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Software Requirements Specification

For

Cloud Based Intelligent Financial Analytic App : FinVista

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INTRODUCTION

1.1. Purpose of the Project

To make an expense tracker app which is Cloud based using AI features to empower individuals and organizations with the tools they need to harness the power of financial data and provide users with real-time access to comprehensive financial data analysis.

1.2. Target Beneficiary

Our project introduces a cutting-edge Cloud-Based Financial Analytics App designed include financial analysts, business owners, investors, financial institutions, government agencies, educational institutions, entrepreneurs, consulting firms, and individual consumers. The app aims to provide real-time data, advanced analytics, and financial insights to support informed decision-making, risk management, and strategic planning across various sectors. Features of this app include advanced data visualization, predictive modeling, and customizable reporting tools. Additionally, the app prioritizes data security and compliance, ensuring the confidentiality and integrity of financial information.

1.3. Project Scope

Our project focus on various sectors depending on the requirement of the users:-

- **Effortless Expense Tracking:** Develop an intuitive and user-friendly interface that allows users to effortlessly record and categorize their expenses.

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- **Real-Time Data Updates:** Provide users with real-time updates on financial transactions and spending patterns for informed decision-making.

- **Secure Cloud Integration:** Implement robust security measures to ensure the safe storage and transmission of financial data to and from the cloud.

- **Data Analysis and Insights:** Enable users to gain valuable insights into their financial behaviour through data visualization and analysis tools.

- **Expense Management Features:** Offer features such as expense categorization, budget tracking, and expense history for comprehensive financial management.

- **User Authentication:** Implement secure user authentication to protect user accounts and financial data.

- **Data Export and Reporting:** Allow users to export their financial data and generate customized reports for personal or business use.

1.4. References

[1] Sakshi Namdev Kore , Onkar Karbhari Tayde , Yogeshwari Pralhad Shahir , Smita S. Wagh, Karan Sanjay Chaughule (2023),Finsave: Expense Administrator AI Based Expense Management System https://www.ijert.org/finsave-expense-administrator-ai-based-expense-management-system#:~:text=An%20AI%2Dbased%20expense%20tracker,on%20how%20to%20save%20money

[2] Iota Kaousar Nassr under the supervision of Robert Patalano(2021).Artificial Intelligence, Machine Learning and Big Data in Finance. https://www.oecd.org/finance/financial-markets/Artificial-intelligence-machine learning-big-data-in-finance.pdf

[3] Ma, M. (2022). Research on the Development of Hospital Intelligent Finance Based on Artificial Intelligence. Computational Intelligence in Neuroscience,2022,6549766 https://doi.org/10.1155/2022/6549766

[4] Sarker, I. H., Hoque, M. M., Uddin, M. K., & Alsanoosy, T. (2021). Mobile Data Science https://doi.org/10.1007/s11036-020-01650-z

[5] Banu, S. R., Rajagopal, B. R., Venkatesan, K. G., & Rawat, P. (May 2023). Smart Financial Management System Based on Integrated Artificial Intelligence and Big Data Analytics.Volume(12),Special Issue 01, 2023.ISSN:2230 5807.https://www.researchgate.net/publication/370652400_Smart_Financial_Management_System_Based_on_Integrated_Artific

[6] Venkatagurunatham Naidu Kollu 1,Vijayaraj Janarthanan 2,Muthulakshmi Karupusamy 3 andManikandan Ramachandran 4,Cloud-Based Smart Contract Analysis in FinTech Using IoT-Integrated Federated Learning in Intrusion Detection Date 2023, 8(5)https://www.mdpi.com/2306-5729/8/5/83

[7] Yi Chen,1Dong Yao,2and Yinying Duan,Complexity of the Analysis of Financial Cloud Based on Fuzzy Theory in the Wisdom of Sustainable Urban Development Volume 2021 | Article ID 3444437 https://www.hindawi.com/journals/complexity/2021/3444437/

