

A FIELD PROJECT REPORT
on
“PERSONAL BUDGET PLANNING”

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CERTIFICATE

This is to certify that the Field Project entitled “**Personal budget planning: A customized financial tool**” that is being submitted by **221FA04015 (K.Komali), 221FA04147 (G.Tanvitha), 221FA04187 (T.Likhita), 221FA04191 (R.Eswar)** for partial fulfilment of Field Project is a bonafide work carried out under the supervision of **Dr.T.R.Rajesh, Department of CSE**.

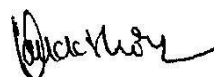


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DECLARATION

We hereby declare that the Field Project entitled “**Personal budget planning: A customized financial tool**” is being submitted by **221FA04015 (K.Komali), 221FA04147 (G.Tanvitha), 221FA04187 (T.Likhita), 221FA04191 (R.Eswar)** in partial fulfilment of Field Project course work. This is our original work, and this project has not formed the basis for the award of any degree. We have worked under the supervision of **Dr.T.R.Rajesh, Department of CSE.**

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ABSTRACT

A personal budget planning system is an essential tool for people who want to attain financial stability and manage their money well. This system assists users in creating and tracking customized budget plans based on their income, spending habits, and savings objectives. It offers features like real-time spending tracking, easily customizable budget categories are like in this form (housing, food, utilities, etc.), and graphical visualizations (pie charts, graphs) for improved clarity. Additionally, the system provides flexibility by enabling users to dynamically modify budget allocations and get rewards for adherence or notifications for violating restrictions. Through the development of goal-oriented savings and improved financial discipline, the personal budget planner facilitates better decision-making and streamlines financial management effectively.

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CHAPTER INTRODUCTION

1.INTRODUCTION

Personal budget planning is a vital tool for effective financial management, enabling individuals to organize and allocate their income toward various expenses such as housing, food, utilities, and savings. By creating a structured budget, people can avoid overspending, reduce debt, and work towards their financial goals.

1.1 Purpose of Personal Budget Planning

Personal budget planning is the process of managing your finances by creating a plan to track your income, expenses, and savings. It helps individuals and families ensure they are living within their means while working toward financial goals. The main purpose of budget planning is to provide a clear picture of where money is going and to help prioritize spending, making it easier to avoid debt, save for future needs, and achieve financial stability. Effective budgeting leads to better decision-making, providing peace of mind, and financial control.

1.2 Benefits of Budgeting

Budgeting offers several key benefits, including:

Financial Control: Budgeting allows individuals to effectively control their spending by strategically allocating funds to specific needs, ensuring that they don't overspend. It also promotes financial awareness, helps prioritize expenses, and encourages savings for future goals. Additionally, a well-structured budget can provide peace of mind, reduce financial stress, and enable individuals to make informed decisions about investments and larger purchases.

Debt Prevention: By diligently tracking expenses, individuals can avoid unnecessary borrowing and significantly reduce the risk of falling into debt while achieving financial stability. This practice also helps identify spending patterns, enabling smarter financial decisions. Furthermore it fosters a greater awareness of where money is going, allowing for adjustments that can lead to increased savings and investments. Ultimately, effective expense tracking contributes to long-term financial health and the ability to pursue personal goals.

Savings Growth: Budgeting helps set aside money for savings goals, whether it's an emergency fund, a big purchase, or long-term investments like retirement. It encourages individuals to prioritize their financial objectives, ensuring that they allocate resources effectively to meet both short-term and long-term needs

Goal Achievement: With a clear budget, people can set and work toward financial milestones, such as paying off debt, buying a home, or saving for a vacation. A well-defined budget provides a roadmap for tracking progress and staying motivated, allowing individuals to celebrate small victories along the way. Additionally, it helps identify potential obstacles and make necessary adjustments, ensuring that goals remain attainable. By consistently reviewing and refining their budget, individuals can cultivate good financial habits, enhance their overall financial literacy, and gain greater confidence in their ability to achieve their aspirations.

Stress Reduction: When finances are under control, individuals experience less stress related to money and can plan for the future with greater confidence. This sense of stability allows for more thoughtful decision-making, enabling people to focus on long-term goals rather than immediate worries. With reduced financial anxiety, individuals can invest in personal growth, pursue new opportunities, and even enjoy leisure activities without guilt. Moreover, a solid financial foundation fosters healthier relationships, as open discussions about money become easier, leading to better collaboration in shared financial goals. Overall, effective financial management enhances quality of life and promotes a more fulfilling, secure future.

