Kathmandu University

Department of Computer Science and Engineering

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A Project Proposal
on
"Student Resource Hub"

[Code No: ENGG 102]

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Abstract For Student Resource Hub

Students frequently encounter challenges in accessing educational resources efficiently, which can impede their academic progress. This project aims to develop a centralized Student Resource Hub through a C++ based application to streamline access to various study materials, tutorials, and academic support. By employing C++ for robust backend development and creating an intuitive user interface, the app will integrate diverse resources seamlessly. The anticipated outcome is to offer students easy access to educational materials, thereby enhancing their learning experience and academic performance. By addressing the issue of scattered resources, the Student Resource Hub will provide a cohesive solution that benefits students. Future projects should focus on continuous updates and integrating advanced tools to ensure the hub remains relevant and efficient.

To achieve this, we will first conduct a thorough needs analysis to identify the most essential resources for students. Following this, we'll design the app architecture, focusing on efficiency and scalability. Development will be iterative, with regular testing phases to ensure functionality and user friendliness. Finally, we'll implement a feedback loop with users to continuously refine and improve the app post-launch.

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Acronyms/ Abbreviation

MySQL	My Structured Query Language
API	Application Programming Interface.
macOS	Macintosh Operating System
DMA	Dynamic Memory Allocation
MS Word	Microsoft Word
RAM	Random Access Memory
GB	Gigabyte
AI	Artificial Intelligence
GUI	Graphical User Interface
UI	User Interface

Introduction

Background

In today's digital age, access to educational resources is pivotal for academic success. However, students often face challenges in locating and utilizing these resources efficiently. Traditional methods of resource distribution libraries, printed materials, and fragmented online platforms pose significant limitations. This is exacerbated by the diverse needs of students, who require a variety of learning aids, from textbooks and research papers to tutorial videos and interactive content.

The rapid advancement of technology presents an opportunity to overcome these hurdles by centralizing educational resources into a cohesive digital hub. Such a platform can offer a more streamlined and accessible approach to learning. A centralized Student Resource Hub can bridge the gap between students and the educational materials they need, making the learning process more efficient and engaging.

Creating this hub using a C++ based application adds robustness and efficiency, ensuring that the platform can handle multiple users and large volumes of data without com promising performance. Furthermore, developing a friendly interface ensures that students from all backgrounds can navigate the platform with ease, maximizing its utility.

This project involves not only the technical aspects of app development but also an understanding of the educational landscape and the specific needs of students. A through needs analysis will be conducted to identify the most essential resources to be included in the hub. The anticipated outcome is a comprehensive Student Resource Hub that addresses the issue of scattered educational resources, providing a centralized solution that enhances the learning experience.

Objectives

The basic principle of this student Resource Hub project revolves around creating an app for centralizing educational resources into a cohesive digital hub.

The Major objectives of our project are listed below:

1. **Centralize Educational Resources:** Develop a unified platform that consolidates various educational materials, such as textbooks, research papers, and tutorial videos, to provide students with a one stop resource hub, eliminating the need to search across multiple platforms.
2. **Enhance Learning Experience:** Create a user-friendly interface with intuitive navigation to ensure that students can easily access and utilize the resources they need. This will help improve their learning experience and make the process more enjoyable and efficient.
3. **Ensure Robust Performance:** Utilize C++ for the backend development of the application to ensure robustness, speed, and reliability. The aim is to handle multiple users and large volumes of data without compromising on performance.
4. **Conduct Needs Analysis:** Perform a thorough needs analysis by surveying and interviewing students and educators. This will help in identifying the essential resources and tools that should be included in the hub, making it tailored to the actual needs of its users.
5. **Continuous Improvement and Updates:** Implement a feedback loop with users to continuously refine and improve the app. Regular updates will be made to incorporate advanced tools and features, ensuring the hub remains relevant and effective in meeting the evolving needs of students.

Motivation and Significance

Access to quality educational resources is a fundamental component of academic success. However, students often find themselves grappling with fragmented and disperse d resources, which can significantly hinder their learning experience. The motivation behind developing a “Student Resource Hub” stems from the need to address these issues by creating a centralized platform that streamlines access to educational resources, enhancing the overall learning experience for students.

I chose this particular topic because of the evident gap in how educational resources are distributed and accessed. Traditional methods. online platforms pose significant limitations. The project aims to bridge this gap by providing a unified digital hub, making it easier for students to find and utilize the resources they need.