[8] Marko Kureljusic, Erik Karger, Forecasting in financial accounting with artificial intelligence – A systematic literature review and future research agenda Article publication date: 10 May 2023 https://www.emerald.com/insight/content/doi/10.1108/JAAR-06-2022-0146/full/html

PROJECT DESCRIPTION

2.1 Reference Algorithm

FinVista is a Cloud Based Intelligent Financial Analytics App which is fully based on Android development which works on Flutter and Dart language and having AI features which enhances our app by having so many facility for the users with modern, user-friendly, and secure tool for seamless expense management. This app will enable users to effortlessly record, analyze, and access their financial data, ultimately leading to improved financial control and informed decision- making.

Here are the steps of which this whole implementation are done of this app:-

Phase 1: Requirement analysis on problem statement

- Set clear goals and identify needed features.
- Understand your target audience.
- Study the competition and industry trends.
- Validate market demand.

Phase 2: Define the project scope

- Create a project plan
- Choose cloud platform and technology stack.

Phase 3: Design App Architecture

- Choose a suitable platform for making architecture for the app
- Now we design and create a user friendly architecture through the project scope

Phase 4: Design and Development

- Our project development entity relevant data sources (financial data, market data,user data) after the requirement analysis and defined the project scope phase is over.Now develop data integration pipelines to collect and process data. Implement data quality checks and ensure data security. We use Machine Learning and AI Model for builds predictive and prescriptive analytics models and for this, we utilizes machine learning and AI algorithms for data analysis. Train models using historical data and continually improve them.

- Design an intuitive and user-friendly interface i.e Frontend UI. It ensure the app is responsive and accessible on various devices. Incorporate data visualization tools for effective communication and then we check the accuracy of the model for an app. It's essential to maintain a focus on data privacy, security, and compliance, especially when dealing with financial data.

Phase 5 : Implement AI Features

- Choose the appropriate AI framework or library for your features (TensorFlow, PyTorch, etc.). Integrate AI models into your app using the chosen framework. Implement data preprocessing and post-processing steps as needed and expense analysis , reminder system and currency conversion as per the requirement .

Phase 6: Test, Deploy and Maintenance

- Integrate AI with Front-End. Connect the front-end UI with the back-end services.
- Ensure smooth communication between the app components.
- Develop the front end of the app using cloud-native technologies.
- Implement security measures to protect user data.
- Conduct thorough testing, including functional, performance, and security testing.
- Maintain a focus on data privacy, security and compliance when dealing with financial data and test the accuracy and performance of the AI model with sample data.

Phase 7: Publish Your App

- Register for a Google Play Developer account.
- Upload your app to the Google Play Store, following their guidelines.

2.2 Data & Data Structure

1. **Relational Database:** Structured financial data may be arranged using tables. Financial applications frequently employ PostgreSQL or MySQL databases.
NoSQL Database: A NoSQL database like MongoDB can be appropriate for you, depending on the type of data you have and your needs for financial applications.

2 .Real-Time Analytics Data Storage:
Time Series Database: This type of database is useful for effectively storing and retrieving time-series data. It is particularly pertinent in financial analytics, where real-time updates and historical data are essential.

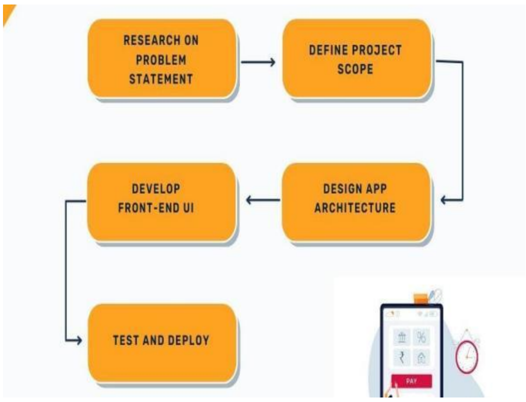
2. Mechanisms of Caching:
In-memory Data Structures: Store frequently accessed or calculated results in data structures like caches (like Redis) for quicker retrieval and less strain on backend services.

