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Development of Edo State University Iyamho Coder's Hub

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Abstract
The advancement of technology in the 21st century has significantly transformed the educational landscape, particularly in the field of computer science and software development. As the demand for digital solutions continues to grow, universities have become breeding grounds for young and talented developers. However, a major gap still exists in providing platforms that support the learning, interaction, and exposure of student programmers within a focused academic environment. In many Nigerian universities, including Edo University Iyamho, student developers often lack a centralized system through which they can showcase their coding projects, explore the work of their peers, and stay informed about tech-related updates or announcements within the school community. This project, titled ESUI Coder's Hub, addresses this need by designing and implementing a web-based platform tailored specifically for students of Edo University. The system allows users to create accounts, build developer profiles, upload their personal projects, and view the projects of other registered users. The implementation of ESUI Coder's Hub demonstrates how modern web technologies can be used to solve real-life academic and community-based challenge.

Keywords: Coder's Hub, build developer, real-time communication

Introduction

Coder's often struggle to find a platform tailored to their specific needs, one that combines learning, collaboration, and a space to showcase their individual coding projects. Recognizing the rapid advancement of technology and its integration into nearly all aspects of daily life have brought about an increased demand for skilled software developers and programmers. The hub will integrate key features like an e-portfolio for students to build and track their progress in their various disciplines a section dedicated to showcasing their various projects, and an official space managed by admins for sharing tutorials, announcements or tech-related events. An important driving factor behind this project is the global emphasis on soft skills such as communication and collaboration in addition to technical expertise. As the coding community continues to grow in ESUI, the ESUI Coder's Hub positions itself as a long-term solution to bridge the gap between aspiring coders and the real-world demands of software development by creating a platform that allows students to display their skills and learn from peers, the initiative supports both individual and collective growth. This project aligns with global trends in tech education that advocate for practical experience and networking as critical factors for success. By providing a dedicated space for learning, project showcasing, and peer interaction, the hub addresses the current challenges in coding education.

Literature Review

Edo University Iyamho is a modern and fast-growing institution of higher learning established in 2016**,** the university is committed to academic excellence, innovation, and the development of future leaders. The Department of Computer Science is one of the key departments under the Faculty of Science. It is focused on producing graduates who are skilled in the use of modern computing tools and technologies. The department offers both theoretical and practical training in areas such as software development, computer programming, database management, web development, and networking. Students in the department are encouraged to participate in hands-on projects and research activities that prepare them for real-world challenges. With access to well-equipped computer labs and experienced lecturers, the department aims to provide quality education that meets global standards.

1. Coder's Community: A WhatsApp Based Coding Platform

In recent years, informal digital communities have played a critical role in fostering student collaboration, especially within technical disciplines such as computer science and software engineering. One such initiative at Edo State University, Iyamho, was the Coder's Community, a WhatsApp-based platform containing seven groups developed and managed by students to support academic interaction. The Coder's Community was originally created to serve as a peer support system for programming-related discussions, code reviews, group project coordination, and announcement dissemination. In the absence of a formal university-hosted digital environment, this WhatsApp group filled a critical void by offering real-time communication, quick problem-solving, and a sense of community among students who shared similar academic interests. However, despite its initial success and relevance, several challenges gradually led to the platform's decline. When the initial group of committed student leaders graduated, the group lost its momentum. New students either failed to join or found little value in a platform that had become largely inactive. While the Coder's Community served as a commendable student-led initiative in its time, its decline reveals deeper systemic issues in how student collaboration is facilitated within the university. The lessons learned from its shortcomings provide a valuable blueprint for the development of more robust, interactive, and inclusive platforms like ESUI Coder's Hub.

Fig 1: Screenshot of WhatsApp-based Coders Community

Methodology

The prototyping methodology was chosen for the development of ESUI Coder's Hub because it allows quick creation of a working model of the platform. This method helps to gather feedback early from users, which improves the final system. This approach made the development process more flexible and user-friendly. This prototyping methodology comprises six phases:

1. **Requirement Gathering:** Basic information about what the system should do was collected
2. **Quick Design:** A simple layout or sketch of the platform was created.
3. **Prototype Building:** A basic version of the platform was developed based on the quick design.
4. **User Evaluation:** Users were asked to test the prototype and give their feedback.
5. **Prototype Refining:** Based on user feedback, the prototype was improved.
6. **Final Product Development:** The final version of ESUI Coder's Hub is developed.

1. Programming Languages and Tools Used

The project was developed using a set of modern programming languages and tools that support rapid and scalable web development process. Below are the main technologies used:

1.1 HTML & CSS: These are frontend tools used to create and style the basic structure of the individual web pages.

1.2 JavaScript: This is the core scripting language used for both the frontend and backend logic.

1.3 React.js: A JavaScript library used to build the user interface. It allowed for creating reusable components, which made the entire development process more organized and efficient.

1.4 Express.js: A minimal and flexible Node.js framework that simplified the creation of server-side routes.

1.5 MongoDB: A NoSQL database used to store user profiles, project data, and admin posts.

1.6 Mongoose: An Object Data Modeling (ODM) library for MongoDB and Node.js. It simplified database queries and helped in defining schemas.

