

# Wealth Wise—AI-Powered Financial Management Platform

Ms. Afsha Sultana<sup>1</sup>, K. Sindhu<sup>2</sup>, N. Tareni<sup>3</sup>, A. Thanishka<sup>4</sup>

<sup>1</sup>Assistant Professor; Department Of Computer Science And Engineering(AI&ML) Bhoj Reddy Engineering College For Women Hyderabad India

<sup>2,3,4</sup>B.Tech Students; Department Of Computer Science And Engineering(AI&ML) Bhoj Reddy Engineering College For Women Hyderabad India

Mail Id; [thanishkaanugu22@gmail.com](mailto:thanishkaanugu22@gmail.com)<sup>4</sup>, [tareni2024@gmail.com](mailto:tareni2024@gmail.com)<sup>3</sup>, [Kanugulasindhu01@gmail.com](mailto:Kanugulasindhu01@gmail.com)<sup>2</sup>

## Abstract

*Managing personal finances effectively has become increasingly challenging due to rising living costs, complex investment options, and limited financial literacy among users. This paper presents **WealthWise**, an Artificial Intelligence (AI)-powered financial advisory platform developed to assist individuals in managing expenses, planning investments, and improving financial awareness through personalized real-time insights. The system integrates an interactive dashboard for visualizing income, expenses, savings, and financial health indicators. It also includes an AI chatbot that provides instant assistance on budgeting, investment planning, and goal-oriented savings strategies. In addition, a virtual stock market simulator enables users to practice trading in a risk-free environment. WealthWise is built using modern web technologies with a focus on scalability, security, and user privacy. Intelligent recommendation algorithms continuously analyze financial behavior to suggest spending optimizations and long-term wealth-building strategies. The platform is suitable for both novice and experienced users seeking a digital solution for smarter financial decision-making.*

**Keywords:** Artificial Intelligence, Financial Advisory System, Personal Finance, Budget Management, Investment Planning, Chatbot, Stock Market Simulator, Financial Literacy.

## Introduction

Managing personal finances has become increasingly challenging due to rising living costs, changing investment markets, and the growing need for financial awareness. Many individuals find it difficult to monitor expenses, choose suitable investment options, and plan long-term savings effectively. In this context, digital solutions supported by Artificial Intelligence can play a significant role in simplifying financial decision-making. WealthWise is an AI-enabled financial advisory and education platform developed to help users manage money in a smarter and more organized manner. The platform combines intelligent analytics with an easy-to-use interface to provide practical support for budgeting, savings, and investment planning. It offers real-time financial insights by analyzing user income, expenses, and spending behavior, allowing individuals to make better financial choices.

The system includes multiple integrated features such as expense monitoring, personalized investment suggestions, and an AI chatbot that responds instantly to user queries related to finance. It also provides a virtual stock market simulator where users can practice trading strategies without financial risk. Through these tools, WealthWise aims to improve financial literacy while making advisory services accessible to users from different backgrounds and experience levels. By merging automation, personalized recommendations, and educational resources into a single platform, WealthWise creates a modern environment for responsible financial planning and long-term wealth growth.

## Existing System

Current financial management solutions mainly consist of banking applications, budgeting tools, and online investment platforms. Although these systems provide useful services such as transaction monitoring, account management, and access to investment products, their capabilities are often limited to basic operations. Most platforms do not deliver personalized recommendations tailored to the user's spending habits, income level, or future goals. Many traditional systems depend on fixed rules or manual inputs, which reduces their ability to generate dynamic and meaningful insights. As a result, users may receive generic suggestions that do not reflect their actual financial situation. In addition, several tools focus only on one area, such as expense tracking or investing, requiring users to switch between multiple applications for complete financial management.

## Proposed System

The proposed system, WealthWise, is designed as an integrated AI-powered financial platform that overcomes the limitations of conventional tools by offering personalized, real-time, and intelligent financial support. It combines budgeting, investment planning, education, and advisory services within a unified digital environment.

The platform continuously analyzes financial data such as income, recurring expenses, spending patterns, and savings trends to generate customized recommendations. Based on user objectives and risk tolerance, WealthWise suggests practical strategies for saving money, controlling unnecessary expenses, and selecting suitable investment

opportunities. This helps users make informed decisions aligned with their financial goals. A key feature of the system is the AI chatbot, which provides immediate responses to questions related to budgeting, investments, debt management, and planning strategies. This interactive support improves accessibility by making expert-like guidance available at any time. The platform also includes a virtual stock market simulator that enables users to explore trading concepts and test strategies without real monetary risk.

