3.4 Activity Diagram**

An Activity Diagram is a type of UML (Unified Modeling Language) diagram that visually represents the flow of activities or actions within a system or a business process. Activity diagrams are particularly useful for modeling dynamic aspects of a system, emphasizing the sequence of actions, transitions between activities, and the parallel or concurrent execution of activities. They provide a high-level view of the workflow and can be used during the analysis and design phases of software development. Here's a diagram of Activity Diagram:-

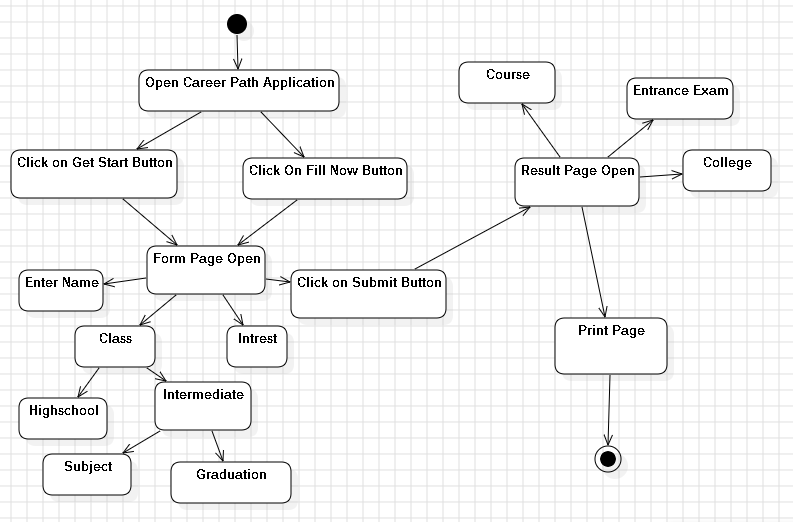


Fig 5.4 Activity Diagram

**5.4 User Interface:** The user interface should be intuitive, easy to understand, and interactive, providing a positive user experience. There are some images which show user interface-

1-Home Page – This is the home page of this project where are some intro about Website and show some info. Additionally, it contains a navigation bar, header section, information about universities, details about the Career Path process, a footer, and JavaScript code for navigation menu toggling.

