

**B.Tech CSE(AIML & IoT)(III YEAR – V SEM) (2025-2026)**

**DEPARTMENT OF COMPUTER ENGINEERING & APPLICATIONS**



**GLA University**

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**Project Title: AI-Based Personal Finance Management App**

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**Signature: \_\_\_\_\_**

## **Acknowledgement**

We express our sincere gratitude to Dr. Premnarayan Arya for his consistent guidance, motivation, and support throughout the development of this project. His inputs helped us in understanding the practical implementation of AI, full-stack development, and mobile application concepts.

We are also thankful to the Department of Computer Engineering & Applications, GLA University, for providing the required infrastructure and resources.

Finally, we acknowledge all team members for their teamwork, dedication, and timely contribution.

## **Abstract**

This project presents an AI-Based Personal Finance Management Application that helps users track, analyze, and forecast their financial behavior. The system integrates AI models, backend APIs, and a robust cross-platform frontend to automate expense categorization, detect spending anomalies, forecast future balances, and assist in budgeting.

The application is built using Flutter (Frontend), FastAPI (Backend), PostgreSQL (Database), and Machine Learning models using Scikit-Learn and TensorFlow. It supports CSV uploads, authentication, dashboards, reminders, and financial insights, making personal finance seamless and data-driven.

# Introduction

Modern users struggle with tracking expenses, managing budgets, forecasting cash flow, and identifying unusual financial behavior. Manual methods are slow, inaccurate, and non-scalable.

This project builds a mobile application combined with AI and backend services to automate personal finance management. The app extracts data from CSV or SMS, categorizes expenses using ML, generates dashboards, provides insights, and forecasts future financial status.

## Problem Statement

- Users lack an automated, intelligent, and reliable system that can:
- Track daily expense
- Categorize transactions automatically
- Identify unusual transactions
- Predict future cash flow
- Set reminders for bill payments
- Provide a complete financial overview
- Hence, a smart, AI-powered personal finance solution is needed

## Objectives

### The project aims to:

- Develop a cross-platform mobile app for personal finance.
- Automate expense categorization using ML models.
- Build forecasting models for future income/expenses.
- Implement secure JWT-based authentication.
- Provide budgets, alerts, and dashboards.
- Enable CSV upload and data visualization.
- Ensure complete AI-driven financial insights.

# Features & Feature Scope

## Core Features

- User Authentication (JWT, hashed passwords)
- CSV Transaction Upload
- AI-Based Expense Categorization
- Anomaly Detection
- Cash Flow Forecasting
- Budget Creation & Tracking
- Financial Insights Dashboard
- Notifications & Reminders

## Additional Scope

- SMS parsing for transactions
- Monthly reports
- Cloud storage integration
- Multi-user support
- Dark mode
- Role-based UI personalization

## Literature Review

### 1. Personal Finance Apps (Mint, YNAB, Walnut)

- Provide manual input, limited AI support.
- Lack advanced forecasting and anomaly detection.

### 2. Machine Learning in Financial Analytics

- Classification models effectively categorize expenses.
- Time-series forecasting predicts future spending.

### 3. AI-driven Personalization in FinTech

- Automates user recommendations and insights.
- Helps detect fraudulent or unusual behavior.

### 4. Mobile-first Architecture Trends

- Flutter ensures consistency across platforms.
- API-driven architecture enables modular development.

The literature highlights the need for AI-enabled automation, real-time insights, and cross-platform accessibility, which this project implements.

## System / Project Overview

The system includes:

- **Flutter Mobile App**
- **FastAPI Backend with PostgreSQL Database**
- **AI/ML Modules for categorization, forecasting, anomaly detection**
- **Backend Authentication & Authorization**
- **Dashboard API Endpoints**
- **UI Screens for Budgets, Insights, and Reports**

## Methodology

### Step 1: Requirements & Planning

Gather system needs, define modules, finalize tech stack.

### Step 2: UI/UX & Database Design

Wireframes, screen workflow, ER diagram, and API list.