### LITERATURE SURVEY

Extensive research has been conducted in the areas of financial management, investment optimization, artificial intelligence, and scalable software systems, all of which provide a strong theoretical and technical foundation for the development of modern financial advisory platforms. Earlier studies in finance mainly focused on maximizing returns while minimizing investment risk. One of the most influential contributions was made by Harry Markowitz in 1952 through the introduction of Modern Portfolio Theory. This theory explained that investors can reduce overall portfolio risk by diversifying investments across multiple assets with different performance patterns. By balancing expected return against variance, the model laid the foundation for scientific portfolio construction and asset allocation strategies. Further advancement in market theory was presented by Eugene Fama in 1970 through the Efficient Market Hypothesis. According to this concept, asset prices in financial markets reflect all publicly available information, making it difficult for investors to consistently outperform the market through prediction alone. Fama categorized market efficiency into weak, semi-strong, and strong forms, each representing different levels of information incorporation. This theory encouraged passive investing approaches and highlighted the importance of efficient information flow in markets. William F. Sharpe introduced the Capital Asset Pricing Model in 1964, which established a relationship between expected return and systematic market risk. The model uses beta to measure the sensitivity of an asset compared with the broader market. CAPM became widely adopted for evaluating securities, estimating the cost of capital, and supporting portfolio decisions. It remains one of the most significant tools in investment analysis and financial planning. With the rapid growth of digital platforms, Artificial Intelligence and Natural Language Processing have become increasingly important in financial applications. A major breakthrough occurred when Ashish Vaswani and his team introduced the Transformer architecture in 2017. Unlike earlier sequential models, Transformers rely on attention mechanisms that process information in parallel, resulting in faster training and better contextual

understanding. This architecture later became the basis for modern conversational AI systems and intelligent advisory chatbots. Patrick Lewis and co-authors proposed Retrieval-Augmented Generation in 2020, combining language generation models with external information retrieval systems. This method improves the factual accuracy and relevance of responses by allowing AI systems to access updated knowledge sources during conversation. Such an approach is highly suitable for finance-related platforms where current and reliable information is essential. In the same year, Tom B. Brown and collaborators demonstrated the capabilities of large-scale language models through few-shot learning techniques. Their work showed that language models trained on extensive datasets can perform multiple tasks with minimal additional training. This finding accelerated the use of AI assistants in education, customer support, and advisory systems, including financial guidance platforms. From a computing infrastructure perspective, Jeffrey Dean and Sanjay Ghemawat introduced MapReduce as a distributed data processing framework capable of handling very large datasets efficiently. By dividing tasks into smaller units and executing them in parallel across multiple systems, the framework enabled scalable analytics for data-intensive applications. Such architectures are valuable in financial systems that continuously process transaction records and user behavior data. Modern application development also depends heavily on flexible databases and responsive user interfaces. MongoDB has become a widely adopted document-oriented database system that supports scalability, schema flexibility, and efficient storage of structured and semi-structured data. These features make it appropriate for platforms handling varied financial records and user preferences. Similarly, React has gained popularity as a front-end library for building interactive and component-based interfaces. Its reusable architecture improves maintainability while enabling responsive dashboards and smooth user experiences.

### REQUIREMENT ANALYSIS

#### Functional Requirements

The WealthWise platform is designed with several core functional modules to ensure effective financial management, personalized advisory services, and secure user interaction. The authentication and security module enables safe access through Google OAuth login, JWT-based authorization, and reCAPTCHA verification to prevent unauthorized use. The financial data processing and analytics module manages expense tracking, savings analysis, and AI-driven investment recommendations across options such as stocks, mutual funds, and fixed deposits. It also supports a virtual stock market simulation environment where users can practice

trading decisions without real financial risk. The investment and market insights module provides predictive analytics, customized portfolio management services, and a Retrieval-Augmented Generation based chatbot that assists users with financial literacy, document interpretation, and planning guidance. The secure architecture module uses MongoDB for efficient storage, Express.js for API management, and protected routing mechanisms to ensure reliable data communication and privacy.