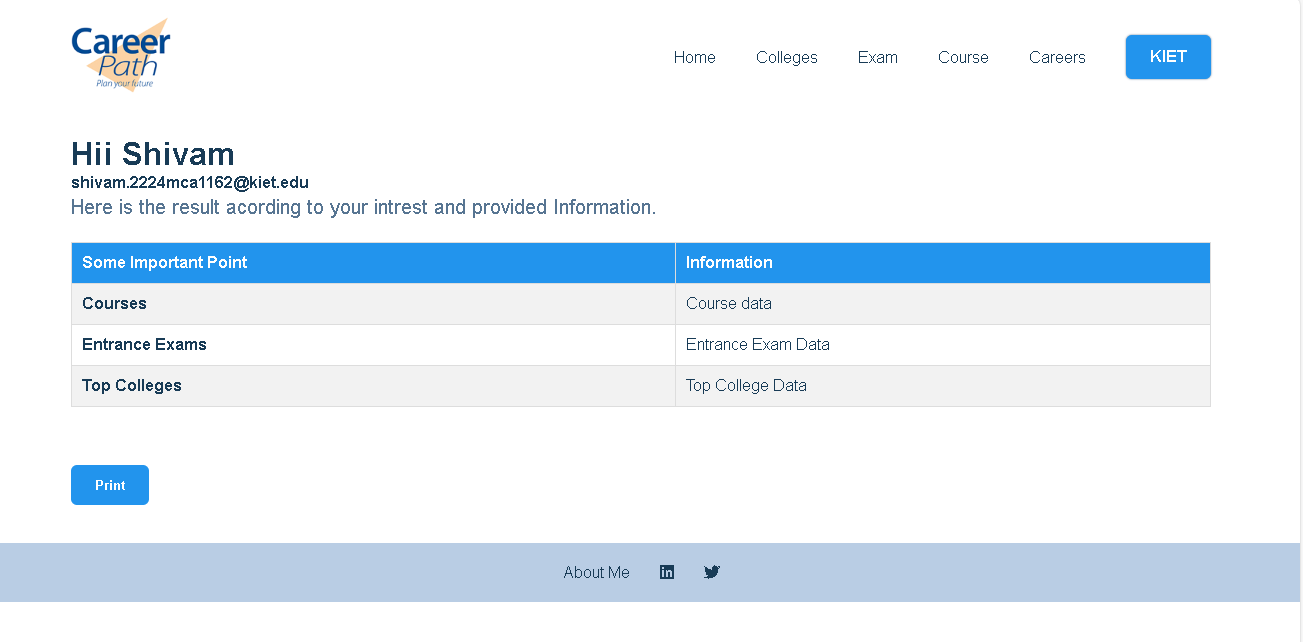
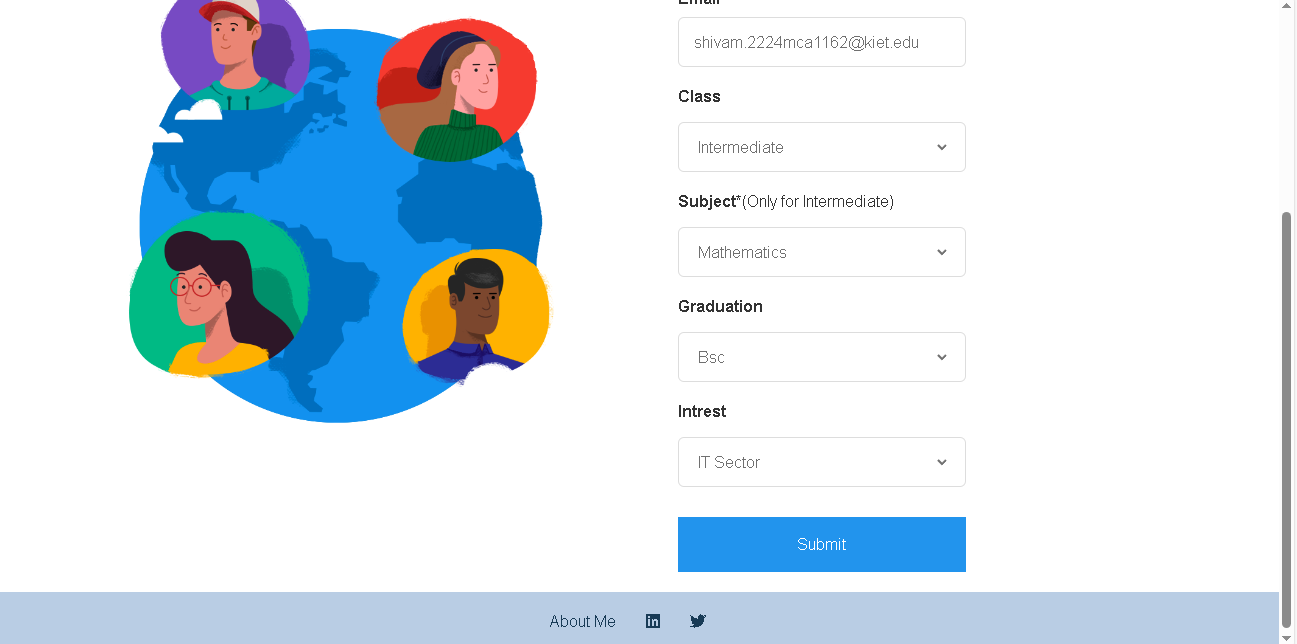
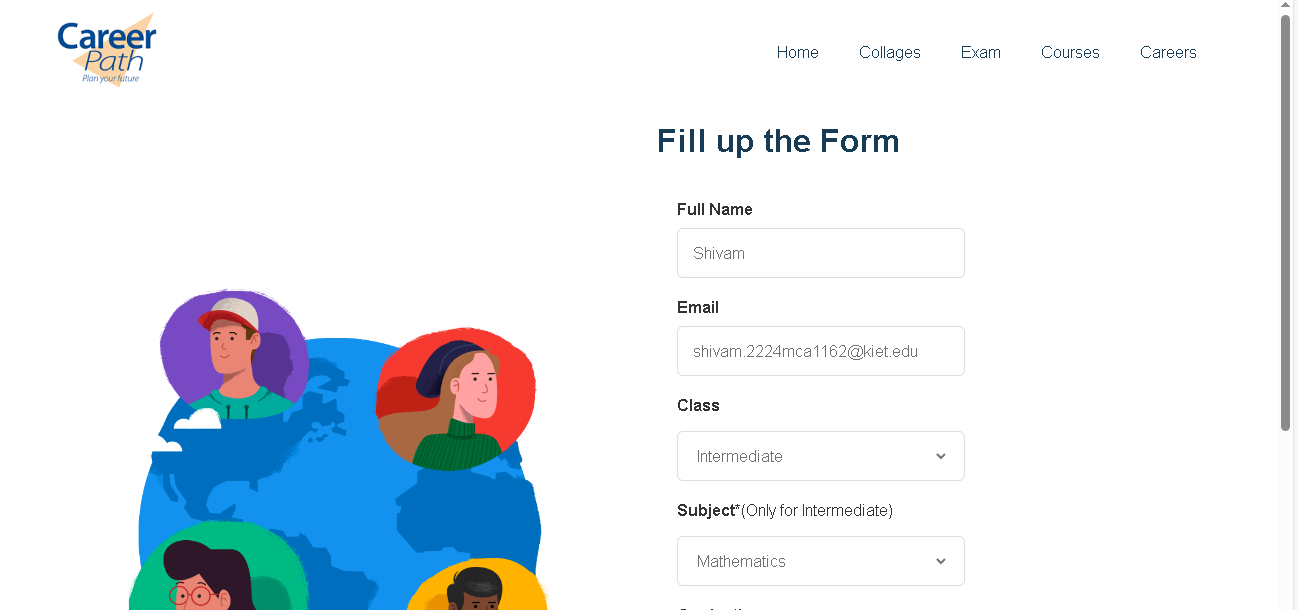
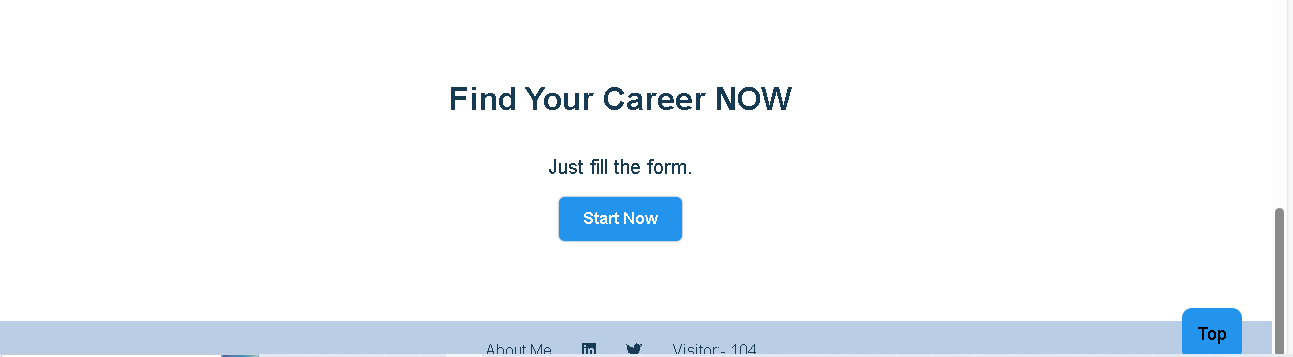
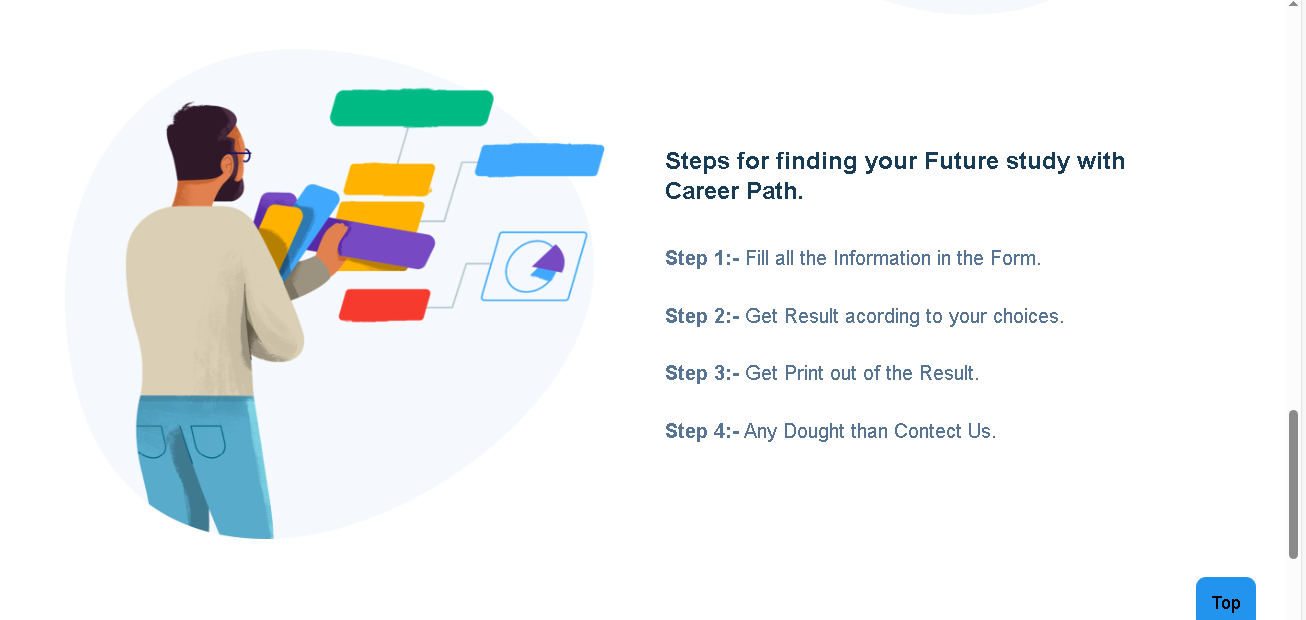
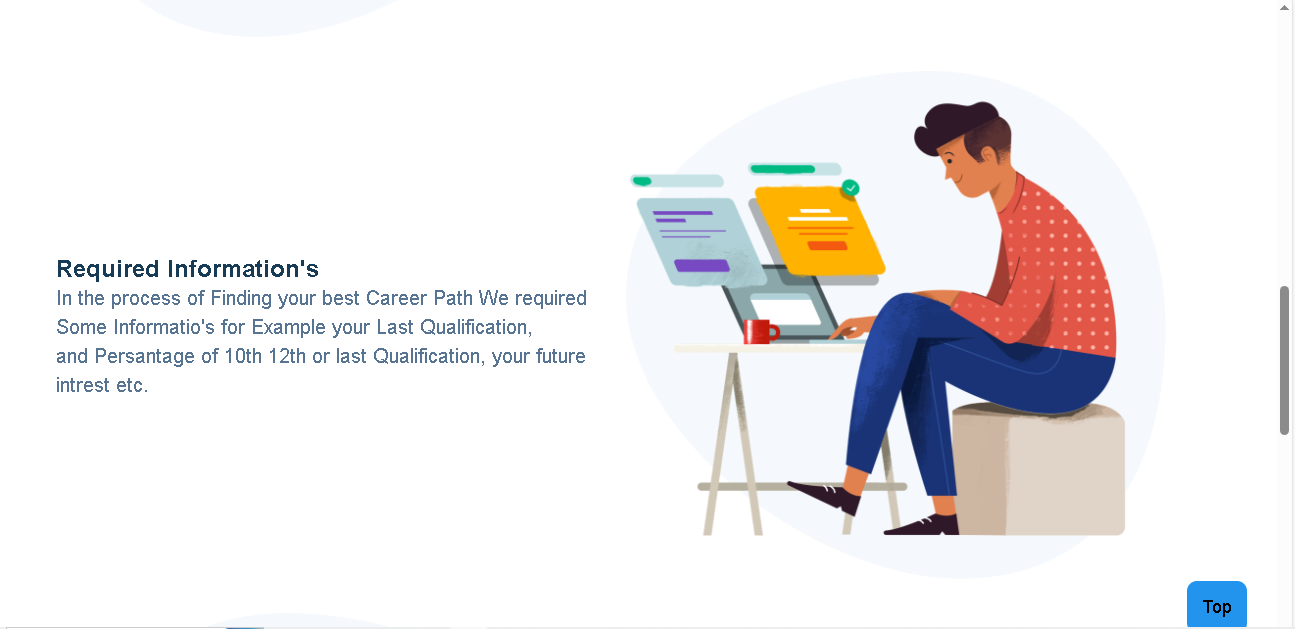
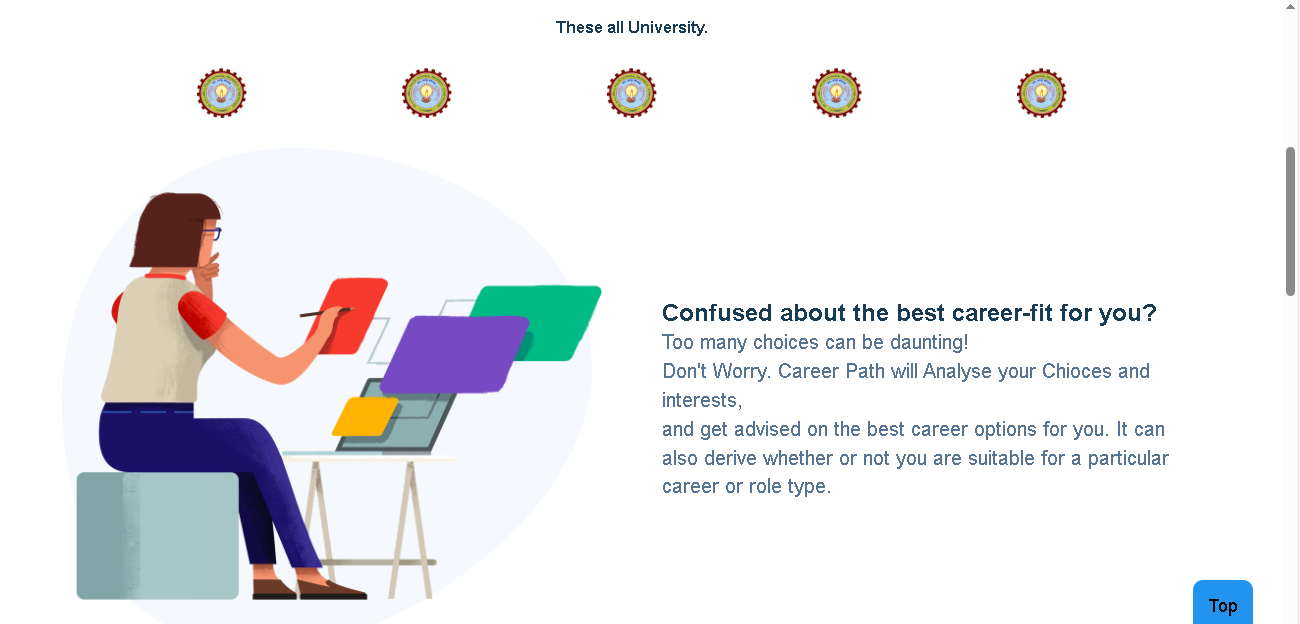
Top of Form