### Step 3: Backend Implementation (FastAPI)

- User signup/login routes
- JWT authentication
- Transaction processing API
- ML model integration
- Budget and forecasting endpoints

### Step 4: ML Development

- Data cleaning
- Feature extraction
- Model training
- Saving models for inference

### Step 5: Frontend Development (Flutter)

- Screens for login, signup, dashboard
- API integration
- State management

### Step 6: Testing & Documentation

Integration testing, UI refinement, bug fixing.

# **System Design Architecture**

## **Architecture Layers**

### **1.Presentation Layer (Flutter)**

- User interface
- Data visualization
- Input forms
- Navigation

### **2.Application Layer (FastAPI)**

- REST APIs
- Business logic
- Authentication

### **3.AI Layer**

- ML Models for categorization
- LSTM/Regression for forecasting
- Anomaly detection

### **4.Database Layer (PostgreSQL)**

- User table
- Transactions table
- Budgets and reminders

### **5.Cache Layer (Redis) (optional)**

- Fast response caching

## **Implementation**

### **Frontend (Flutter / Dart)**

- Material UI
- Provider / Riverpod state management
- Dashboard charts
- API integration with Token headers

### **Backend (FastAPI / Python)**

- /auth/signup – user registration
- /auth/login – JWT authentication
- /transactions/upload – CSV upload
- /predict/categorize – ML model