### Computational Resource Requirements

#### Hardware Requirements

The minimum hardware configuration for smooth system operation includes an Intel Core i3 processor or equivalent, 8 GB RAM, and at least 256 GB of available storage. Higher specifications may be preferred for development, analytics training, or large-scale deployment environments.

#### Software Requirements

The software environment includes Windows 10 or later operating systems for development use. The front-end is implemented using React.js to support dynamic rendering and interactive user experiences. Backend services are developed with Node.js and Express.js for RESTful API communication.

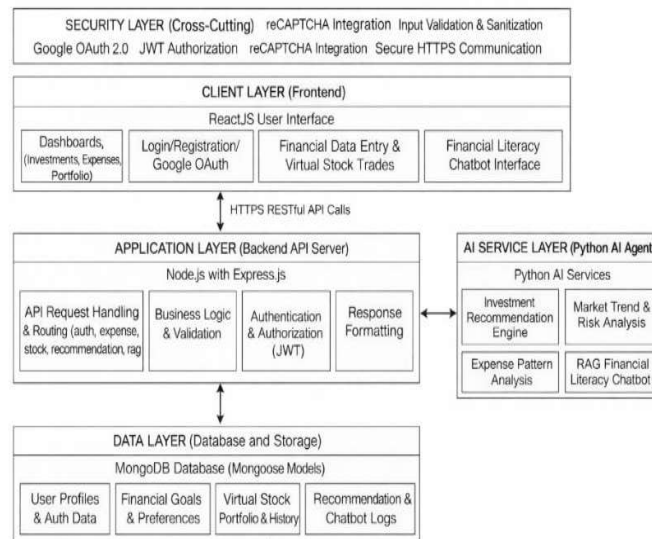
MongoDB Atlas with Mongoose is used for cloud-based database management and schema modeling. Python is utilized for AI and analytics functions through libraries such as Scikit-learn and TensorFlow, while external services such as Groq API and Pinecone may be integrated for language intelligence and embeddings. Authentication services include Google OAuth, JWT, and reCAPTCHA. Final deployment can be performed through cloud hosting providers such as AWS, Render, or Vercel.

### DESIGN

#### Architecture

System architecture defines the structural organization of the project, the major components involved, and the sequence in which requests are processed. A well-designed architecture helps in understanding how different modules interact, exchange data, and support system scalability, maintainability, and performance. For the WealthWise platform, the architecture is divided into software architecture and technical architecture to clearly represent logical flow and implementation infrastructure.

#### Software Architecture



**Fig: 1 Software Architecture**

The software architecture of WealthWise follows a modular multi-tier design consisting of presentation, application, intelligence, and data layers. The presentation layer includes the web interface through which users perform activities such as registration, login, dashboard access, expense entry, portfolio tracking, and chatbot interaction. The application layer manages business logic such as authentication, transaction handling, financial calculations, notification management, and API communication. The intelligence layer contains machine learning models, recommendation engines,

and the AI chatbot module. This layer analyzes user spending behavior, financial goals, and risk tolerance to generate meaningful suggestions. It also processes user queries through natural language understanding methods. The data layer stores user profiles, transactions, preferences, recommendations, and market information in secure databases. This separation of concerns improves maintainability and allows each layer to be upgraded independently.