1.3 Overview of Budgeting Process

The budgeting process typically involves several steps:

Assess Income: Start by calculating total monthly income, including salary, side earnings, and any passive income streams. This assessment provides a clear picture of available funds and helps in determining how much can be allocated toward expenses and savings. It's important to consider all sources of income, including bonuses, freelance work, and investment returns, to ensure a comprehensive understanding of financial resources.

Track Expenses: Record all fixed (e.g., rent, utilities) and variable expenses like we spend for (e.g., groceries, entertainment) to understand where money is going. Tracking expenses can be done using budgeting apps, spreadsheets, or simply pen and paper. By categorizing expenses, individuals can identify areas where they may be overspending and where they can cut back. This step is crucial for gaining insight into spending habits and making informed decisions about financial adjustments.

Set Financial Goals: Identify short-term and long-term financial goals, such as saving for a car, paying off credit cards, or building an emergency fund. Short-term goals might include saving for a vacation or new gadget, while long-term goals could encompass retirement savings or homeownership. Setting specific, measurable, achievable, relevant, and time-bound (SMART) goals helps individuals stay focused and motivated, providing clear milestones to work toward.

CHAPTER-2

LITERATURE SURVEY

2.LITERATURE SURVEY

2.1 Literature Review

The literature review provides an overview of existing research, tools, and techniques related to the project's field of study. In recent years, the use of web applications has become ubiquitous across various domains, as they offer accessible and interactive platforms for managing and visualizing information. Studies highlight the advantages of using frameworks like Express.js and Node.js to build efficient server-side applications due to their lightweight nature and ease of use in handling asynchronous tasks, which is essential for real-time data processing and quick client-server interactions.

The use of templating engines, like Handlebars, has been recognized in academic and professional literature as a powerful method for rendering dynamic content on the server side, which contributes to a faster and more responsive user experience. Unlike front-end JavaScript libraries such as React, server-rendered applications with templating engines can improve performance by sending fully rendered HTML to the browser, minimizing client-side work and reducing initial load times. MongoDB, a NoSQL database, is widely discussed in literature for its scalability, flexibility in handling unstructured data, and suitability for modern applications requiring efficient data storage and retrieval without the rigidity of SQL-based schemas.

This project combines these technologies to create a robust and flexible web application. The literature indicates that using the MERN stack, even without the React component, is beneficial in developing applications that require a structured yet scalable backend, a modular front end, and efficient data handling capabilities through MongoDB.

2.2 Motivation

The motivation for this project stems from the need to develop web applications that are both responsive and scalable, capable of handling real-time user interactions and data processing effectively. With the growing demand for faster, highly interactive applications, the combination of Express.js, Node.js, MongoDB, and Handlebars presents an optimal solution for achieving both performance and user satisfaction.

Additionally, this project is motivated by the need to provide a platform where both end-users and developers benefit. End-users gain a smooth, intuitive interface with quick load times and reliable functionality, while developers benefit from a modular, easy-to-maintain codebase and a scalable

database system that accommodates future growth. By focusing on server-side rendering, this project aims to optimize performance, particularly on lower-end devices, while ensuring data remains securely managed and accessible within the MongoDB database.

CHAPTER-3

PROPOSED SYSTEM

3.PROPOSED SYSTEM

3.1 System Overview

The proposed system is a dynamic web application built to handle user interactions, data processing, and efficient data management through server-side rendering. The application uses a combination of Node.js, Express.js, Handlebars, and MongoDB to deliver a responsive and high-performance user experience. The system integrates these technologies to offer a seamless interface for users while ensuring secure data handling and optimized server response times. By leveraging server-side rendering with Handlebars, the application reduces client-side workload and improves compatibility, providing a smooth experience even on lower-end devices.

3.2 System Architecture

The system architecture follows a three-layered approach: presentation, application, and data. The **presentation layer** is powered by Handlebars, which dynamically renders HTML content on the server. The **application layer** uses Express.js and Node.js to handle routing, business logic, and API calls. Finally, the **data layer** utilizes MongoDB to store and manage application data efficiently. This architecture ensures modularity, allowing each layer to be developed, maintained, and scaled independently. The client-server interactions are streamlined to reduce latency and maintain optimal data flow, ensuring a responsive application experience.