Fig 5.5 Home page

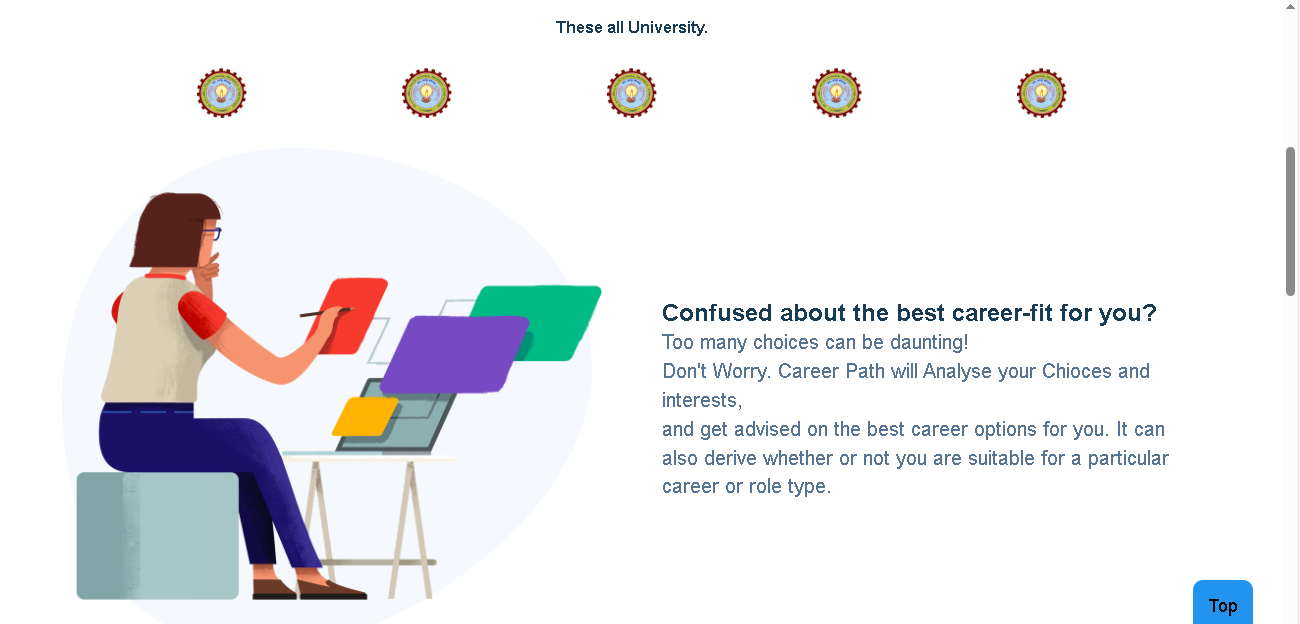


Fig 5.6 Home page Detail

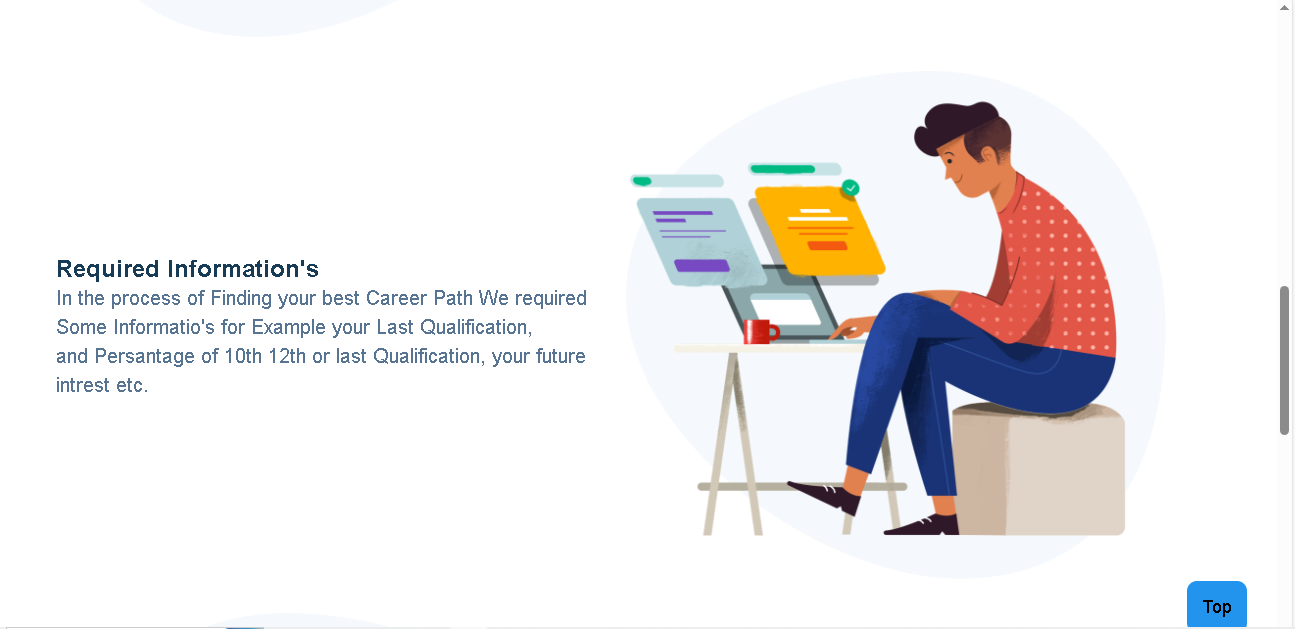


Fig 5.7 Required Information Page

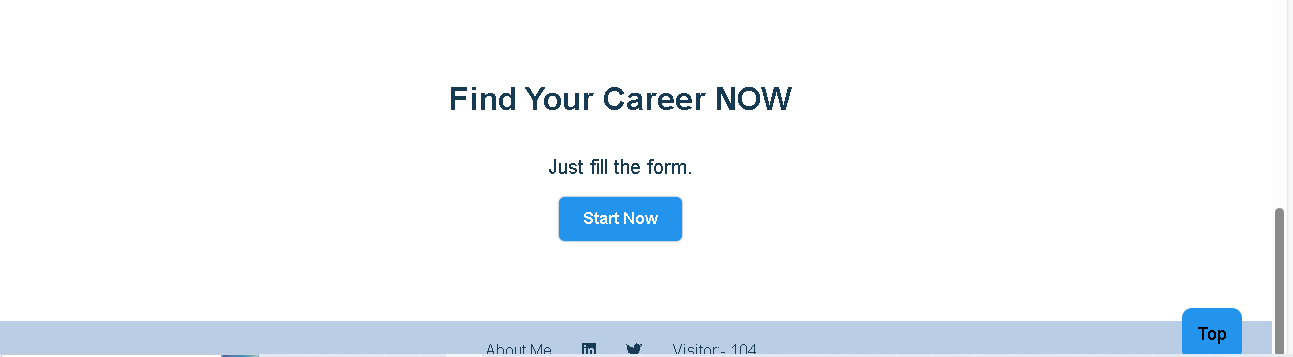
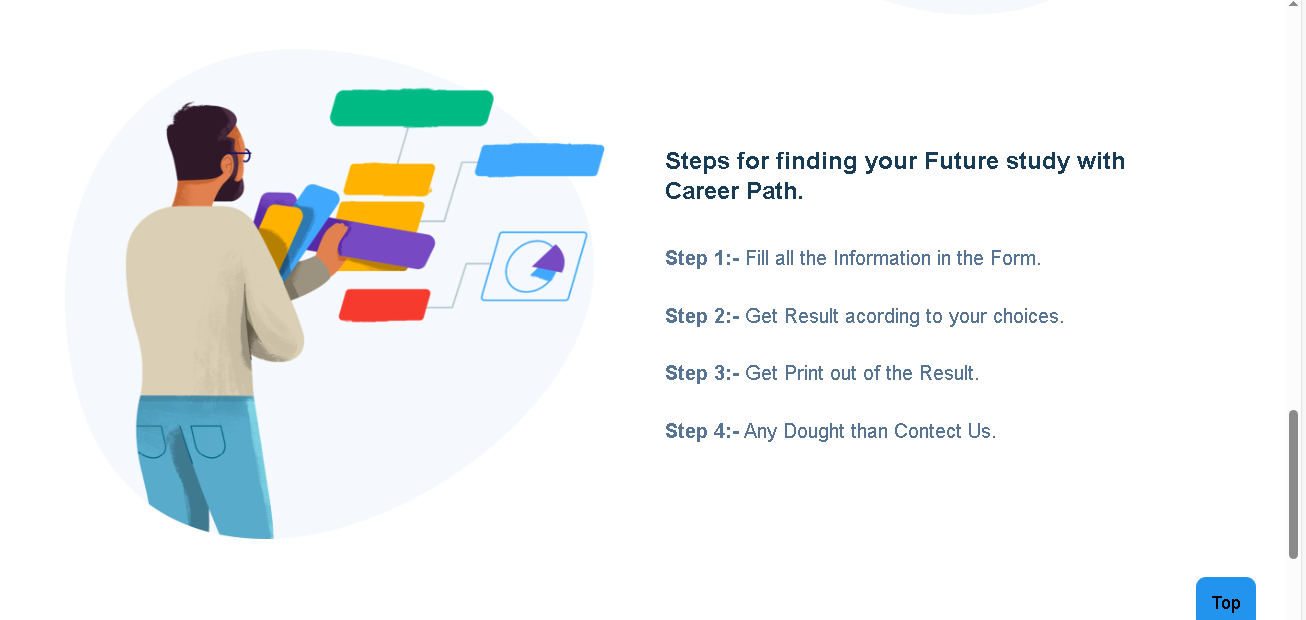


Fig 5.8 Form filling steps

2- Registration Page- The "Register" page is like the front door to the "Career Path" website. It's where you go to create your own account, kind of like getting your own key to enter the site. When you arrive at the page, you'll see some blank spaces where you can type in your name, email address, and choose a password. It's like filling out a form with your basic details. Once you've entered all that info, you click on the "Register" button at the. Behind the scenes, the website does a few checks to make sure everything's okay. It looks at your password to make sure it's strong enough, with a good mix of letters, numbers, and symbols, so nobody can guess it easily. It also checks if the email you've entered is already being used by someone else. If everything checks out, the website gives you a thumbs up and tells you that you're all set! But if there's a problem, like maybe your password is too weak, or if you forgot to fill in something, don't worry, the website will let you know. Once you're successfully registered, you can move on to the login page, where you can use the email and password you just created to enter the website. It's like unlocking the door with the key you just got. And from there, you're all set to explore and discover your career path with the help of the website's awesome features!