The work addresses the drawbacks of existing systems by eliminating the inefficiency and time wastage associated with searching for resources across multiple platforms. Existing systems often lack integration, leading to scattered and hard-to find materials. this project stands out from existing works by leveraging C++ for backend development, ensuring robustness, speed, and reliability. Additionally, the project emphasizes user centered design, incorporating feedback from students and educators to tailor the hub to their specific needs.

In conclusion, the development of this project represents a significant step forward in addressing the challenges associated with accessing educational resources. By centralizing a wide range of materials into a single, user-friendly platform, project aims to enhance the learning experience and support academic. The use of C++ for backend development ensures robustness and efficiency, while a user centered design approach guarantees that the platform will be tailored to the specific needs of its users. Ultimately, It potential to make a substantial and lasting impact. landscape by providing students with the tools they need to excel academically.

Expected Outcomes

The development of the Student Resource Hub is anticipated to yield several significant outcomes, benefitting students and educators alike. One of the primary outcomes is the creation of a centralized platform that consolidates various educational resources, such as textbooks, research papers, tutorial videos, and interactive content. This centralized approach will save students valuable time that would otherwise be spent searching for materials across multiple sources, allowing them to focus more on their studies and less on the logistics of finding the necessary resources. By providing easy access to a wide range of study materials, the hub is expected to enhance the overall learning experience for students. The user-friendly interface, designed with an intuitive navigation system, will ensure that students can easily locate and utilize the resources they need. This improvement in accessibility and usability will make the learning process more enjoyable and efficient, catering to different learning styles and preferences.

The project’s focus on conducting a thorough needs analysis and incorporating feedback from students and educators will result in a platform that is tailored to the actual ne eds of its users. This targeted approach will maximize the utility and impact of the hub, ensuring that it provides the most relevant and beneficial resources to support students' academic success. The continuous feedback loops and regular updates will further enhance the platform's effectiveness, keeping it up-to date with the evolving needs of students.

In summary, the Student Resource Hub is expected to create a cohesive and efficient solution for accessing educational resources. Its development will address the current challenges of fragmented and dispersed resources, providing a robust and user 5 friendly platform that enhances the learning experience. The anticipated improvement s in accessibility, usability, and academic performance the significance and impact of this project on the educational landscape

Related Works/Existing Works

Here's a list of apps that Student Resource Hub functions, which might be relevant for comparison to our project:

1. **Quizlet:**

   Quizlet is a go to app for making study sessions interactive and effective. It allows users to create custom flashcards for any subject, which can then be used for self-testing through quizzes and games. The app also provides access to millions of pre made flashcards, making it easy to find study sets on virtually any topic. Quizlet's interactive learning tools, such as the "Learn" mode and "Match" game, turn studying into an engaging and productive activity. By integrating features similar to Quizlet into the Student Resource Hub, the platform can not only organize study materials but also make learning interactive and fun. This ensures that students have all the tools they need to reinforce their knowledge and prepare for exams in one place.

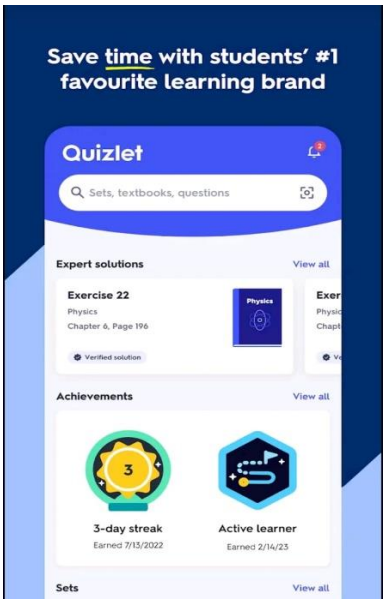

Figure 1: Quizlet app

2. **Evernote:**

Evernote is a go to tool for keeping everything organized and accessible. It allows users to create notebooks for each subject, clip web articles, attach files, and even record audio notes, all in one place. This makes it incredibly easy to compile and organize notes, research, and study materials across multiple devices. Whether there is a need to jot down quick ideas, draft detailed notes, or store multimedia content, Evernote has got users covered. By incorporating features similar to Evernote into the Student Resource Hub, it can ensure that all study mate rials are well organized and easily accessible, enhancing the overall learning experience for students.