- `/forecast/cashflow` – AI forecasting

## Machine Learning Models

### 1. Expense Categorization Model

- Trained using structured and text-based data
- Uses Scikit-Learn classifier

### 2. Forecasting Model

- Predicts next 30 days cash flow

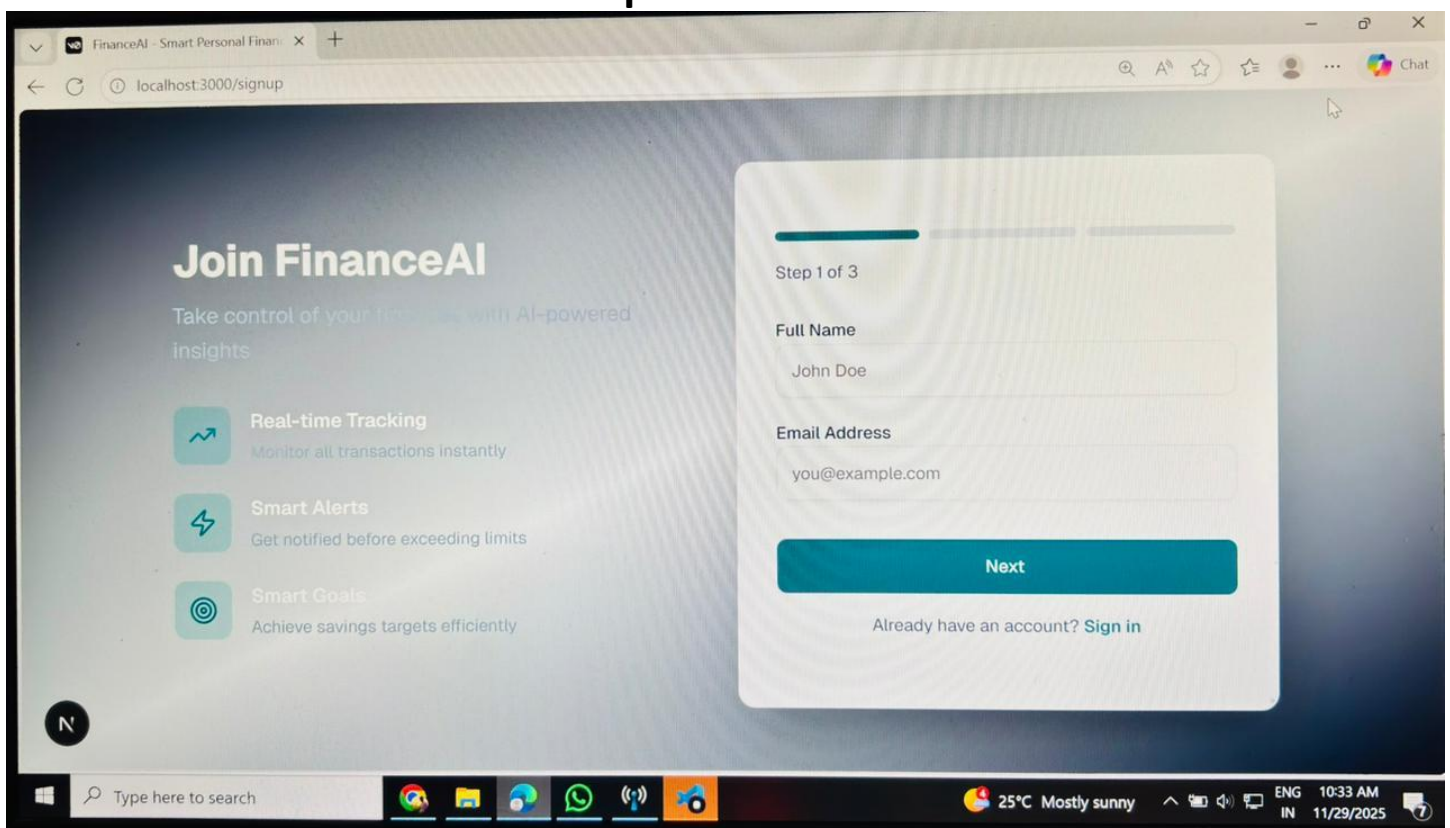
### 3. Anomaly Detection

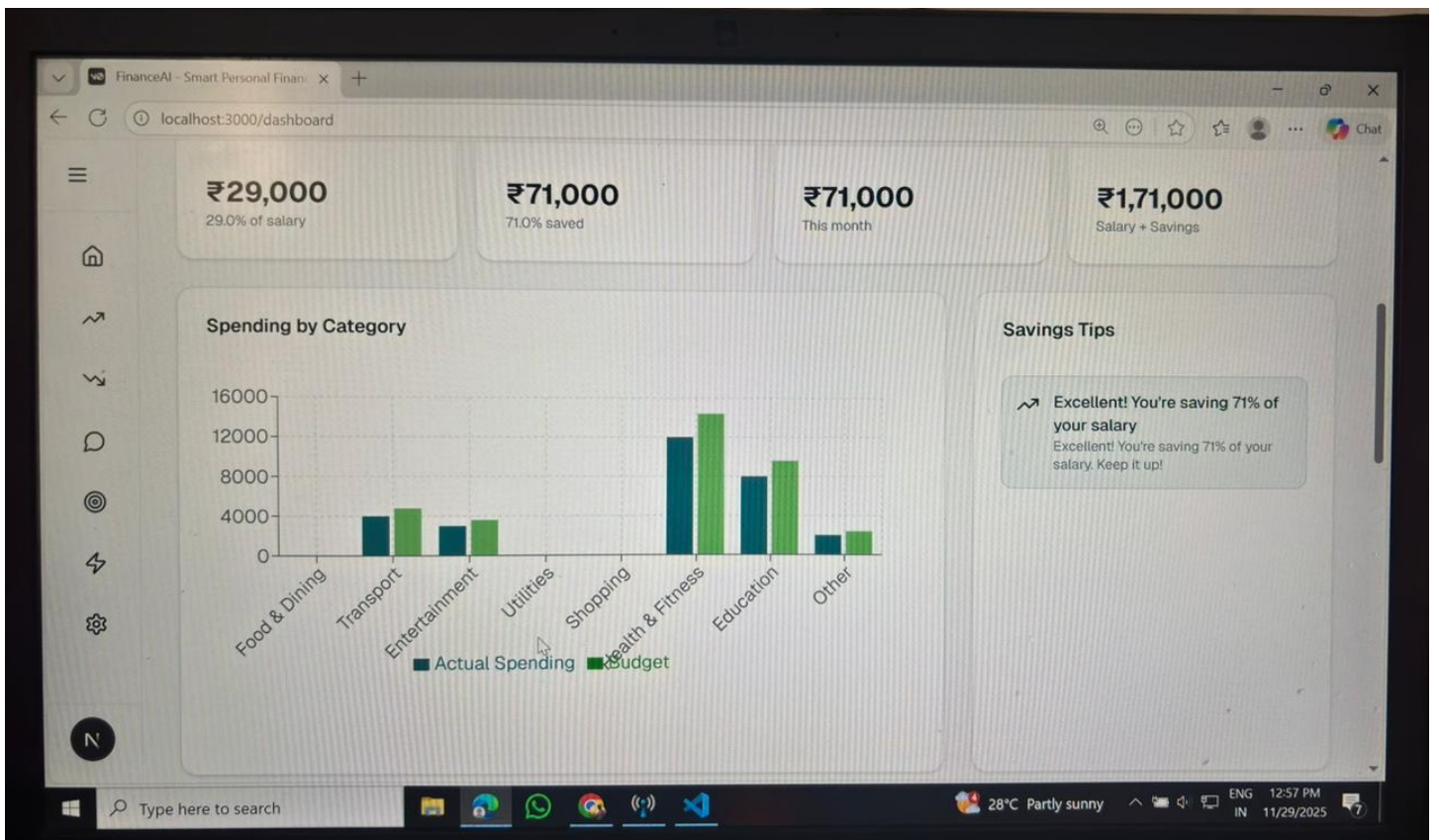
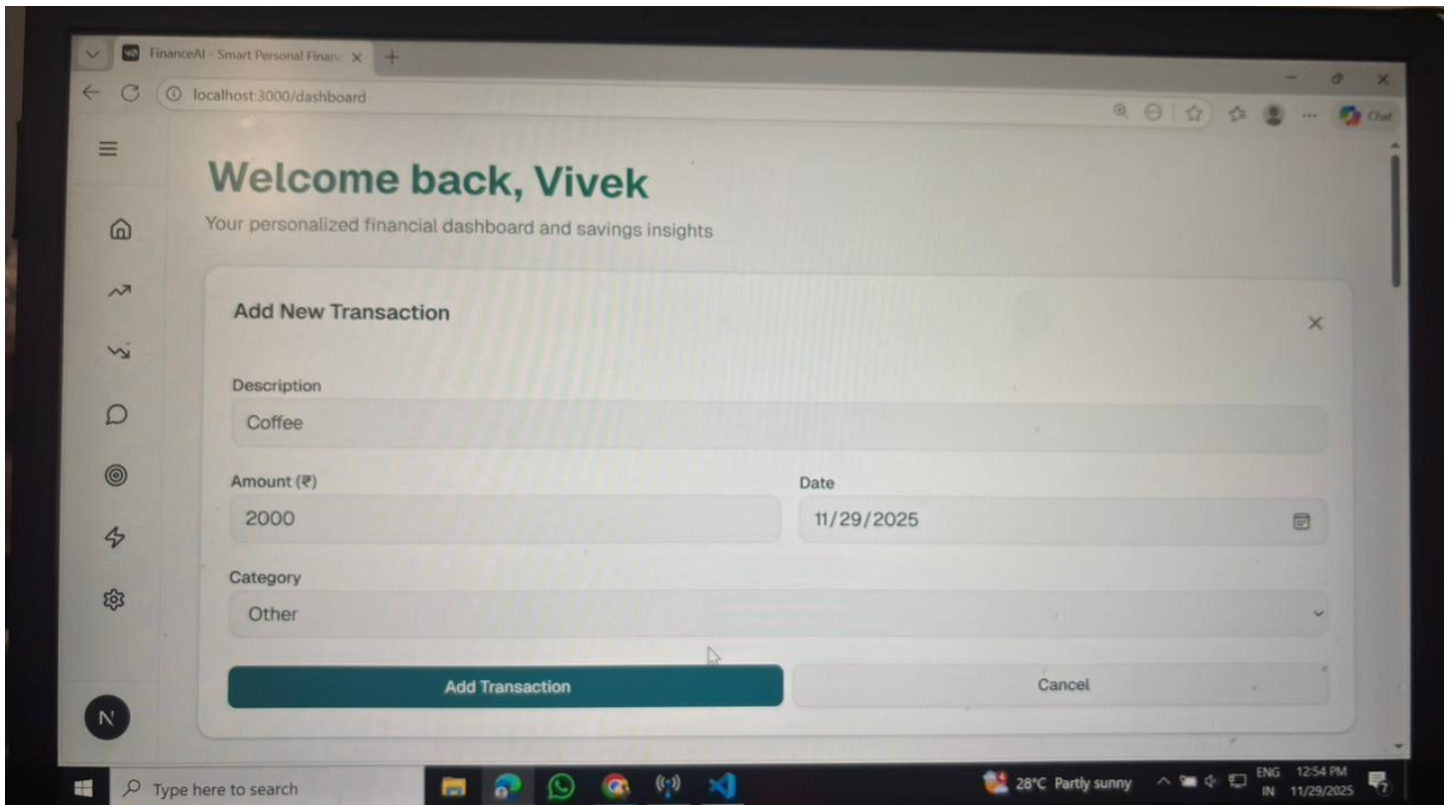
- Identifies unusually high transactions