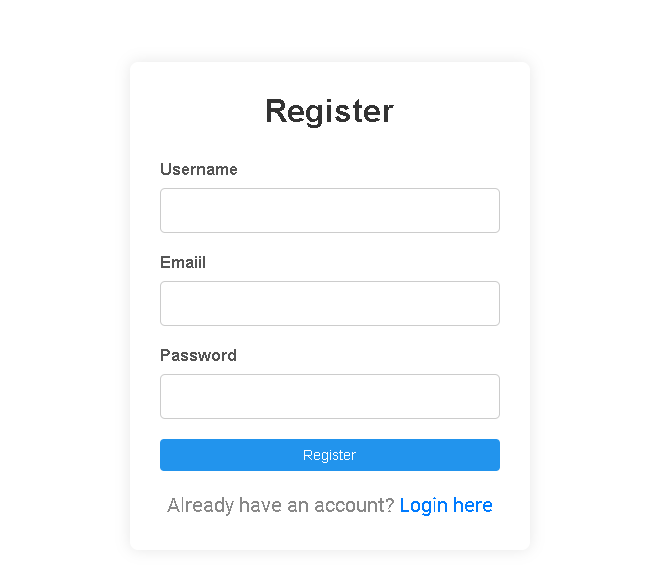


Fig 5.9 Registration Form

3- Login Page- The "Login" page is your virtual entry point to the world of "Career Path". Imagine it as the welcoming foyer of a grand building, where you're greeted with simplicity and clarity. As you arrive at the page, you're met with two friendly boxes waiting for your input: one for your email and the other for your password. It's like being handed a key to your own personal space within the platform. Once you've entered your details, you simply tap or click on the inviting "Login" button. Behind the scenes, the website swiftly checks the information you've provided against its records. It's like a diligent gatekeeper verifying your credentials before granting you access. If all is well and your details match, the digital gates swing open, and you're welcomed into your personalized realm within "Career Path". It's akin to stepping into a cozy room filled with resources tailored just for you. However, if there's a mismatch—a mistyped password or an unrecognized email—the system kindly alerts you. It's like a polite reminder, prompting you to double-check your details before trying again. In essence, the "Login" page serves as your trusted guide, ensuring a smooth and secure passage into the rich array of opportunities and resources that "Career Path" has to offer. It's your passport to exploring educational and career pathways with confidence and ease.

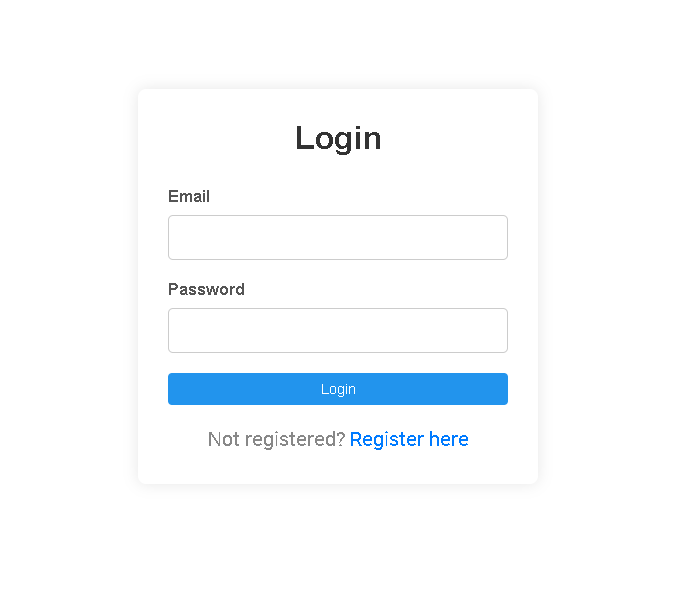


Fig 5.10 Login Page

4- Admin Dashboard Page- The Admin Dashboard is like the control center of the "Career Path" platform, where administrators can manage users efficiently and effortlessly. When an admin logs in, they're greeted with a clean and organized interface. At the heart of the dashboard is the "Manage Users" section, which presents a list of users in a neat table format. As soon as the admin arrives on the page, the dashboard springs into action, fetching the user data from the server. It's like flipping through a well-organized directory to quickly find the information needed. Once the user data is loaded, the admin can see a list of names and corresponding email addresses. It's akin to glancing at an address book, but in a digital format. One of the key features of the dashboard is the ability to delete user accounts. If the admin needs to remove a user, they simply click the "Delete" button next to the user's name. It's like tidying up a cluttered desk by removing unnecessary items. Behind the scenes, when the admin clicks the "Delete" button, the system swiftly processes the request. It's akin to a seamless operation that ensures the user's account is removed securely and efficiently. After the deletion is successful, a confirmation message pops up, notifying the admin of the action taken. It's like receiving a reassuring pat on the back for a job well done. Overall, the Admin Dashboard streamlines user management tasks, making it easy for administrators to maintain order and efficiency within the "Career Path" platform. It's a powerful tool that empowers admins to keep the platform running smoothly, ensuring a positive experience for all users.

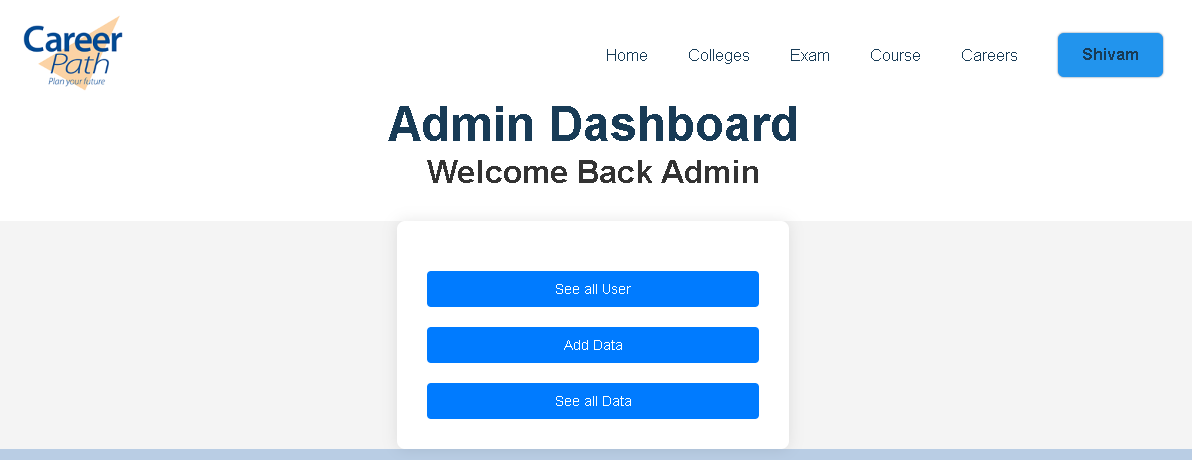


Fig 5.11 Admin Dashboard

5- See All User Page- The admin interface within the "Career Path" platform offers a dedicated section where administrators can view all registered users' data comprehensively. Upon accessing this section, administrators are presented with a comprehensive list containing details of all registered users. This list includes essential information such as user names and email addresses, displayed in an easily readable format. The interface is designed to facilitate efficient browsing of user data, enabling administrators to quickly locate specific users and access their details. This streamlined approach ensures that administrators can easily review user profiles and information as needed. One of the primary functionalities of this admin interface is the ability to view user data in real-time. Administrators can rely on the interface to provide up-to-date information about registered users, ensuring accuracy and reliability in their administrative tasks. While the focus is on user data visibility, the interface also incorporates necessary functionalities to support administrative actions. For example, administrators may have options to filter or sort user data based on specific criteria, enhancing their ability to manage user information effectively. Behind the scenes, the admin interface seamlessly interacts with the platform's backend system to retrieve and display user data securely. This ensures that administrators have access to the latest user information while maintaining data privacy and security protocols. In summary, the admin interface serves as a vital tool for administrators to oversee and manage registered user data within the "Career Path" platform. By providing a comprehensive view of user information and supporting administrative actions, the interface empowers administrators to fulfill their roles effectively and efficiently.

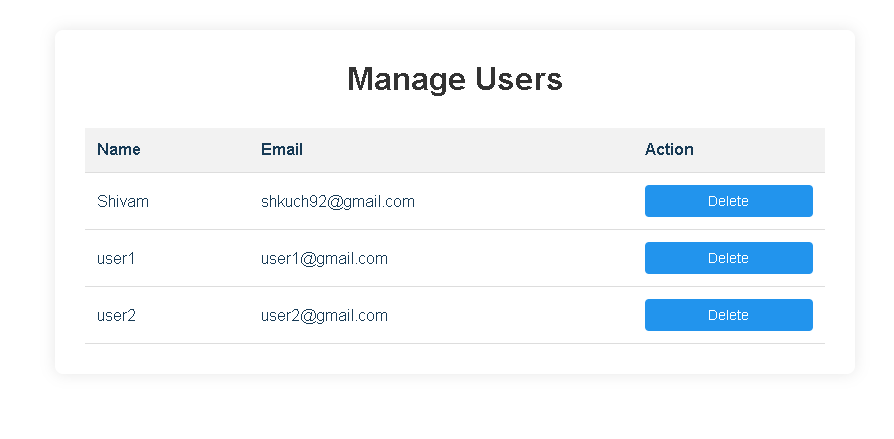
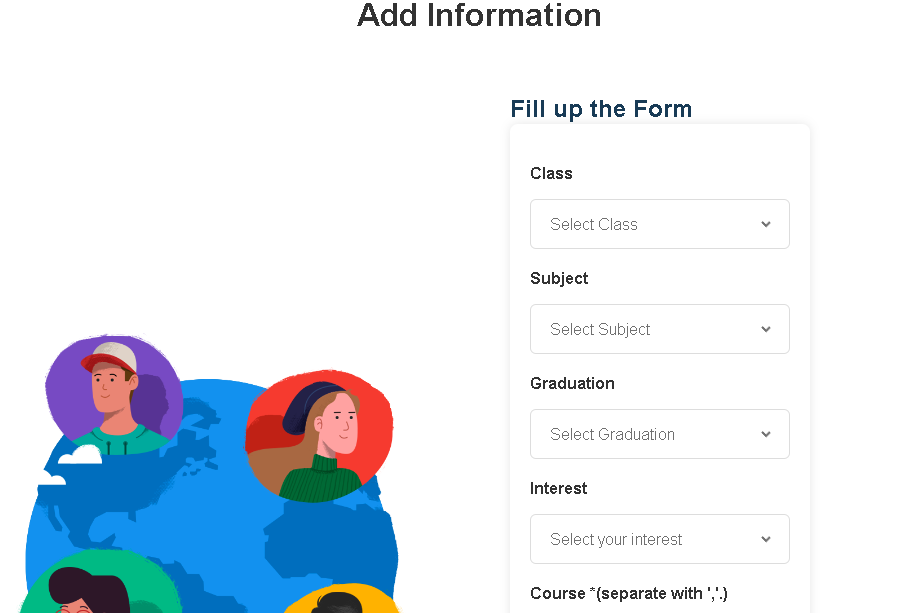