#### 4.1.2 Technical Architecture

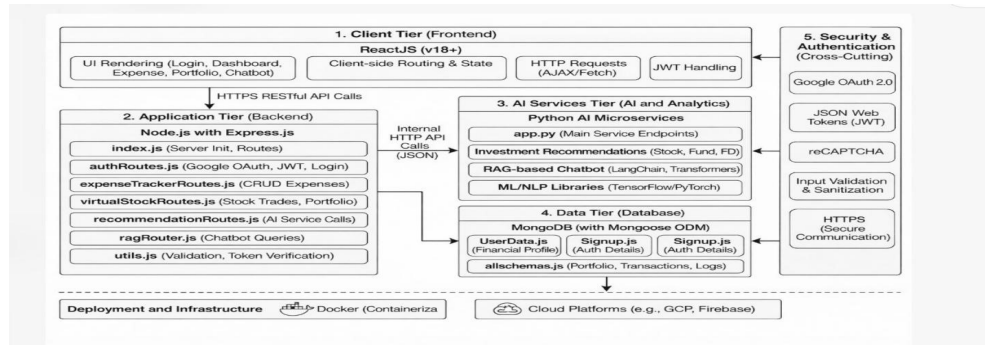


Fig: 2 Technical Architecture

The technical architecture is based on modern web technologies that ensure responsiveness, security, and cloud scalability. The front-end is implemented using React.js and Tailwind CSS to provide a dynamic user experience across devices. The backend is developed using Node.js and Express.js, which handle RESTful APIs, authentication, and server-side processing. MongoDB Atlas is used for storing financial data, user records, and historical activity logs. Firebase services support authentication and selected real-time functions. Artificial intelligence services are integrated through Python-based analytics modules, Groq API for fast language model responses, and Pinecone for vector-based retrieval in chatbot functions. Cloud hosting platforms such as Vercel, Render, or AWS enable deployment with load balancing and continuous availability.

### IMPLEMENTATION

The WealthWise system is implemented as an AI-driven personal finance platform that combines budgeting tools, investment planning, education modules, and intelligent assistance. The implementation process is divided into structured phases to ensure reliability and modular development. Initially, the user interface is developed to support registration, login, dashboards, chatbot communication, and simulator access. Secure authentication methods protect account access. Financial data such as income, expenses, goals, and preferences is collected from users, while market information is obtained through external APIs. The collected data undergoes preprocessing to remove incomplete values, standardize formats, and categorize transactions into useful groups such as food, rent, transport, and utilities. This processed information is then analyzed using machine learning models to understand spending patterns and estimate financial opportunities. The recommendation engine generates investment suggestions based on user profiles, risk levels, and financial objectives. Dashboards display charts, summaries, and performance metrics for easy understanding. A virtual stock market simulator allows users to practice buying and selling securities using virtual capital. The system also includes notifications that alert users when spending exceeds budgets or when

useful opportunities are identified. All activities are securely logged so users can review historical progress over time.

### Technologies Used

The front-end of WealthWise is developed using React.js, JavaScript, and Tailwind CSS to provide a modern and responsive interface. Backend services are implemented with Node.js and Express.js to handle APIs and application logic. Firebase is used for authentication and selected backend services. MongoDB stores user accounts, transactions, recommendations, and simulator records, while Firebase Firestore may support selected real-time synchronization tasks. Artificial intelligence features use Python libraries such as Scikit-learn and TensorFlow. Groq API is used for high-speed inference, while Pinecone enables vector retrieval for context-aware chatbot responses. Deployment is achieved using cloud platforms such as Vercel, AWS, or Render, ensuring scalability and continuous access. Security technologies include Google OAuth, JWT-based authorization, HTTPS communication, and encrypted storage practices.

### Pseudo Code Description

The application begins by initializing server services, loading configuration variables, connecting databases, and starting AI integrations. Users can register, log in, or use Google authentication. After authentication, profile information such as income, expenses, goals, and risk tolerance is stored. The system then collects transaction records, processes market feeds, cleans raw data, and analyzes user spending behavior. Based on this analysis, recommendations are produced using AI services and knowledge retrieval systems. Dashboards are generated to display income, expenses, savings, and charts. If the user accesses the simulator, stock data is retrieved and virtual trading operations are executed. Budget alerts and opportunity notifications are generated when required. Finally, all records are securely stored for future use and progress tracking.

### TESTING

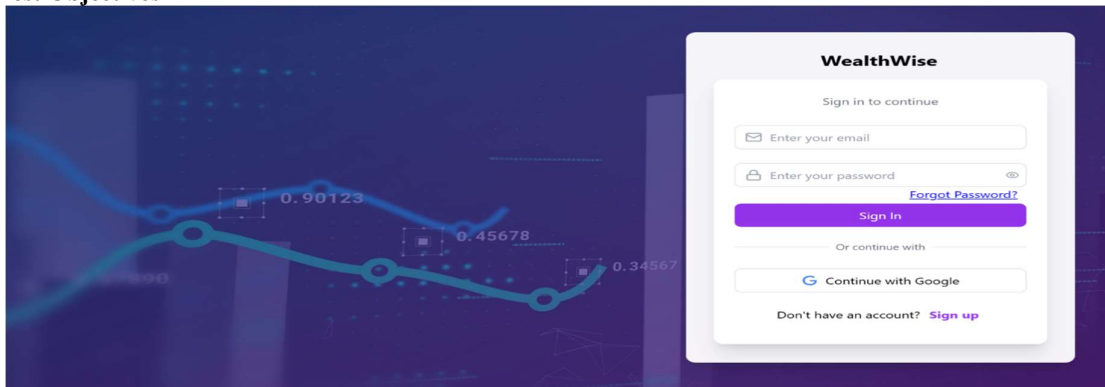
Software testing is an essential phase used to verify that an application performs according to its

