IS 4110 - Capstone Project Proposal

CONSTRUCTION ENABLEMENT PLATFORM

“BuildMate+”

Group 03

Department of Computing & Information Systems

Faculty of Computing

Sabaragamuwa University of Sri Lanka

Belihuloya

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Approval of Mini Project

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For office use only:

Approved/Not approved :

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Date :

Suggestions if any :

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Thank You,

G.A.P.Pathum

S.A.K.C.Dasanayaka

K.W.V.A.Waidyaratne

S.M.Kankanamge

2. Introduction & Objectives

2.1. Introduction

Buildmate+ is a construction enablement platform designed to help individuals turn their construction ideas into reality. It connects clients with the right tools, professionals, and community to streamline every step of their journey. The platform empowers individuals to finding your dream team of professionals perfectly suited to your project, collaborate seamlessly with real-time communication, progress tracking, and transparent workflows, build with confidence, and transform their ideas into stunning 3D models,

Buildmate+ is more than just a platform; it's a community of passionate builders, designers, and dreamers connected by a shared commitment to excellence.

Below are some of the grant problems we identified that led to the creation of this system.

- Finding the right team: Homeowners often struggle to find the right team of contractors who are qualified, reliable, and trustworthy while also understanding their vision and budget.
- The complexities of project management (permits, contracts, and budget constraints).
- Transparency and trust: Manifested in the absence of clear visibility into project progress, costs, and potential issues, exacerbates the challenges faced by clients in bringing their visions to fruition.

Challenges in sharing the construction idea:

- Visual barriers: Rough sketches or ambiguous explanations can result in misunderstandings among contractors.
- Differing expectations: Homeowners and professionals may possess contrasting perceptions of the intended result, resulting in expensive alterations.
- Limited feedback mechanisms: Challenges arise in obtaining feedback and enhancing the concept during the preparatory stage.

Challenges in Construction professionals and designers:

- Finding steady work, Marketing, and client acquisition: Difficulty finding new clients and growing their business.
- Struggling to manage communication, schedules, and budgets effectively.
- Data and insights: Lack of access to comprehensive data to improve project planning and efficiency.
- Unclear payment terms and delays: Irritation stemming from tardy or irregular payments.
- Lack of upskilling opportunities: Struggles in accessing training resources and remaining current with industry developments.

2.2. Objectives

Buildmate+ is a great tool for anyone looking to turn their construction dreams into reality, whether it's a homeowner, architect, or contractor. The platform empowers individuals, fosters collaboration, and ensures a transparent future. Clients can customize the platform based on their audience and features, including adding a call to action and visuals or videos to make the introduction more engaging.

Primary Objectives:

- Empower individuals: To empower individuals of varying levels of expertise to transform their construction aspirations into tangible outcomes through the provision of essential resources, tools, and networking opportunities.
- Simplify construction: To enhance the construction journey by linking clients with suitable experts, fostering teamwork, and presenting clear communication channels and project management solutions.
- Foster a collaborative community: To establish a supportive ecosystem comprising dedicated builders, designers, and experts, facilitating connections, knowledge exchange, and mutual growth.

Secondary Objectives:

- Improve the efficiency and effectiveness of construction projects: Buildmate+ aims to streamline communication, collaboration, and resource access, potentially resulting in shorter timelines, reduced costs, and enhanced quality outcomes.
- Increase transparency and trust in the construction industry.
- **Buildmate+** promotes trust and professionalism through an honor code agreement, fostering mutual respect, transparency, accountability, and commitment to quality in construction service transactions.
- Promote innovation and sustainability in the construction industry: Buildmate+ connects clients with new technologies and resources, promoting the adoption of sustainable and innovative construction practices.
- Create more job opportunities in the construction sector: By linking qualified professionals with projects and promoting transparency and efficiency, Buildmate+ could stimulate increased demand for labor in the construction sector.