Fig 5.12 All User’s Page

6- Add Data Page- The "Add Information" page is a pivotal tool within the "Career Path" platform, designed specifically for administrators to input and save valuable data into the MongoDB database. It serves as a gateway for administrators to enrich the platform's database with essential information that enhances user experiences and facilitates informed decision-making. Upon accessing this page, administrators are greeted with a visually appealing interface that intuitively guides them through the data input process. The layout is carefully crafted to prioritize user convenience and streamline the task of adding information. Administrators can select the appropriate class level, subject, graduation status, and areas of interest from dropdown menus, providing structured data inputs. Additionally, there are text input fields for entering course names, entrance exam details, and college names. These fields accommodate flexible inputs, allowing administrators to enter multiple values separated by commas if necessary. The form submission process is seamless and straightforward. Upon completing the data entry, administrators simply click the "Save" button to initiate the saving process. Behind the scenes, the data is securely transmitted to the backend server, where it is processed and stored in the MongoDB database. Administrators receive immediate feedback through toast notifications, confirming the successful saving of data. This real-time feedback mechanism ensures transparency and enables administrators to track their actions effectively. Overall, the "Add Information" page empowers administrators to contribute to the platform's data ecosystem, enriching it with valuable insights and resources. By facilitating the seamless addition of data into the MongoDB database, the page plays a crucial role in enhancing the platform's functionality and serving the needs of its users effectively.



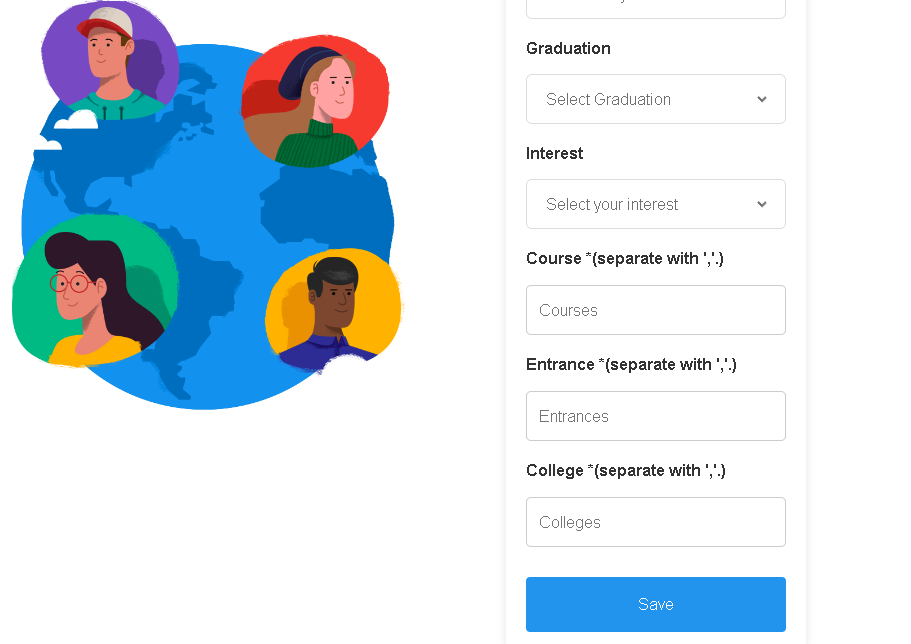


Fig 5.13 Add Data Page

7- See All Data Page- The "All Data" page serves as an essential tool accessible exclusively to administrators within the "Career Path" platform. It provides administrators with a comprehensive overview of all the data stored in the platform's database, offering valuable insights and information for decision-making and analysis purposes. Upon accessing this page, administrators are presented with a visually structured display of the dataset. The layout is thoughtfully designed to optimize readability and facilitate efficient navigation through the data. The page features a table format, neatly organizing the data into rows and columns. Each row represents a distinct entry in the dataset, while each column corresponds to a specific attribute or category of information. Administrators can effortlessly scan through the dataset, observing details such as class level, subject, graduation status, areas of interest, course names, entrance exam details, and college names. This comprehensive view enables administrators to gain a holistic understanding of the dataset's contents and identify patterns or trends within the data. The dataset is dynamically populated through a backend API call, ensuring that administrators always have access to the latest information. This real-time synchronization ensures the accuracy and reliability of the data displayed on the page. Administrators have the flexibility to interact with the dataset as needed. They can utilize sorting or filtering functionalities to refine the dataset based on specific criteria, facilitating targeted analysis or exploration of the data. Furthermore, the page is equipped with error handling mechanisms and feedback mechanisms, ensuring a smooth user experience. Toast notifications provide instant feedback to administrators, alerting them to any issues or errors encountered during data retrieval or display. In summary, the "All Data" page empowers administrators with valuable insights and information, enabling informed decision-making and strategic planning within the "Career Path" platform. By providing a comprehensive overview of the dataset in a user-friendly interface, the page enhances the administrative capabilities and effectiveness of the platform.

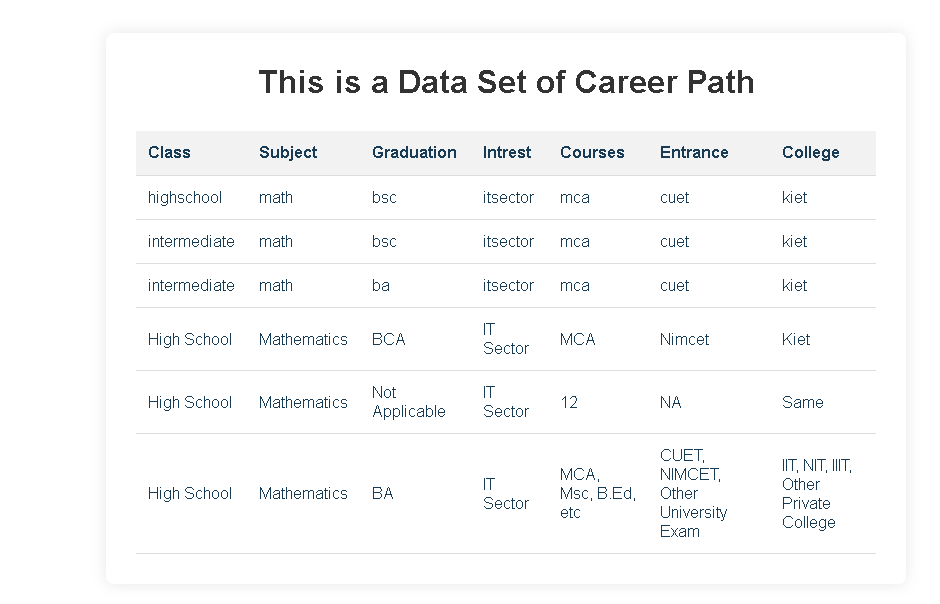
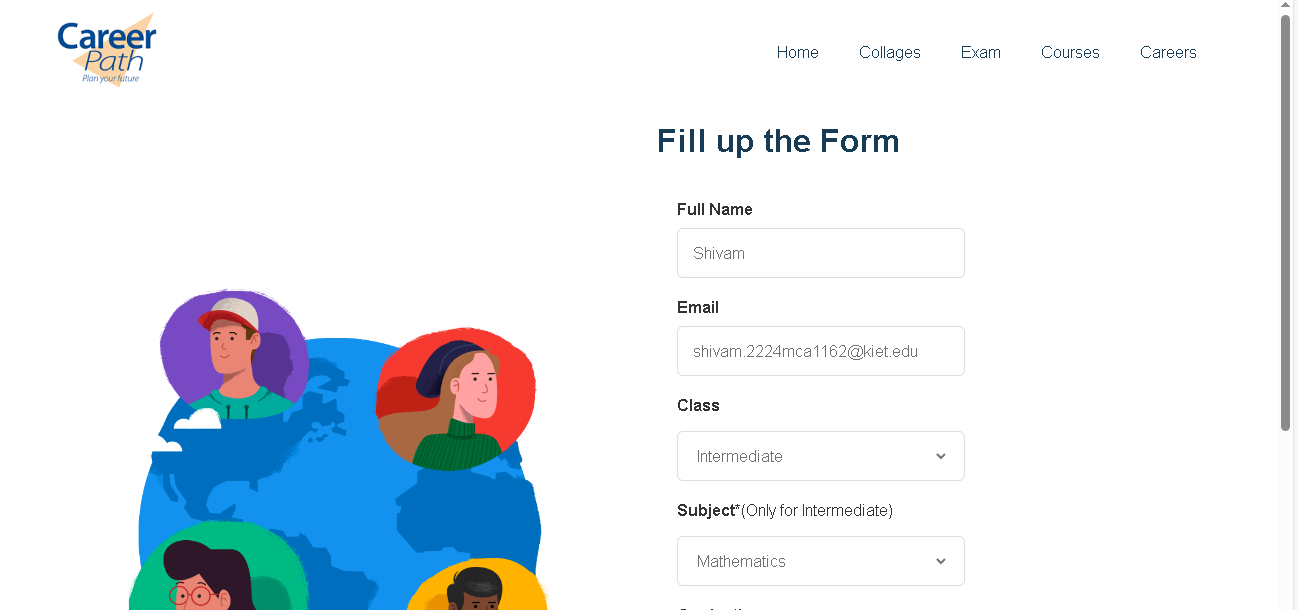