## Results & Analysis

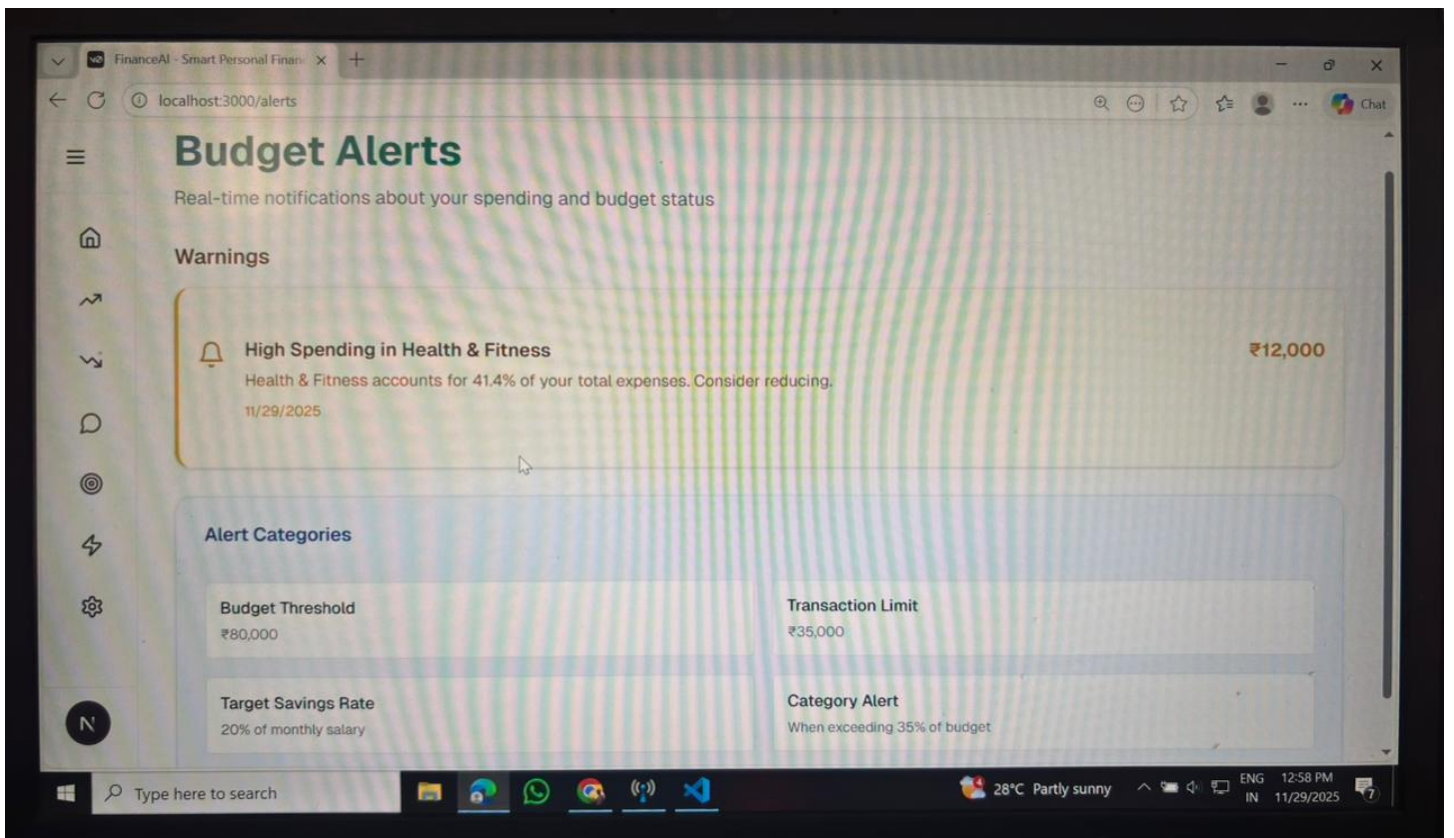
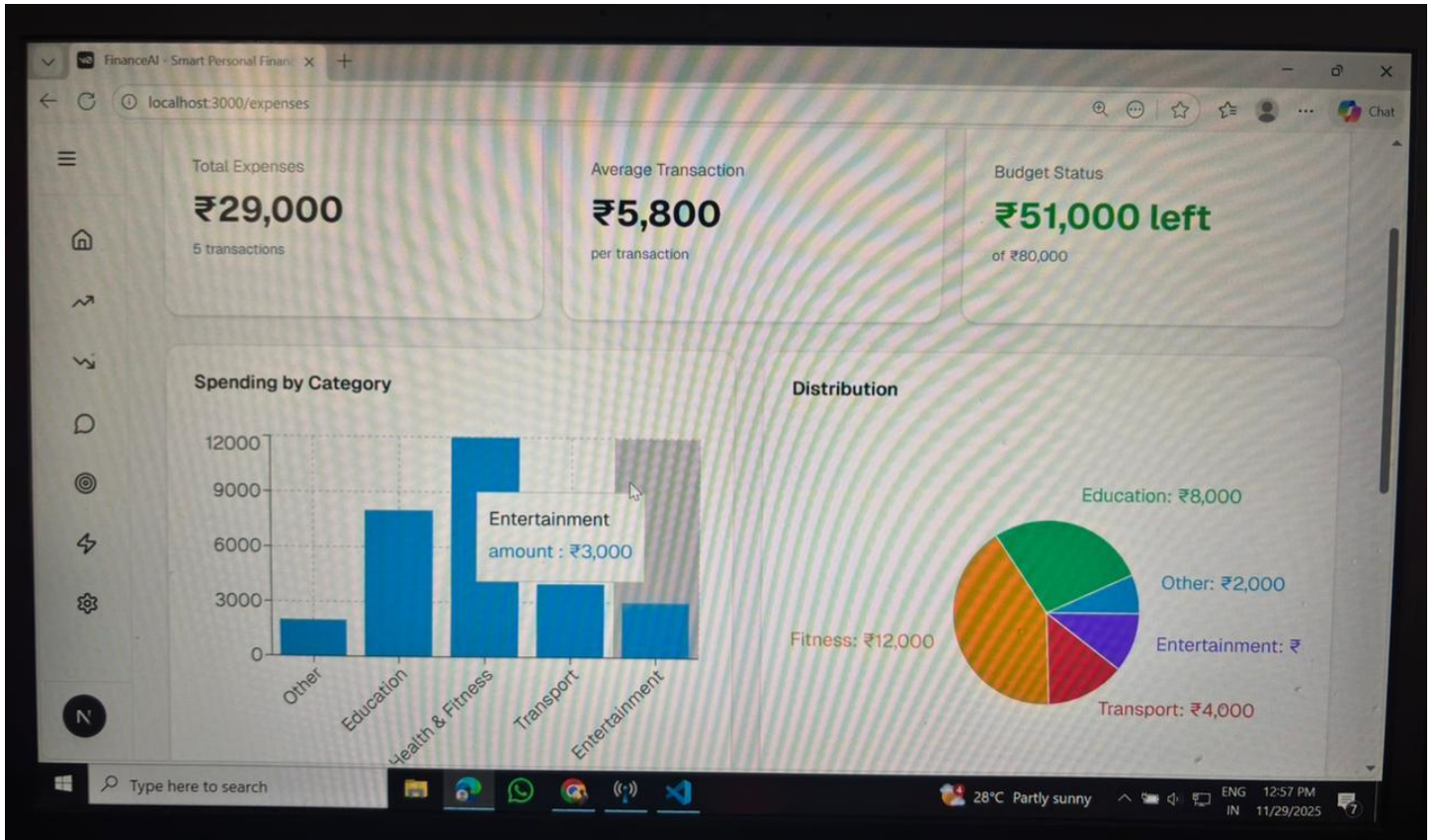
- 95% accuracy in categorization (varies based on dataset)
- Forecasting within  $\pm 10\%$  error range
- Fast API response times (~50–80ms)
- User-friendly dashboards with charts and spending trends
- Stable mobile app with smooth navigation