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3. Analysis

3.1. Feasibility Study

3.1.1. The Technical Feasibility

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The technical feasibility of implementing Buildmate+ using React for the front end, MongoDB for the database, and Node.js for the backend is quite promising. Several key points underscore this feasibility:

- **Compatibility :** React, MongoDB, and Node.js harmonize well together due to their common use of JavaScript. This alignment facilitates seamless integration and development processes.
- **Scalability :** Node.js boasts scalability features that accommodate increasing client bases and data loads. MongoDB's scalability, including features like sharding, further supports the platform's expansion.
- **Real-time Updates :** Node.js's event-driven architecture enables real-time updates and communication, pivotal for features like messaging and collaborative tools.
- **Data Handling :** MongoDB's adaptable schema and scalability suit various data types related to clients, projects, messages, and more.
- **Performance :** React's virtual DOM and efficient rendering enhance front-end performance, while Node.js's non-blocking I/O operations and event-driven architecture bolster overall platform efficiency.
- **Development Efficiency :** React's component-based architecture, paired with Node.js's extensive package ecosystem, streamlines development processes and boosts developer productivity.
- **Security** : While Node.js and MongoDB offer inherent security features, reinforcing measures like input validation, authentication, and authorization is imperative to safeguard client data and avert vulnerabilities.

In conclusion, the technical feasibility of Buildmate+ utilizing React, MongoDB, and Node.js presents a robust foundation for constructing a scalable, efficient, and feature-rich construction platform.

3.1.2. Operational Feasibility

The operational feasibility of Buildmate+ focuses on evaluating whether the proposed platform can be effectively integrated into the existing operations and workflows of clients, as well as assessing its ability to meet their needs and expectations. Here are some key aspects of operational feasibility for Buildmate+:

- **Client Acceptance:** Assessing whether Clients, including homeowners, architects, designers, contractors, and construction professionals, will embrace and adopt the platform. This involves understanding their preferences, pain points, and requirements through client research, surveys, and feedback.
- **Ease of Use:** Ensuring that Buildmate+ is intuitive and client-friendly, with clear navigation, simple workflows, and minimal learning curve.

- **Workflow Integration:** Ensuring that Buildmate+ seamlessly integrates into clients' existing workflows and processes, rather than disrupting or adding unnecessary complexity. This involves identifying pain points and inefficiencies in current workflows and designing the platform to address them effectively.
- **Customization:** Providing flexibility for clients to customize their experience and adapt Buildmate+ to their specific needs and preferences.
- **Scalability and Reliability:** Ensuring that Buildmate+ can scale to support a growing client base and handle increasing workload demands without compromising performance or reliability.

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3.1.3. Financial Feasibility

The financial feasibility of Buildmate+ appears promising, particularly due to its revenue model, which revolves around charging a 15% commission on every project, supplemented by additional income sources from advertising and package offerings. 15 shapeda

Here's how the financial feasibility breaks down:

- **Commission from Projects:** By charging a 15% commission on each project, Buildmate+ establishes a consistent revenue stream directly linked to platform usage.
- **Advertising Revenue:** Buildmate+ can generate additional income by capitalizing on advertising opportunities, such as credit card bonuses, thereby monetizing its client base and platform traffic effectively.

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- **Package Offerings:** Offering various packages with additional features or enhanced services, such as project status reviews, allows for upselling and diversification of revenue streams.
- **Financial Projection and Sustainability:** Conducting financial projections based on factors like client growth, project volume, average transaction size, and advertising revenue potential can offer insights into Buildmate+'s long-term sustainability and profitability.

4. Hardware and Software Requirements

Software Requirements:

- Frontend: React
- Backend: Node.js Express js enna ona
- Database: MongoDB
- Web server: Apache 3D model eka hadana eka, prompter eka

Development Tools:

- Code Editor: Visual Studio Code, Sublime Text, Atom
- Version Control: Git
- Database GUI: MongoDB Compass or Robo 3T for managing MongoDB databases
- API Testing: Postman for testing APIs

Hardware Requirements:

Minimum:

- CPU: Dual-core processor
- RAM: 4GB
- Storage: 50GB SSD web ekakata mechchara ai

Recommended for production:

- CPU: Quad-core processor or higher
- RAM: 8GB or higher
- Storage: 100GB SSD or higher
- Network: Stable internet connection for development and hosting
- Backup: Regular backups of the database and application files

7.Proposed System

7.1 Functional Requirements

- User Registration and Authentication:

  Users must register securely and authenticate their identities.
- Project Creation and Management:

  Clients should create and oversee construction projects, specifying details, timelines, and budgets.
- Team Selection:

  Clients select professionals from the platform for their projects.
- Real-time Communication:

  Users communicate in real-time for project coordination and updates.
- Feedback and Review:

  Clients provide feedback on team members and professionals review clients.
- Material Supplier Selection:

  Clients choose material suppliers from the platform.
- Progress Tracking and Reporting:

  Users monitor project progress and generate analysis reports.
- Budget Management:

  Effective management of client budgets considering team and material selection.
- Community and Support:

  A platform for users to interact, share knowledge, and seek support.
- System Administration:

  Admins manage user profiles, monitor system progress, update the system, and generate reports.
- Integration and Scalability:

  The platform should integrate with other systems and scale according to user needs.
- 3D Modeling and Visualization:

  Users create and share 3D models for better project visualization.

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7.2 Non-functional Requirements

Non-functional requirements outline the quality attributes of a system, such as performance, security, usability, and reliability. Below are some non-functional requirements for Buildmate+:

- Performance:

  The system must respond to user interactions (e.g., page loads, search queries) within an acceptable timeframe, even during peak usage periods.
- Scalability:

  The platform should be capable of accommodating a growing user base, expanding project count, and increasing data volume without sacrificing performance.
- Reliability:

  Buildmate+ should operate reliably, experiencing minimal downtime and data loss, ensuring users can access the platform whenever necessary.
- Security:

  Robust security measures, including encryption, secure authentication, and access control, must safeguard user data on Buildmate+.
- Usability:

  The platform's interfaces should be intuitive and navigation clear to enable users to easily complete tasks and locate information.
- Compatibility:

  Buildmate+ must function seamlessly across various devices and browsers, ensuring accessibility from different environments.
- Maintainability:

  The system should feature clear documentation and a modular design to facilitate easy maintenance and future enhancements.
- Data Backup and Recovery:

  Regular data backups and robust recovery mechanisms are necessary to prevent loss or corruption of user data on Buildmate+. time eka flexibility

These non-functional requirements are essential for ensuring that Buildmate+ effectively meets user needs in terms of performance, security, usability, and reliability.

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7.3 Methodology

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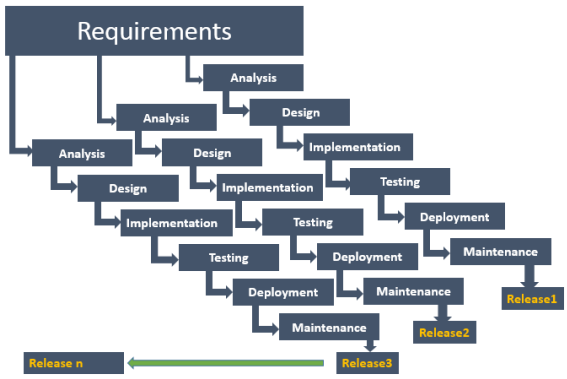
The most suitable methodology for Buildmate+ would be the incremental model. This model is well-suited for projects that require frequent updates and improvements based on user feedback and changing requirements, which aligns with the goals of Buildmate+ to continuously improve its platform.



Buildmate+ has chosen the incremental model as its methodology for several reasons:

- Flexibility:

  The incremental model allows for flexibility in development, as new features and functionalities can be added incrementally based on user feedback and changing requirements. This flexibility is crucial for Buildmate+ as it evolves and grows to meet the needs of its users.

- User-Centric Approach:

  By incorporating user feedback into each incremental release, Buildmate+ can ensure that the platform is continuously improving and meeting the needs of its users. This iterative approach helps to create a platform that is more user-friendly and effective.

- Risk Management:

  The incremental model helps to mitigate risks by breaking the development process into smaller, more manageable increments. This allows Buildmate+ to identify and address issues early in the development process, reducing the risk of major problems later.

- Quick Feedback Loop:

  The incremental model allows Buildmate+ to quickly gather feedback from users on new features and functionalities. This feedback can then be used to make improvements in future increments, ensuring that the platform is always improving and meeting user needs.

Tasks	Time Duration (In weeks)														
Project Planning															
Learning Techniques															
Requirement gathering															
Gathering data sets															
Training data sets															
Building OCR API															
Front-End Development															
Testing and debugging															
Maintenance & Deployment															

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