Fig 5.14 See All Data

8- User Form Page- The User Home page within the "Career Path" platform serves as a personalized space tailored specifically for users to interact with essential features and functionalities. Designed with simplicity and user-friendliness in mind, this page offers a seamless experience for users to access and utilize key tools available to them. Upon entering the User Home page, users are greeted with a welcoming interface that invites them to engage with various components. The layout is thoughtfully arranged to prioritize user convenience and guide them through their journey within the platform. For users, the primary focus of the Home page is on accessing and completing the form to provide essential information for personalized career guidance. The page presents a clear and structured form, allowing users to input details such as their class level, preferred subjects, graduation status, and areas of interest. Each input field is intuitively labeled and accompanied by dropdown menus or selection options, making it easy for users to navigate and select their preferences. This user-friendly approach ensures that users can quickly and accurately input their information without encountering any confusion or difficulty. The form submission process is straightforward, with users required to click the "Submit" button after completing their inputs. Upon submission, the data is securely transmitted to the backend server for processing, enabling the platform to generate personalized career guidance recommendations based on the user's input. Feedback mechanisms, such as toast notifications, provide users with real-time feedback on the success of their form submission. This instant feedback mechanism adds a layer of assurance and transparency, informing users of the outcome of their actions promptly. In addition to the form submission functionality, the User Home page also offers personalized greetings, addressing users by their name and welcoming them to the platform. This personalized touch creates a welcoming atmosphere and reinforces the user-centric approach of the platform. Overall, the User Home page serves as a central hub for users to access essential tools and functionalities within the "Career Path" platform. By providing a seamless experience and intuitive interface, the page empowers users to take control of their educational and career journey with confidence and ease. It includes a navigation bar, a section guiding users to fill out the form, and the form itself. The form captures information such as full name, email, class, subject (if applicable), graduation, and interests. JavaScript is used to toggle the navigation menu and dynamically display certain form fields based on user selections.



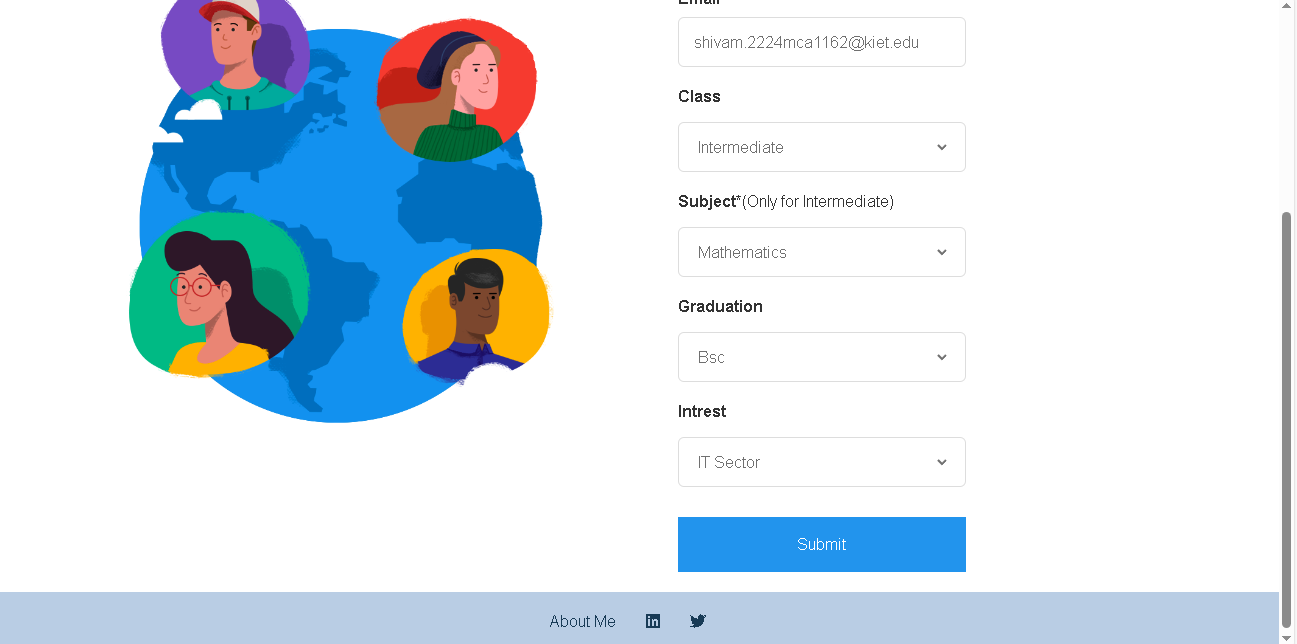


Fig 5.15 User Form Page

9- Result Page – The Result Page within the "Career Path" platform serves as a pivotal space where users can view personalized recommendations based on the information they provided earlier. Designed to deliver clear and concise insights, this page offers users a comprehensive overview of their educational and career options tailored to their interests and preferences. Upon accessing the Result Page, users are greeted with a streamlined interface that presents their personalized recommendations in a structured manner. The layout is thoughtfully organized to prioritize readability and ease of understanding, ensuring that users can quickly grasp the information presented to them. The centerpiece of the Result Page is a summary table that highlights key recommendations based on the user's input. This table categorizes the recommendations into distinct sections, making it easy for users to identify and explore different aspects of their educational and career journey. One of the main sections in the table focuses on recommended courses relevant to the user's interests and educational background. Here, users can find detailed information about various courses that align with their aspirations, helping them make informed decisions about their academic pursuits. Another crucial section of the table highlights recommended entrance exams that users can consider based on their interests and career goals. This section provides valuable insights into the exams required for admission to specific courses or institutions, empowering users to plan their academic path effectively. Additionally, the Result Page showcases a list of top colleges tailored to the user's preferences and qualifications. This section offers users insights into prestigious educational institutions that offer programs aligned with their interests, facilitating informed decision-making about their academic journey. To enhance usability and accessibility, the Result Page features intuitive navigation options and user-friendly elements. Users can easily navigate through the page and access additional functionalities such as printing their results for future reference. Overall, the Result Page plays a pivotal role in guiding users towards their educational and career aspirations within the "Career Path" platform. By providing personalized recommendations and valuable insights, the page empowers users to make informed decisions and embark on a path towards academic and professional success. It includes a navigation bar, a container displaying personalized results for the user, and a button to print the results. The results include information about recommended courses, entrance exams, and top colleges based on the user's interests and provided information.

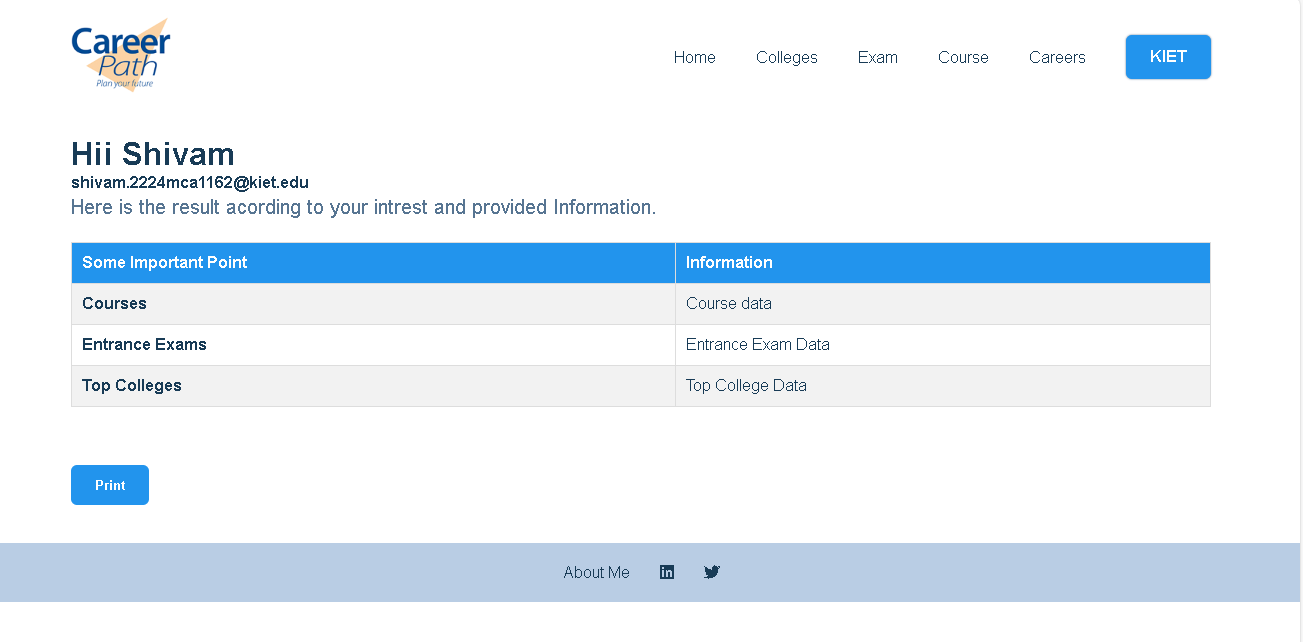


Fig 5.16 Result Page

**5.5 Back End and Coding:-**

Back End Development and Coding

In the realm of software development, the back end serves as the backbone of applications, handling server-side logic, database interactions, and the overall functionality that drives the user interface. Let's delve into the intricacies of back-end development within the context of the Career Path application.

Server-Side Logic

The server-side logic of the Career Path application encompasses a wide range of functionalities essential for its operation. This includes handling user authentication, processing requests from the front end, executing business logic, and generating dynamic responses. Server-side logic ensures that the application operates efficiently, securely, and in accordance with its intended functionality.