3. **Data Structures for Graphs**
Graph Database: A graph database, such as Neo4j, may be useful if your software analyzes the links between financial institutions, such as networks of transactions.

4. **Structures for Machine Learning Model Data:**
Model Illustration: In order to represent neural networks, decision trees, etc., the models may employ certain data structures, depending on the machine learning frameworks being used (e.g., TensorFlow, PyTorch).

6. Security Procedures:
Hashing Algorithms: Use cryptographic hash functions to safely store sensitive data, such as user passwords.

Proposed Model & AI features



Features of AI-based Expense Management app
Expenses
Cards
Compliance
Budgets
Payments
Analytics
Security

2.3. SWOT Analysis

Strengths:

- **Accessibility and Ease:** Users can access their financial information from any location with an internet connection thanks to the app's cloud-based architecture, which provides unparalleled ease.
- **Automation:** Automated features decrease the need for human data entry, increasing expenditure tracking accuracy and efficiency.

Weakness:

- **Data Privacy Concerns:** Users utilizing cloud-based applications may be concerned about the security and privacy of their financial information.
- **Learning Curve:** The features and operations of the app may be difficult for users who are not tech-savvy to grasp.

Opportunities:

- **Market Growth:** There is a significant market opportunity due to the growing digitalization of finance and the demand for improved spending control.
- **Integration with Financial Services:** By integrating the app with financial and banking services, its worth and usefulness may be increased.
- **International Expansion:** The app may see significant expansion and user acquisition if its services are made available in other countries.

Trust:

- **Competition:** There is strong rivalry in the market for expense monitoring applications, with both long-standing companies and recent arrivals continuously fighting for market share.
- **Regulatory Shifts:** The app's data management and security procedures may be impacted by changing financial rules.
- **Data Breach:** There is a chance that the app will have a data breach, which might result in lost data or privacy issues.

2.4. Project Features

Project features of the app FinVista:-

- **Effortless Expense Tracking:** Develop an intuitive and user-friendly interface that allows users to effortlessly record and categorize their expenses.

- **Real-Time Data Updates:** Provide users with real-time updates on their financial transactions and spending patterns to enable informed financial decision-making.

- **Secure Cloud Integration:** Implement robust security measures to ensure the safe storage and transmission of financial data to and from the cloud.

- **Overview and Dashboard for individual for each user: S**ummary of the main KPIs and financial data & Integration of Financial integration with many financial data sources, such as investment portfolios and bank accounts. updates and synchronization of data in real time.

- **Advanced Information Analysis:** Using predictive analytics to forecast finances. Analyzing trends and monitoring past performance & planning and budgeting is Setting and monitoring a budget. Planning scenarios and doing "what-if" analyses.

- **Managing Expenses:** Sorting and monitoring of spending, integration and scanning of receipts. Evaluation of investments tools for managing a portfolio. Investment advice and risk analysis.

- **Accounting Reporting:** Personalized financial statements, automated creation and delivery of reports.

- **Warnings and Announcements:** Alerts that may be customized for abnormalities or financial milestones. Notifications via push for important financial occurrences.

- **Expense Management Features:** Offer features such as expense categorization, budget tracking, and expense history for comprehensive financial management.

- **User Authentication:** Implement secure user authentication to protect user accounts and financial data.

2.5 User Classes and Characteristics

Different user classes of this app FinVista :-

1. **Individual Investors:** Qualities include goal planning, investment tracking, and personal money management. Predictive analytics, budgeting tools, and portfolio management are among the interesting features.
2. **Analysts of finance:** Qualities that experts who evaluate financial information for customers or establishments interest-grabbing features include collaborative tools, customisable reports, and advanced analytics**.**
3. **Owners of Small Businesses:** Qualities that handling a small business's money. Interest-grabbing features include interaction with accounting software, managing expenses, and budgeting.
4. **Teams for Corporate Finance:** Qualities that overseeing larger businesses' budgets and finances. Interest-grabbing features include collaborative tools, scenario preparation, and strong analytics.
5. **Analysts of finance:** Qualities that experts who evaluate financial information for customers or establishments.