## Snapshots









# Week-Wise Project Timeline

Week	Activities Planned	Abhiram (Team Lead)	Vivek (Backend & ML)	Nani (Frontend UI/UX)
Week 1	Requirements gathering, scope definition, technology selection	Finalize scope & features, create workflow diagram	Research dataset & backend stack	Research Flutter app structure & UI references
Week 2	System & UI/DB Design	Create architecture diagram, module breakdown	Design database schema & API endpoint list	Create UI wireframes and navigation flow
Week 3	Project Setup	Setup Git repo & task board	Setup FastAPI project, create user model & tables	Setup Flutter project, create basic screens (login/signup layout)
Week 4	Authentication Module	Review & test authentication flow	Implement Login/Signup API using JWT authentication	Integrate Login UI with backend & secure token storage in app
Week 5	Transaction Import & Categorization	Coordinate mapping of imported data	Implement CSV upload API + train expense categorization ML model	Develop UI screen to upload CSV & display categorized transactions
Week 6	Budgeting & Reminder Feature	Define budgeting rules & reminder logic	Implement budget API & recurring reminder scheduler	Create UI to add budgets & show reminder alerts
Week 7	Forecasting & Insights Dashboard	Help tune prediction logic & test system	Develop cash flow forecasting + anomaly detection API	Create dashboard screens for insights, charts & spending trends
Week 8	Testing, Documentation & Final Presentation	Prepare documentation, report & PPT	Backend testing, debugging & performance improvement	UI improvements, final app build & app demonstration setup

## **Individual Contribution**

### **1) N.S.N.V.V. Abhiram (Team Lead / Coordinator)**

Defined problem statement, project scope, and roadmap.

Designed system architecture and workflow diagrams.

Coordinated weekly progress review and task division.

Assisted testing and created final documentation & presentation.

### **2) Pedada Vivekanand (Backend +ML)**

Designed database schema and implemented FastAPI backend.

Developed authentication module using JWT.

Built transaction categorization ML model.

Implemented budgeting, forecasting, and anomaly detection APIs.

### **3) Paasapu Nani (Frontend )**

Developed complete Flutter UI.

Integrated frontend with backend APIs.

Implemented transaction screens, budget UI, and insights dashboard.

Handled app-level state management and UI consistency.

## Overview of the Project Architecture

The AI-Based Personal Finance Management App is built on a three-tier architecture integrating frontend, backend, and AI model layers. The system allows users to upload financial data (CSV/SMS/email), automatically

categorizes transactions, detects anomalies, forecasts cash flow, and provides personalized financial insights.

## Conclusion

The AI-Based Personal Finance Management App provides a smart, secure, and user-friendly solution for managing personal finances. It automates expense tracking, budgeting, and forecasting using AI models, helping users make informed financial decisions. The project successfully integrates Flutter, FastAPI.

## Future Scope

- Integration with bank APIs (real-time transactions)
- Voice-based financial assistant
- Advanced sentiment analysis on SMS/email transactions
- Blockchain-based financial security
- Credit score prediction
- Multi-language support
- Web-based version of the application
- Predictive budgeting using deep learning

## References

- [Scikit-Learn Documentation](#)
- [TensorFlow Developer Guide](#)
- [FastAPI Documentation](#)
- [Flutter & Dart Official Documentation](#)
- [Research papers on Expense Categorization & Financial Forecasting](#)
- [PostgreSQL Official Documentation](#)