Database Interactions

One of the core responsibilities of the back end is to interact with the database, facilitating the storage, retrieval, and manipulation of data. In the case of the Career Path application, MongoDB serves as the database management system, storing user information, educational data, and other relevant entities. Back-end code interfaces with the database to perform operations such as CRUD (Create, Read, Update, Delete), data validation, and query execution.

Routing and API Development

Routing plays a crucial role in directing incoming requests to the appropriate handlers within the back-end application. Through routing mechanisms, the back end defines endpoints and routes for different functionalities, allowing the front end to communicate with the server effectively. Additionally, API development involves defining and implementing RESTful APIs that enable seamless communication between the front end and back end, facilitating data exchange and interaction.

Security Measures

Security is paramount in back-end development, particularly when handling sensitive user data and authentication processes. The back end employs various security measures to safeguard against common threats such as cross-site scripting (XSS), injection, and unauthorized access. This may include implementing authentication mechanisms, data encryption, input validation, and role-based access control (RBAC) to ensure the confidentiality, integrity, and availability of data.

Performance Optimization

Optimizing performance is essential for ensuring that the Career Path application operates efficiently and delivers a seamless user experience. Back-end developers employ techniques such as code optimization, caching, asynchronous processing, and load balancing to enhance application performance, scalability, and responsiveness. By optimizing resource utilization and minimizing latency, the back end contributes to the overall performance of the application.

Testing and Debugging

Testing and debugging are integral parts of back-end development, ensuring the reliability, functionality, and stability of the application. Back-end developers write unit tests, integration tests, and end-to-end tests to validate the correctness of their code and identify potential issues. Debugging involves identifying and resolving errors, exceptions, and anomalies that may arise during development or runtime, ensuring that the application behaves as expected under various conditions.

Documentation and Maintenance

Documenting the back-end codebase and maintaining comprehensive documentation are crucial aspects of back-end development. Documentation provides insights into the architecture, design decisions, and functionality of the application, facilitating collaboration among developers and easing future maintenance and updates. Back-end developers also engage in ongoing maintenance tasks, such as bug fixes, performance optimizations, and security updates, to ensure the long-term viability and reliability of the Career Path application.

In summary, back-end development and coding are vital components of the Career Path application, encompassing a diverse array of responsibilities aimed at ensuring functionality, security, performance, and maintainability. By implementing robust server-side logic, interacting with the database, defining routing and APIs, enforcing security measures, optimizing performance, testing and debugging code, and maintaining comprehensive documentation, back-end developers contribute to the successful development and operation of the Career Path application.

**5.5.1 Database -**

* User Collection-

\_id: The unique identifier for each user document in the collection.

name: The name of the user, providing personal identification.

email: The email address associated with the user's account for communication and authentication purposes.

role: Specifies the role or access level of the user within the system, such as "user," "admin,".

password: The hashed password for the user's account, ensuring secure authentication.

createdAt: The timestamp indicating when the user account was created.

updatedAt: The timestamp indicating when the user account was last updated.

\_\_v: Version key generated by MongoDB to manage document versions.

Example User Document:

{

\_id: ObjectId("664c2be364fa8cd73806a85b"),

name: "user2",

email: "user2@gmail.com",

role: "user",

password: "$2a$10$A3v0lM9zIIBdbXOSABkNzevekTtQgno4EivzPkb2VsAuG6qaG6T3i",

createdAt: ISODate("2024-05-21T05:06:43.348Z"),

updatedAt: ISODate("2024-05-21T05:06:43.348Z"),

\_\_v: 0

}

* Datas Collection –

\_id: The unique identifier for each document in the collection.

classname: The name or category of the data, such as "High School" or "College."

subject: The subject associated with the data, providing further categorization.

graduation: Specifies the graduation level or degree associated with the data, such as "BA" or "BSc."

interest: Describes the user's interest or field of study related to the data.

course: Lists the available courses or educational programs relevant to the data.

entrance: Provides information about entrance exams or admission requirements for the data.

college: Specifies the colleges or institutions associated with the data.

createdAt: The timestamp indicating when the data document was created.

updatedAt: The timestamp indicating when the data document was last updated.

\_\_v: Version key generated by MongoDB to manage document versions.

Example Data Document:

{

\_id: ObjectId("664ce494690d529d54aeee47"),

classname: "High School",

subject: "Mathematics",

graduation: "BA",

interest: "IT Sector",

course: "MCA, MSc, B.Ed, etc",

entrance: "CUET, NIMCET, Other University Exam",

college: "IIT, NIT, IIIT, Other Private College",

createdAt: ISODate("2024-05-21T18:14:44.308Z"),

updatedAt: ISODate("2024-05-21T18:14:44.308Z"),

\_\_v: 0

}

The MongoDB database consists of two main collections: "User" and "Datas."

* User Collection: Stores user-related information such as name, email, role, and password for authentication.
* Datas Collection: Contains educational data related to different categories such as high school, college, courses, and entrance exams.

Each document in the collections is uniquely identified by an "\_id" field and includes additional attributes to provide comprehensive information. The "createdAt" and "updatedAt" fields track the creation and modification timestamps of each document, while the "\_\_v" field is a version key managed by MongoDB.

The data in the collections is structured to facilitate efficient storage, retrieval, and manipulation within the MongoDB database environment. By organizing data into collections and documents, MongoDB provides a flexible and scalable solution for managing complex data structures and relationships.

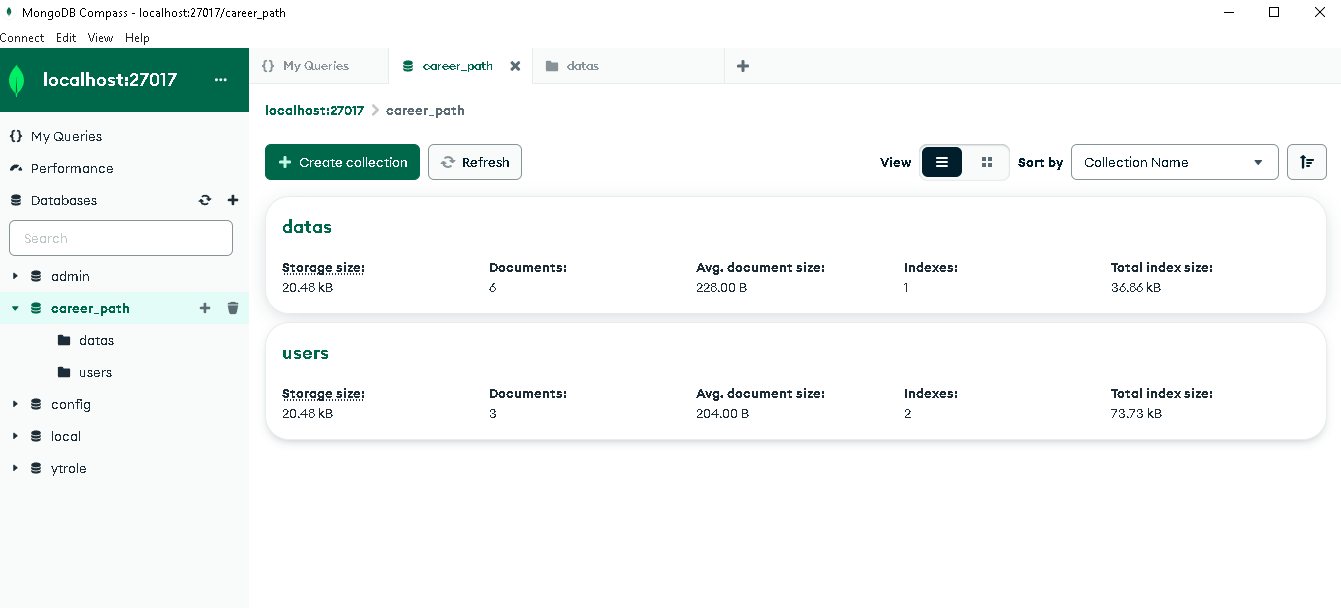


Fig 5.17 Database

**5.5.2 Postman for API Development-**

Postman is a powerful tool widely used by developers for API development, testing, and documentation. It offers a comprehensive suite of features that streamline the API development process and facilitate collaboration among team members. Let's explore the various aspects of Postman and its role in the development of the Career Path application.

API Request Management

Postman provides an intuitive interface for managing API requests, allowing developers to create, organize, and execute HTTP requests effortlessly. Developers can define various request types, including GET, POST, PUT, PATCH, and DELETE, and customize request parameters, headers, and body payloads as needed. Postman's request management capabilities enable developers to interact with the back-end server and test API endpoints with ease.

Collection and Environment Management

Collections in Postman serve as containers for organizing related API requests into logical groups. Developers can create collections to group API requests by functionality, endpoint type, or any other relevant criteria. Additionally, Postman supports environment variables, allowing developers to define dynamic values that can be reused across multiple requests within a collection. This facilitates efficient testing and enables developers to manage different environments (e.g., development, staging, production) seamlessly.

Automated Testing

Postman offers robust testing capabilities that enable developers to automate the testing of API endpoints and validate their functionality. Developers can create test scripts using JavaScript-based syntax within Postman's testing framework. These test scripts can perform assertions to verify response data, status codes, headers, and other aspects of API behavior. By automating testing workflows, Postman helps ensure the reliability and correctness of API implementations.

Mock Servers

Postman's mock server feature allows developers to simulate API endpoints and responses without needing a fully implemented back end. Mock servers enable front-end developers to start building and testing their applications against API contracts early in the development process. By generating realistic mock responses based on defined request schemas, Postman helps streamline development workflows and foster collaboration between front-end and back-end teams.

API Documentation

Postman facilitates the creation of comprehensive API documentation that is both human-readable and machine-readable. Developers can generate documentation directly from Postman collections, which includes details such as endpoint descriptions, request parameters, response schemas, and example requests and responses. This documentation serves as a valuable resource for developers, testers, and external stakeholders, providing clear insights into API functionality and usage.