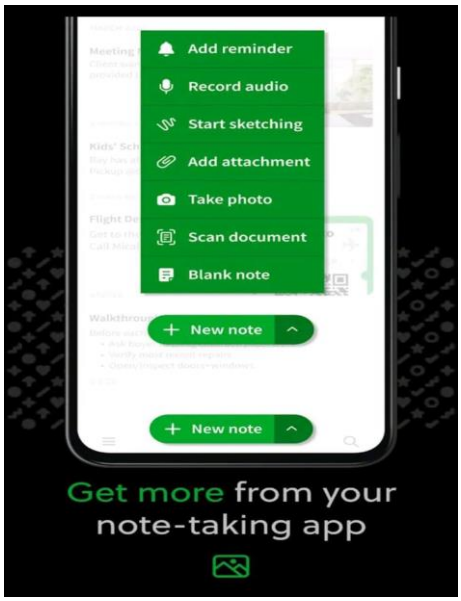

Figure 2: Evernote app

3. **MyStudyLife:**

MyStudyLife is a lifesaver for organizing classes, assignments, and schedule s. It's incredibly handy, offering a digital planner that helps users keep track of everything in one place. Similarly, Overdrive and Libby revolutionize ho w users access digital books and audiobooks from local libraries. Both apps are user friendly and provide a treasure trove of educational materials accessible anytime, anywhere. By integrating these kinds of planning and resource features into the Student Resource Hub, a centralized platform can be created that not only consolidates all necessary study materials but also supports time management. This integrated approach makes the hub indispensable for any student.

Figure 3: MyStudyLife app

Procedure and Methods

Planning Phase:

After analysis of our recourses, we drafted a detailed plan and implementation strategy to tackle the problem effectively. Our approach considered various factors such as resource allocation, timeline considerations, ensuring alignment with our objectives.

Planning and Work Division:

Keeping the resources and the project idea in consideration, the time and workload will be evenly distributed among team members to ensure efficient execution. Our aim is to optimize productivity and collaboration, allowing each member to contribute effectively to the project's success.

Research and Learning:

We will engage in a comprehensive learning process to understand the field, technologies, and criteria crucial for this app, ensuring that we are well-prepared to identify and acquire the resources needed for its development. In doing so, we aim to be fully prepared to tackle any challenges or problems that may arise, ensuring the smooth progression of the program's development.

Development:

We'll design the user interface focusing on user-friendliness and visual appeal using Qt. We'll develop the backend logic, databases, and components that fuel the application using C++.

Documentation:

We'll document the project's design, functionality, and implementation details for future reference and maintenance.

Block Diagram

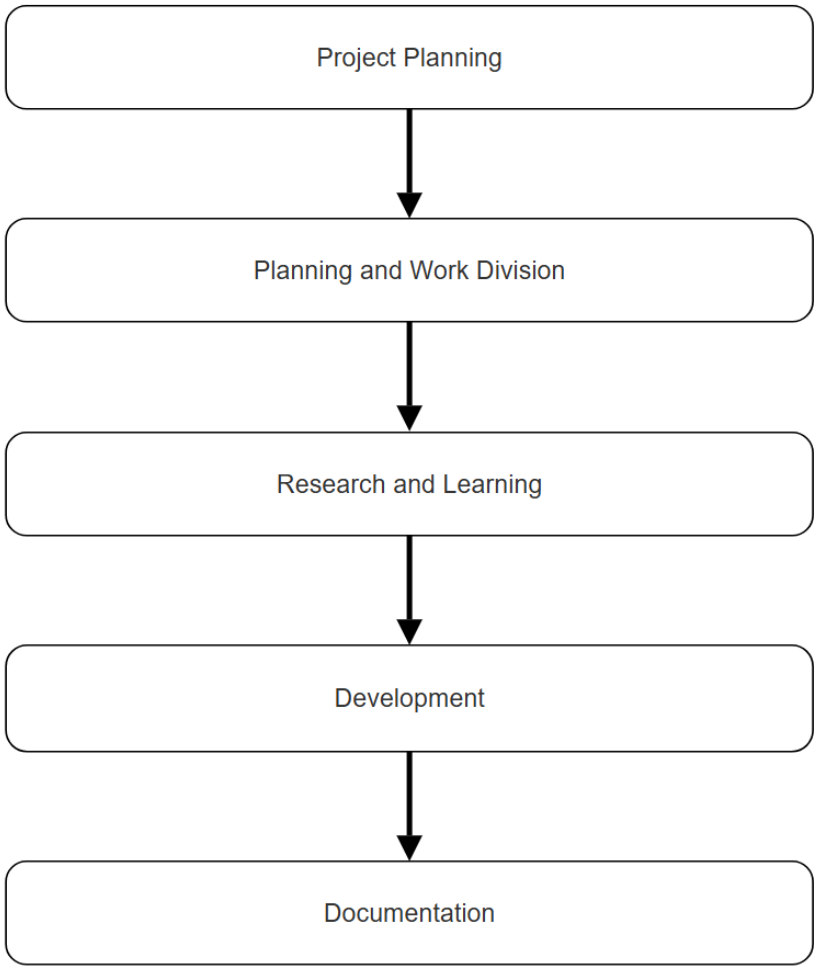

Figure 4: Block Diagram for app development

System Requirement Specifications

Hardware Specifications

Minimum: 2 GigaBytes of RAM with Intel or AMD based CPU.