3.3 Frontend with Handlebars Templating

The frontend uses Handlebars as a templating engine to render HTML content dynamically. Handlebars templates enable reusability and efficient data binding, allowing the server to populate views with data before sending them to the client. This approach reduces initial load times by delivering fully rendered HTML and enhances SEO by making content more accessible to search engines. Handlebars also allows partial templates, enabling component-based design that simplifies frontend development and maintenance by breaking down the UI into reusable pieces.

3.4 Backend with Express & Node.js

The backend is built on Express.js and Node.js, which form the core of the application's logic and routing. Express handles HTTP requests, manages routes, and provides middleware support for handling sessions, user authentication, and data validation. Node.js enables asynchronous, non-blocking operations, which allows the backend to handle multiple requests efficiently, even under heavy load.

Together, these technologies create a robust, scalable backend capable of managing complex data processing and delivering rapid responses to the frontend.

3.5 Database Design (MongoDB)

MongoDB serves as the database for this application, storing all user data and application content in a flexible, document-oriented format. MongoDB's schema-less design supports unstructured data and makes it easy to adjust fields as the application evolves. Collections and documents in MongoDB allow the data to be organized efficiently while providing scalability to handle larger datasets in the future. MongoDB's indexing and query optimization features ensure quick data retrieval, contributing to faster overall application performance.

3.6 Constraints

The proposed system is designed with several constraints in mind:

- **Technical Constraints:** Limited to using the MERN stack technologies (without React) to maintain uniformity and ease of development.
- **Performance Constraints:** As the application relies on server-side rendering, the backend server may experience higher loads during peak usage, necessitating optimized code and efficient database queries.
- **Scalability Constraints:** The application is intended to handle moderate traffic; further architectural adjustments, such as implementing caching, may be required for high-scale deployment.
- **User Constraints:** The system assumes users will have access to modern browsers that support server-rendered HTML.

3.7 Cost and Sustainability Impact

The proposed system is designed with cost-efficiency in mind, leveraging open-source technologies like Node.js, Express, Handlebars, and MongoDB to reduce software costs. The backend's ability to handle multiple concurrent users without high resource usage ensures lower hosting and operational costs. Additionally, server-side rendering with Handlebars minimizes client resource consumption, promoting sustainability by reducing the energy required for processing on user devices. Sustainable practices are also supported by MongoDB's scalability, which allows for gradual growth without needing to overhaul the database architecture.

3.7.1 Use of Standards

The development process adheres to widely recognized standards, such as:

- **HTML5 and CSS3** for structuring and styling web content.
- **JavaScript ES6+** for writing clean, modular, and maintainable code.
- **RESTful principles** in route design to maintain clarity in backend code organization.
- **Security Standards** including HTTPS, encryption, and session management to protect user data.

Following these standards ensures the application is compatible with modern technologies, secure, and accessible.

3.8 Experiment / Product Results

The system will undergo testing to evaluate its functionality, usability, and performance. Experiments will focus on assessing response times, server load handling, and user experience across different devices and browsers. The results of these tests will provide insights into areas for optimization and confirm that the application meets the performance and usability requirements. Testing will also evaluate security standards compliance, ensuring the system's resilience against potential security threats.

CHAPTER 4

IMPLEMENTATION

4.IMPLEMENTAION

4.1 Setting Up MongoDB Database

To manage user data and selected budget plans, MongoDB is set up as the database for this application. A MongoDB collection stores user details, income data, and associated budget plans. For simplicity, each user entry includes fields for user ID, income, and the selected budget plan. MongoDB's flexible document-oriented structure allows easy storage and retrieval of data without rigid schema requirements, making it ideal for the evolving nature of the application.

4.2 Configuring Express.js and Node.js Server

The Express.js framework on Node.js powers the server side, handling requests, managing routes, and delivering responses. Setting up the Express server involves configuring middleware for parsing JSON data, managing sessions, and handling cookies. This setup ensures efficient communication between the client and the server, enabling smooth data transfer. Node's asynchronous capabilities allow the application to handle multiple requests simultaneously, maintaining performance even during high traffic.

4.3 Using Handlebars for Dynamic Page Rendering

The application uses Handlebars as a templating engine to render pages dynamically based on user input and interactions. Handlebars templates are processed server-side, enabling the server to deliver fully rendered HTML content to the client, improving performance and user experience.