2.6 Design and Implementation Constraints

Design and implementation constraints are factors that can impact the development and deployment of app. Here are some examples of design and implementation constraints:-

The technical concepts for a Cloud-Based Expense Tracking App include :-
Cloud infrastructure - Amazon Web Service (AWS) , Google Cloud Platform (GCP), or Microsoft Azure.

1. **Database management** - A cloud-based database, such as SQL or NoSQL databases.
2. **API integration with Financial Institutions** - The app integrates with various financial institutions and payment platforms using APIs to fetch transaction data.
3. **Security measures** - To give the security for safety.
4. **Real-time updates** - Implement technologies like WebSockets or server-sent events to provide real-time updates for expense tracking, ensuring that users see changes immediately.
5. **Cross-platform development**- Flutter enables the development of a single codebase for both iOS and Android, reducing development effort.
6. **User interface design** - Interface using Flutter's widgets and components to provide a seamless user experience.
7. **Data analysis tools** - Tableau , Plotly , Matplotlib , gplot2 , looker & Excel to offer users insights into their spending habits and financial trends.
8. **Data synchronization** - Various platforms for synchronized & backup, compliance with regulations, and more.

These elements collectively enable the app to securely and efficiently track and manage expenses while providing a user-friendly experience.

2.7 Design diagram

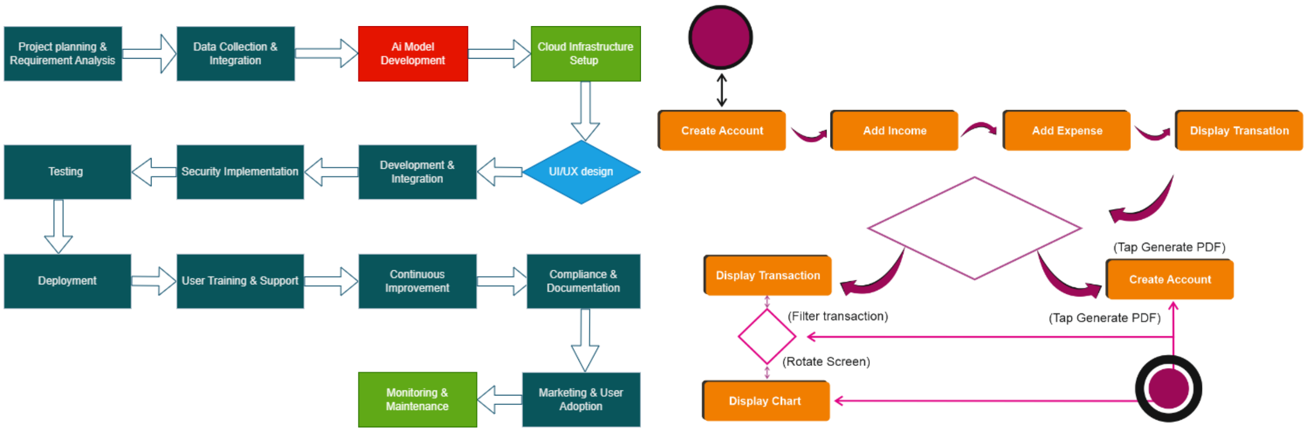


Fig :1 – Design & UML Diagram of the application: FinVista app

2.8 Assumptions and Dependencies

In the planning and execution of a project, assumptions and dependencies are essential. They support controlling expectations and comprehending the variables that may affect the app's performance. They are as follows:-

Assumptions-

1. **Availability of APIs:** It is assumed that payment systems and financial institutions offer dependable and easily available APIs for retrieving transaction data.
2. **Internet connectivity of the user:** In order to get real-time updates and synchronize with cloud services, users must have reliable internet access.