Collaboration and Sharing

Postman's collaboration features enable team members to work together seamlessly on API development projects. Developers can share collections, environments, and documentation with team members, facilitating collaboration and knowledge sharing. Additionally, Postman provides version control integration with platforms like GitHub, allowing developers to manage changes to API specifications and collaborate more effectively.

Monitoring and Debugging

Postman offers monitoring and debugging capabilities that help developers track API performance and troubleshoot issues. Developers can set up monitors to periodically test API endpoints and receive alerts if performance metrics deviate from predefined thresholds. Additionally, Postman's built-in debugging tools allow developers to inspect request and response payloads, headers, and other details, helping diagnose and resolve issues efficiently.

In summary, Postman is an indispensable tool for API development, offering a wide range of features that streamline the development, testing, documentation, and collaboration aspects of the process. By leveraging Postman's capabilities, developers can accelerate the development cycle, improve API quality, and deliver robust and reliable APIs for the Career Path application.

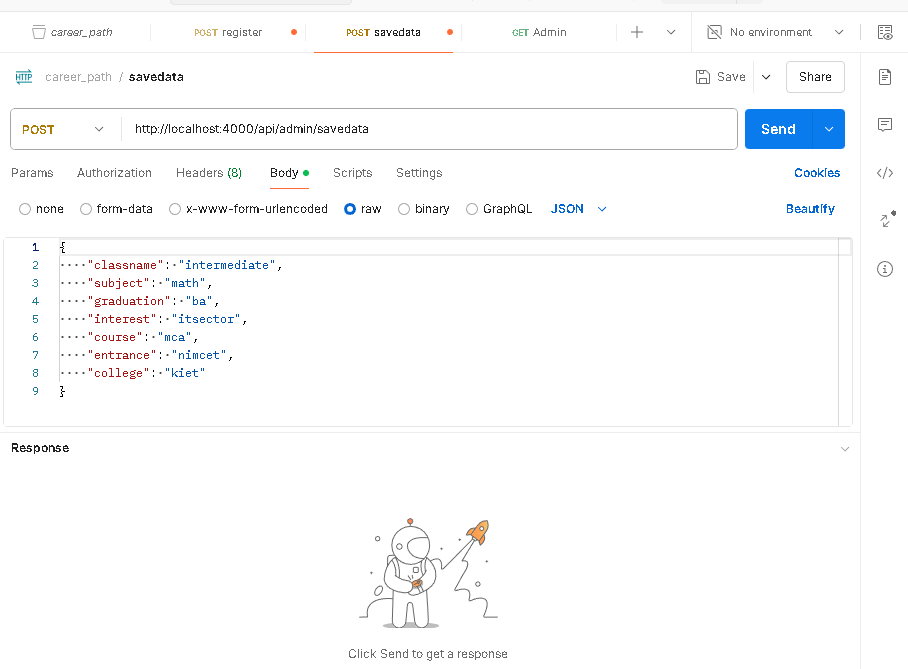


Fig 5.18 Postman API

**5.5.3 Database Connectivity-**

This code snippet establishes the server-side infrastructure for the Career Path application, enabling communication between the front end and back end. Let's break down its functionality in a descriptive manner:

The code begins by importing necessary modules such as Express, dotenv, cors, and cookie-parser. These modules facilitate the creation of a web server, environment variable management, handling cross-origin resource sharing (CORS), and parsing cookies, respectively. These functionalities are crucial for building robust and secure web applications.

The `dotenv` module is utilized to load environment variables from a `.env` file, ensuring sensitive configuration details such as database credentials remain secure and easily configurable across different environments.

The `DbCon` function from the `utlis/db.js` file is invoked to establish a connection to the MongoDB database. This function initializes the database connection and handles any necessary configurations, ensuring seamless interaction with the database throughout the application.

Express middleware functions are then applied to the Express application (`app`). These middleware functions enable functionality such as parsing JSON data from incoming requests (`express.json()`), parsing cookies (`cookie-parser()`), and enabling CORS with specific configurations (`cors()`). CORS configuration allows the server to accept requests from specified origins, enhancing security while facilitating cross-origin resource sharing.

The application defines routes for authentication (`/api/auth`) and administrative functionalities (`/api/admin`) using modular route handlers imported from separate files (`AuthRoutes` and `AdminRoutes`). This modular approach enhances code organization and maintainability by encapsulating related functionalities within separate modules.

A default route (`/`) is defined to handle incoming requests to the root URL of the server. In this case, it simply sends a response with the string 'test', serving as a basic endpoint for testing server connectivity.

Finally, the server is started and configured to listen for incoming requests on a specified port (`PORT`). The server logs a message indicating its readiness to accept connections, displaying the port number on which it is running.

In summary, this code snippet sets up the foundational components of the back-end server for the Career Path application, including database connectivity, middleware configuration, route handling, and server initialization. It forms the backbone of the application's server-side logic, enabling it to handle incoming requests, interact with the database, and provide responses to client-side interactions.

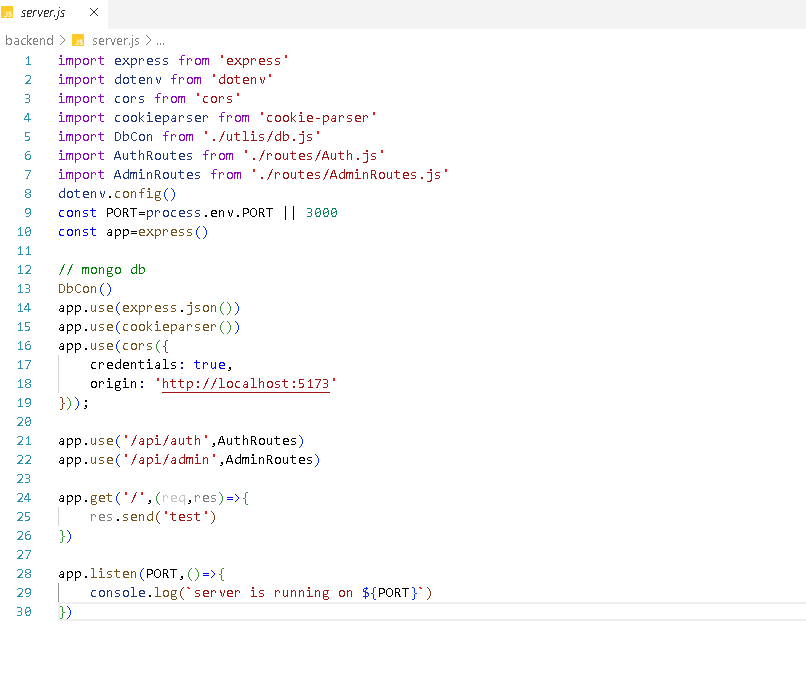


Fig 5.19 Database Connectivity

**5.5.4 App.js -**

This code snippet represents the main entry point of the Career Path application, built using React framework. Let's explore its functionality and structure descriptively: The `App` component serves as the root component of the application, encapsulating the entire application logic and rendering hierarchy.

Within the `App` component, various React elements are imported, including components for different pages (`Home`, `Login`, `Register`, `Admin`, `FirstPage`, `ResultPage`, `DataForm`, `Alldata`) and layout components (`AdminLayouts`, `UserLayout`, `PublicLayouts`).

The `useSelector` hook is utilized to access the Redux store state, specifically retrieving the `user` object from the `Auth` slice. This `user` object contains information about the currently authenticated user, if any.

The `useEffect` hook is employed to dispatch the `updateUser` action from the Redux store upon component mount. This action is responsible for updating the user information stored in the Redux store, ensuring that the application has access to the latest user data.

The component from `react-router-dom` is used to enable client-side routing within the application. This component establishes a browser router context, enabling navigation between different pages and components based on the URL path.

The `<Routes>` component defines the routing configuration for the application, specifying the mapping between URL paths and corresponding components to render. Routes are nested within the `<Routes>` component, allowing for hierarchical routing structures.

Different routes are defined using the `<Route>` component, each specifying a unique path and the corresponding component to render when the path matches the current URL. Routes can be nested within each other to create nested routing structures.

Conditional rendering is employed based on the authentication status of the user. Depending on whether the user is authenticated or not, different layout components (`UserLayout`, `AdminLayouts`, `PublicLayouts`) are rendered to provide appropriate UI layouts and functionalities.

The `<Toaster>` component from `react-hot-toast` is included to provide toast notifications within the application. Toast notifications are used to display brief messages or alerts to the user, enhancing the user experience by providing feedback on various actions or events.

In summary, this code snippet sets up the routing and rendering logic for the Career Path application, enabling navigation between different pages/components and facilitating conditional rendering based on user authentication status. It establishes the foundation for building a dynamic and interactive user interface for the application.



Fig 5.21.1 App.js



Fig 5.21.2 App.js

**CHAPTER 6**

**CONCLUSION**

In conclusion, the "Career Path: Personalized Student Career Path Guidance System" project aims to revolutionize the way students make educational and career choices. The project has undergone a thorough analysis, feasibility study, and requirement analysis to ensure its technical, economic, operational, and behavioral viability. The design of the system encompasses various elements, including data flow diagrams, flow diagrams, entity-relationship diagrams, and activity diagrams.

The user interface has been meticulously designed to be intuitive, interactive, and visually appealing, offering a positive experience for users. The back-end development involves MERN Stack ensuring a seamless and functional experience for users.

The project's objective is to provide personalized career paths, accurate college recommendations, optimal course selection, enhanced academic preparedness, and improved decision-making for students. The anticipated outcomes include empowering students to take ownership of their education and career choices, leading to lifelong success and fulfilment.

Throughout the project, gratitude is extended to the project supervisor, Dr. Ankit Verma, and Dr. Arun Kumar Tripathi, Professor and Head of the Department of Computer Applications, for their guidance and support. Acknowledgments are also extended to friends, family, and others who have provided moral support and assistance.

As the project moves forward, the commitment to continuous improvement remains strong, with a focus on refining recommendations based on user feedback, staying updated on educational trends, and adapting to advancements in technology. The "Career Path" project stands as a beacon of hope and guidance for students embarking on their educational and career journeys, exemplifying the intersection of technology, data-driven decision-making, and education.

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