4.3.1 Creating Layouts and Partial

Layouts and partials in Handlebars simplify page structure and ensure reusability. The main layout template includes a consistent structure for the header, footer, and navigation, while partials are used for reusable elements like the budget plan options. This modular approach reduces code duplication and makes it easier to manage the presentation layer as the application grows.

4.3.2 Implementing Views and Templates

Views are created in Handlebars for each core function, including input collection (e.g., income entry) and displaying budget plans. The income input page allows users to enter their monthly income, and the budget plans page presents three predefined plans. Once the user selects a plan, the server processes and saves the choice, which is then rendered in the user's dashboard view.

4.4 Routing with Express

Express handles all routing, directing users to appropriate pages based on their actions. Key routes include:

- **/income:** Renders the income input page where users can enter their monthly income.
- **/budget-plans:** Displays the three budget plan options, which are generated based on the user's entered income.
- **/select-plan:** Handles the selected budget plan, saving it to the user's profile in the database.

Each route is structured to handle HTTP methods like GET (for rendering pages) and POST (for processing user input and storing data).

4.5 Session Management

Session management is essential to keep track of user interactions and selected options. Express-session is used to create secure sessions that allow users to navigate between pages without losing their selected options or requiring repeated data entry. This approach ensures that users can enter income data, choose a budget plan, and review the selection in a single, seamless session.

4.6 Authentication and Authorization

Basic authentication is implemented to ensure that only authorized users can access and select budget plans. User login details are verified during login, and unauthorized users are redirected to the login page. This security measure protects user data and ensures personalized access to saved budget plans.

4.7 Data Handling between Server and Views

The server uses Handlebars to dynamically pass data between the backend and the frontend views. For example:

- **Income Data:** After entering income, this data is passed to the budget plan view, where it dynamically adjusts the amounts in each budget plan.
- **Selected Budget Plan:** Once a budget plan is selected, the choice is sent back to the server, saved in the database, and rendered in the user's dashboard.

This real-time data binding between server and views provides a responsive and customized user experience.

4.8 Error Handling and Logging

Robust error handling ensures a smooth user experience by managing potential issues in data entry, routing, or server interactions. Express provides middleware for handling errors, which can display customized error messages to users and log errors on the server. For instance:

- **Invalid Input:** If a user submits invalid income data (e.g., non-numeric values), an error message prompts them to correct the input.
- **Server Errors:** Logs are maintained for all server errors to allow developers to track issues and improve application stability.

Logging mechanisms keep a record of user actions and any errors, which are helpful for both debugging and optimizing the application.

CHAPTER 5
EXPERIMENTATION AND RESULT
ANALYSIS

5.EXPERIMENTATION AND RESULT ANALYSIS

5.1 Testing the Application

The application was tested extensively to ensure that each component functions as expected. Unit testing was conducted on individual modules, including the income input, budget plan selection, and database handling functions. End-to-end testing followed to simulate user interactions and validate the smooth flow of data across the application. Manual testing covered various scenarios, including valid and invalid inputs, to verify that the application responds appropriately in each case. These tests confirm that the application handles user input accurately and that all features work together seamlessly.

5.2 Frontend Functionalities and User Experience

The frontend was evaluated for usability and visual appeal. Handlebars templates render dynamic content, allowing the application to deliver a responsive and user-friendly interface. Key frontend functionalities tested include:

- **Income Entry:** Users enter their monthly income, and the interface responds with clear feedback on successful input submission or prompts for invalid entries.
- **Budget Plan Selection:** Users are presented with three budget plan options, and can easily select their preferred plan.
- **Responsive Design:** The application adapts to different screen sizes, providing a consistent user experience on both desktop and mobile devices.

Through user testing, the layout and navigation were fine-tuned to ensure ease of use and accessibility, with clear instructions guiding users through each step.

5.3 Backend Functions and Server Performance

The backend was tested to ensure reliable data handling and efficient server response times. Express.js and Node.js handle all server-side functionalities, including routing, session management, and database interactions. Testing covered:

- **Session Management:** The server maintains user sessions, allowing users to move between pages without losing data, which was confirmed through repeated session interactions.
- **Database Operations:** MongoDB operations for saving, retrieving, and updating user income and budget plan selections were validated to ensure data integrity.
- **Route Management:** All routes functioned as intended, directing users to the appropriate pages and displaying relevant data based on user actions.