Software Specifications

Any computer with Windows 10 or later is sufficient to run this software.

Front-end Technologies

The front end of the ‘Student Resource Hub’ will be developed using the Qt framework.

Qt 6.5.2

Free and open-source cross-platform software for creating graphical user interfaces as well as multi-platform applications that run on various software and hardware platforms such as Linux, Windows, macOS, QNX, Android, or embedded systems. It supports the Write Once, Compile Anywhere (WOCA) principle.

Back-end Technologies

The back-end of the ‘Student Resource Hub’ will be developed using exclusively C++ and its Object-Oriented Programming concepts.

C++ Programing Language

C++ is a cross-platform language developed by Bjarne Stroustrup, as an extension to the C language that can be used to create high-performance applications. It is an object-oriented programming language that supports features such as classes, objects, encapsulation, abstraction, inheritance, and polymorphism. It allows developers to organize code into reusable objects and create complex software.

Project Planning and Scheduling

A good amount of dedication, teamwork, and consistency is required for the completion of this project. To achieve this goal we have decided to divide the project into different components so that we can provide adequate time on each component. The rough estimate of time allocation of different tasks is shown below in the Gantt chart.

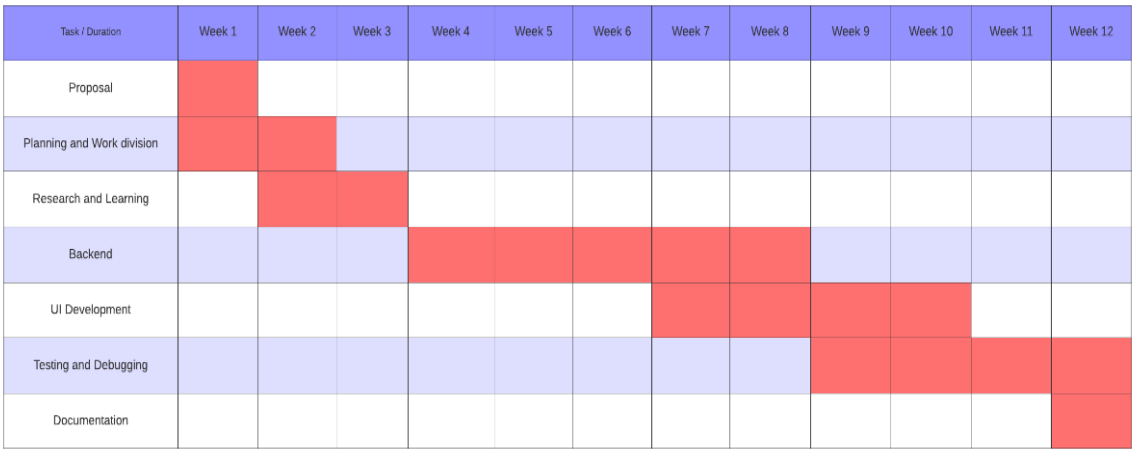

Figure 5: Gantt Chart

Tasks

1. Proposal
2. Planning and Work division
3. Research and Learning
4. Backend
5. UI Development
6. Testing and Debugging
7. Documentation

APPENDIX

We conducted a comprehensive needs analysis to understand the types of educational resources most frequently used by students and the challenges they face in accessing these resources. The technical backbone of the Student Resource Hub relies on robust tools and programming languages. For backend development, we are utilizing C++ du e to its speed and reliability. The frontend will be developed using the Qt framework, which allows for the creation of a cross platform graphical user interface. We will integrate a database, such as SQLite for loc al storage needs, or MySQL for more complex and scalable requirements. Furthermore, we plan to integrate various APIs, including Google Books API for accessing textbooks and YouTube API for tutorial videos, to enhance the resource pool available to students. Continuous improvement is a key aspect of our project. We will implement a feedback loop where users can submit their suggestions and report issues through in app feedback forms and regular surveys. Additionally, we will establish user forums f or discussions and suggestions. The goal is to continuously refine and update the app based on user feedback, ensuring that the Student Resource Hub remains relevant and effective in meeting the evolving needs of students.

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