1.7 Git & GitHub: Git was used for version control, while GitHub served as a remote repository for code backup and collaboration

2. System Design

The system design and specification describe how the software system will be built and how it will function. It incorporates various UML diagrams to represent different aspects of the system as well as the structure, processes, and interactions within the system.

2.1 Software Architecture

The software architecture serves as a blueprint of the ESUI Coder's Hub and is made up of three main parts:

React. js which is used for the front-end. It handles the user interface by displaying components like buttons, forms, and pages.

Node. js with Express powers the back-end. It provides API endpoints that allow the front-end to send and receive data.

MongoDB which is a NO SQL database. It stores user information, blog posts, announcements, and project details.

Together, these three parts works to make ESUI Coder's Hub a complete full-stack web application.

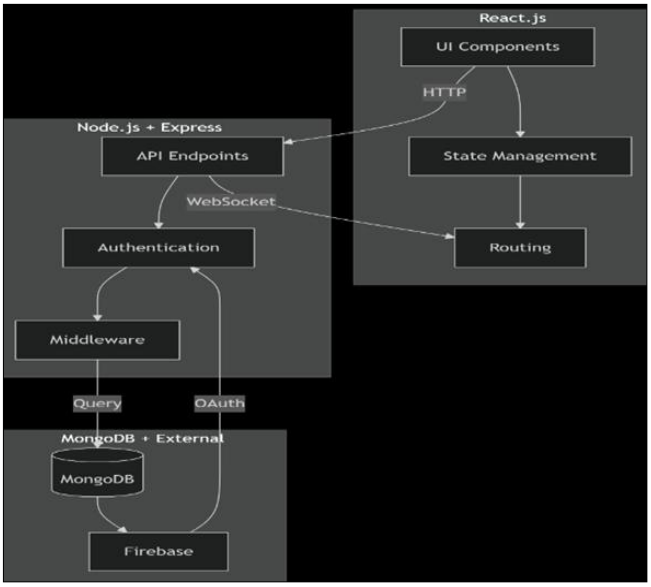

Fig 2: Software Architecture

2.2 Use Case Model

Use cases are valuable techniques in software development for outlining the different ways a user interacts with a system to achieve a specific goal. They provide a clear and concise description of the system's functionality from the user's perspective. Below are the main use cases for this project:

User Registration; Actor: New user

- **Description:** A student signs up with their details and school email to create an account.

Content Management; Actor: Admin

- **Description:** The admin is in charge or managing all the content displayed on the platform by making blog posts, announcements or uploading learning materials.

Profile Management; Actor: Logged-in user

- **Description:** The student edits their user profiles and uploads their individual personal projects.

View Project; Actor: Logged-in user

- **Description:** User visits another profile and views uploaded projects.

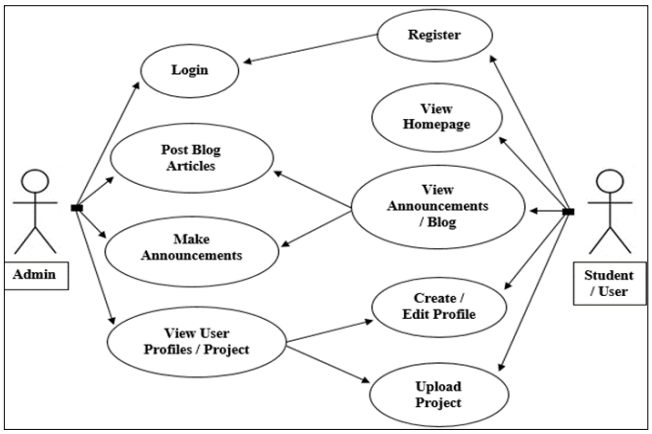

Fig 3: General Use Case Diagram

Results and Discussion

This section provides a detailed explanation of how the ESUI Coder's Hub was brought about. The implementation phase is a crucial step in any software project, as it transforms theoretical designs and plans into a product. For this project, the development began with creating a blueprint or mock-up of how the actual site will look like, fragmenting each part of the system and setting up the development environment and tools. The system was built using the MERN stack technology (MongoDB, Express.js, React.js and Node.js), chosen for its efficiency and scalability.

1. Implementation Procedures

The system was implemented in well-structured phases to ensure stability and maintainability. Below are the key steps followed:

1.1 Setting up the Development Environment: This included installing Node.js, MongoDB, Visual Studio Code, and other required dependencies.

1.2 Frontend Development: The user interface was built using React.js. Pages like the home page, login/signup modal, dashboard, blog, and announcements were designed with attention to usability and responsiveness.

1.3 Backend Development: Using Node.js and Express.js, RESTful APIs were created to handle user requests such as authentication, project uploads and admin actions.

1.4 Database Setup: MongoDB Atlas was connected to the backend via Mongoose. Collections were created for users, projects, blogs, and announcements.

1.5 Role Management: Admin privileges were restricted to specific users who could post blogs and announcements.

1.6 Integration: The frontend and backend were connected through APIs. Functionality such as form submission, data fetching, and rendering was integrated into the frontend.