Testing demonstrated that the backend reliably supports application needs, with smooth data flow and minimal delays, ensuring a positive user experience.

5.5 Results

The final results of the experimentation and testing confirm that the application meets its objectives:

- **User Input and Budget Plan Selection:** Users can enter income data and seamlessly choose from the three budget plans. The selection process is intuitive, with immediate feedback and dynamic rendering of chosen plans.
- **Functionality and Usability:** Frontend testing validated that the application is visually appealing and functional, providing a streamlined user experience. Backend testing ensured that server and database operations are efficient and accurate, with stable performance throughout.

Generate Your Budget Plan

Here you can input your income and expenses to generate a customized budget plan.

Enter your Monthly Income:

90000

Generate Budget

Least Savings

Savings	₹4500.00
Housing	₹27000.00
Food	₹13500.00
Utilities	₹6300.00
Transportation	₹9000.00
Entertainment	₹4500.00
Education	₹11700.00
Health	₹9000.00
Clothing	₹4500.00

Default Savings

Savings	₹13500.00
Housing	₹22500.00
Food	₹13500.00
Utilities	₹6300.00
Transportation	₹9000.00
Entertainment	₹4500.00
Education	₹11700.00
Health	₹4500.00
Clothing	₹4500.00

Best Savings

Savings	₹27000.00
Housing	₹18000.00
Food	₹9000.00
Utilities	₹4500.00
Transportation	₹9000.00
Entertainment	₹4500.00
Education	₹9000.00
Health	₹4500.00
Clothing	₹4500.00

After selecting one plan and doing any changes in that plan:

Default Savings

Savings	₹13500.00
Housing	₹22500.00
Food	₹18500.00
Utilities	₹5675.00
Transportation	₹8375.00
Entertainment	₹3875.00
Education	₹11075.00
Health	₹3875.00
Clothing	₹3875.00

Would you like to add more savings for any category?

Yes

No

Select a category to add more savings:

Food

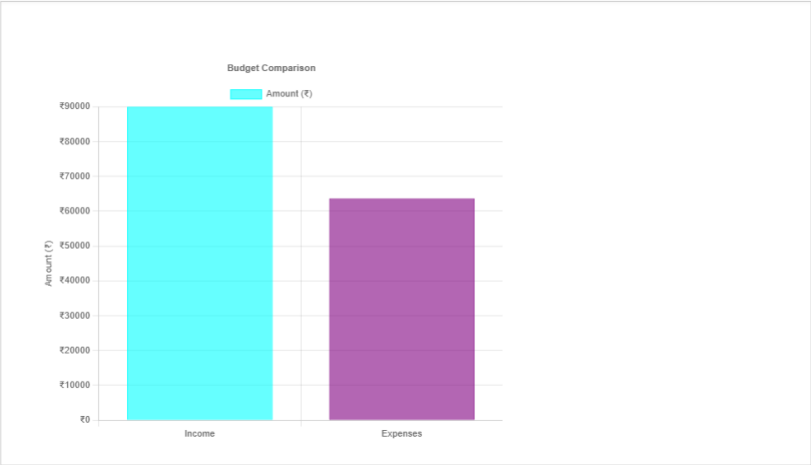
Enter the amount you want to save:

5000

Update Plan

Total Expenses: ₹63666.00

Good job! Your expenses are within your budget.



CHAPTER 6

CONCLUSION

CONCLUSION

Personal budget planning is essential for managing finances, allowing individuals to track income sources and categorize expenses into fixed and variable. By identifying financial goals, whether short-term or long-term, budgeting helps achieve stability and savings growth. The Best Savings Plan, aimed at those prioritizing financial security, allocates more to savings while limiting discretionary spending, leading to increased financial discipline and future preparedness. Overall, effective budgeting offers control, stress reduction, and goal achievement.

Moreover, it encourages individuals to build an emergency fund, providing a safety net for unexpected expenses. Regularly reviewing and adjusting the budget fosters a proactive approach to financial management, ensuring alignment with changing circumstances. Additionally, budgeting can enhance overall financial literacy, equipping individuals with the knowledge to make informed decisions. Ultimately, a well-structured budget lays the foundation for a secure financial future, empowering individuals to pursue their dreams with confidence.

CHAPTER 7

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