Dependencies-

1. **Cloud Service Provider:** The operation of the app is dependent on the cloud service provider (AWS, GCP, Azure) that is selected for storage and hosting.
2. **Stability and Availability of APIs Dependency:** The app depends on the availability and reliability of APIs offered by payment processors and financial institutions.

SYSTEM REQUIREMENTS

3.1 User Interface

Designing User Interfaces (UI):

1. **Dashboard**: A summary of recent transactions and important financial indicators.
2. **Monitoring Expenses**: Easy-to-use interface for organizing and inputting costs the ability to affix notes or receipts.
3. **Setting a budget**: Budget categories shown visually. Establish and modify spending limitations.
4. **History of transactions**: Comprehensive transaction history with search and filter functions.
5. **Analytics and Reports**: Charts and graphs to show expenditure trends. Custom or monthly reports are available for in-depth research.

3.2 Software Interface

1. **System of Operation:** Android - 1.0.0+1and later versions
2. **iOS: 17** and later versions
3. **Device specifications:** Android that suitable for a wide range of screen dimensions and resolutions.
4. **iOS:** Suitable for a range of iPad and iPhone devices.
5. **Connectivity to the Internet:** Dependable internet connection for cloud service synchronization and real-time upgrades.
6. **Keep in mind:** Enough room on the device for local data caching and app installation. Hardware standard specs for tablets and smartphones in the current day.
7. **Authorizations:** access to the device's storage to save receipts and data. Aauthorization to retrieve transaction data from the internet.
8. **Security Procedures:** Features for device security, such facial recognition, fingerprint, or PIN, to protect user data within the app.

3.3 Database Interface

The Cloud-Based Expense Tracking App's Database Interface:

Type of Database:

1. Databases hosted in the cloud (such as Google Cloud Firestore and Amazon DynamoDB).
2. Tables: Budgets for Transactions and User Profiles sections outside accounts.

3. Important Connections: Transactions between Users (One-to-Many)
4. Budgets from Users to Many
5. One-to-Many: User to External Accounts
6. Operations involving Transactions to Categories (Many-to-One): For transactions, budgets, categories, and external accounts, create, read, update, and delete.
7. Security Procedures: Encryption for private information. Stringent controls over access.
8. Audit trails are used to monitor modifications. Enhancement that indexing to provide quicker access to info.

This brief overview captures the essential components and considerations for the database interface of the Cloud-Based.

NON-FUNCTIONAL REQUIREMENTS

4.1 Performance requirements –

1. **Reaction Time:** The goal is to reduce transaction processing latency and improve user interface responsiveness. 95% of transactions must be completed in less than two seconds.
2. **Retrieval Time of Data:** Display and retrieve user data efficiently.
3. **Requirement:** Less than three seconds should be needed to get data for typical user inquiries.
4. **Scalability:** Goal to verify that the application can manage higher user loads. Within six months, the system must be scalable enough to support a 50% increase in the number of concurrent users.
5. **Functioning Offline:** Goal is to offer essential features even in the absence of an internet connection.
6. **Requirement of Users:** When users rejoin, their data should synchronize, allowing them to examine recent transactions and manually add charges offline.

4.2 Software quality attributes

1. **Reliability:** Goal to make sure the application runs consistently and doesn't crash on you. Attain a crash rate of less than 1% during a thirty-day period.
2. **Safety:** Goal Protect user information and guarantee safe transactions.
3. **Requirement:** Perform routine security audits and encrypt all sensitive data from beginning to finish.

4. **Usability:** Goal to offer an interface that is simple to use and intuitive. Attain a usability score in user testing of 80 or above.

OTHER REQUIREMENTS

1. **Dependability:** The objective to ensure that the program launches reliably and doesn't crash on you. Reach a crash rate of under 1% in a thirty-day window.

2. **Security:** The objective to ensure secure transactions and safeguard user information. It is necessary to carry out regular security audits and to encrypt any critical data.

3. **Usability:** The objective is to provide an intuitive and user-friendly interface. Obtain an 80 or higher usability score in user testing.

4. **Durability:** The intention is to simplify upgrading and maintenance.