1.7 Testing: Each module was tested individually and then collectively to ensure seamless integration.

This structured implementation approach ensured that each part of the project functioned as expected and met user requirements.

2. System Modules Description

The ESUI Coder's Hub was designed with several modules, each serving a specific purpose:

2.1 Welcome Module: The Welcome Page serves as the landing screen of the ESUI Coder's Hub application. It provides a warm and minimal interface that introduces users to the platform as well as a get started button forwarding the users to the authentication page.

2.2 Authentication Module: Upon clicking the get started button, it takes you to the authentication or registration page where the user can create an account, as well as a link that directs the user to the login page if he/she already has an account registered.

Fig 4: Welcome Module

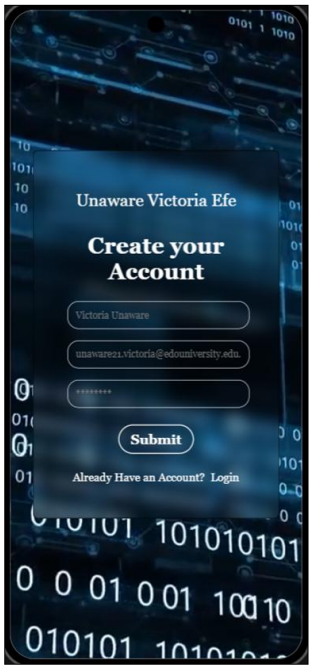

Fig 5: Sign up Module

2.3 User Dashboard Module: The user dashboard is the main interface users see after successfully signing in or logging in to the ESUI Coder's Hub. It acts as a

personalized space where users can manage their activities, view content, and interact with key features of the platform. The platform consists of 4 main pages (Home page, Category page, Contact page and Profile Page).

Fig 6: Home Page

Fig 7: Category Page

2.4 Profile Module: The User Profile Module allows registered users to personalize and manage their profiles within the ESUI Coder's Hub platform. It provides interactive tools for users to update their respective profile information, change their profile picture, showcase their level of technical skills and upload details of projects they have worked on.

Fig 8: Profile Page before Editing

Fig 9: Profile Page before Editing 2

Fig 10: Profile Page after Editing

Fig 11: Profile Page after Editing 2

2.5 Testing Strategies

Testing was a critical part of the development process to ensure that the system performed correctly and efficiently.

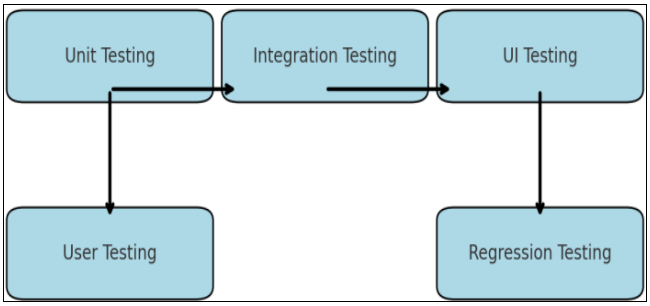

Fig 12: Testing Workflow Diagram

This diagram visually represents the different types of testing used during the development of your system and how they relate to each other. It includes:

Unit Testing: The foundation, testing individual functions or components (e.g., login logic).

Integration Testing: Follows unit testing, checking how modules interact (e.g., login leading to dashboard).

UI Testing: Ensures the user interface is responsive and behaves correctly across devices.

User Testing: Performed by actual users to find issues from a non-developer perspective.

Regression Testing: Done after changes or bug fixes to ensure new updates don't break existing features.

Arrows show progression and dependencies; for example, unit testing feeds into both integration and user testing.

Summary, Conclusion and Recommendations

The ESUI Coder's Hub is a web-based coding platform developed using the MERN (MongoDB, Express.js, React.js, and Node.js) stack. The primary aim of the platform is to create a collaborative environment where coders, particularly students from Edo University Iyamho, can share their personal projects, view others' portfolios,

and stay updated with announcements from the school's tech community. The development process involved front-end implementation using React.js and CSS for styling, back-end logic using Node.js and Express, and data storage handled by MongoDB. The platform emphasizes simplicity, ease of navigation, and user engagement through its intuitive interface and functionality.

Conclusion

The ESUI Coder's Hub successfully demonstrates how a student-oriented coding platform can bridge the gap between individual skill-building and community engagement. By focusing on profile visibility, project sharing, and admin-curated updates, the platform encourages a culture of learning, mentorship, and collaboration. The use of modern full-stack technologies ensures a scalable, responsive, and efficient web application. Overall, the project met its objectives and lays a strong foundation for future development and adoption within the university community.

Recommendation

Based on the success and potential of the ESUI Coder's Hub, it is recommended that:

1. The university's ICT department consider hosting the platform officially and integrating it into student tech programs.
2. Future project teams continue developing the app by incorporating AI-based skill suggestions or peer matching based on projects and profiles.
3. A maintenance team be assigned to regularly update the app, fix bugs, and monitor user activities to ensure quality engagement.
4. Workshops or coding competitions be organized using the platform to promote practical use and visibility of students' talents.

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