requirements and delivers reliable results. Since WealthWise handles sensitive financial information and generates advisory recommendations, correctness, speed, and security are especially important. Errors in calculations, incorrect recommendations, or system failures could negatively affect user trust and decision-making. Therefore, testing is carried out under multiple conditions using realistic financial scenarios, different user inputs, and stress conditions to ensure stable performance. Testing in this project validates data processing, dashboard generation, AI recommendations, chatbot responses, simulator accuracy, and secure access control.

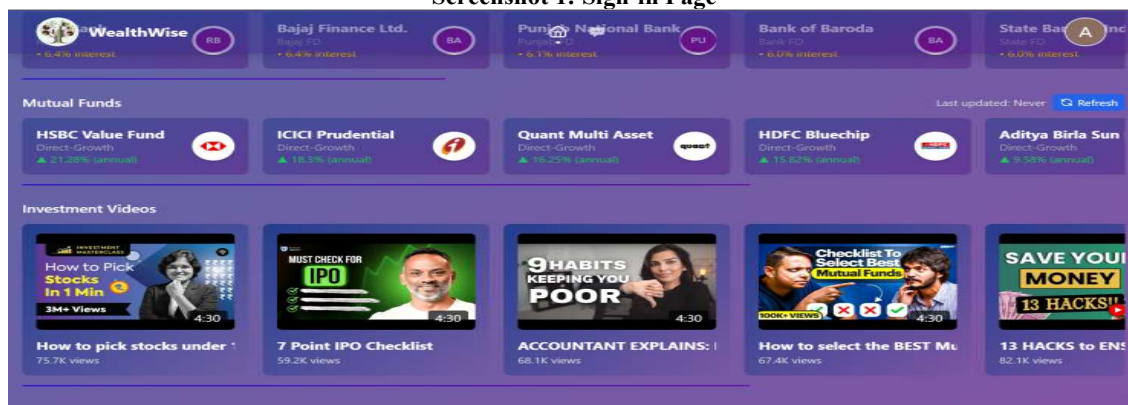
The main objective of testing is to ensure that each system module functions correctly and integrates smoothly with other modules. Specific objectives include verifying user authentication, validating financial calculations, checking the accuracy of recommendations, ensuring reliable data storage, and confirming dashboard responsiveness. Additional objectives include measuring system response time, confirming security protections, testing robustness against invalid inputs, and identifying defects before deployment.

### Test Objectives

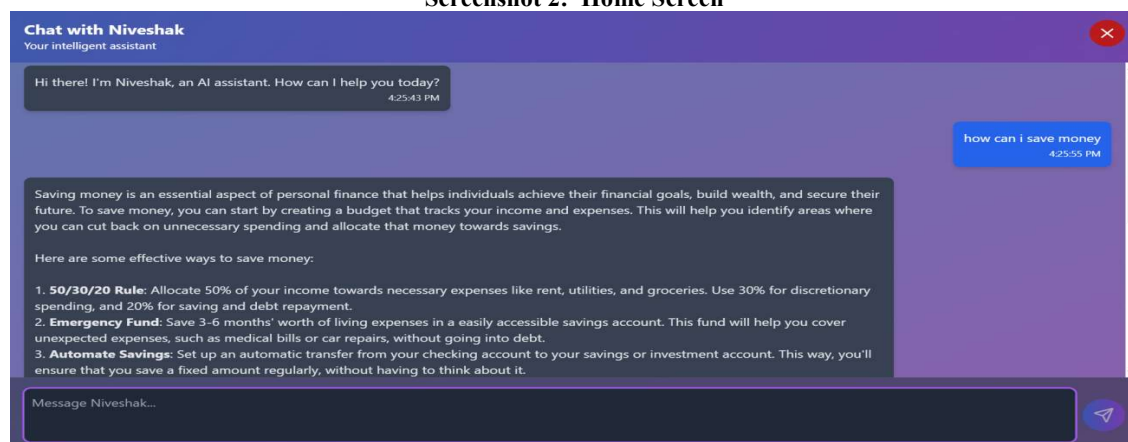
### SCREENSHOTS



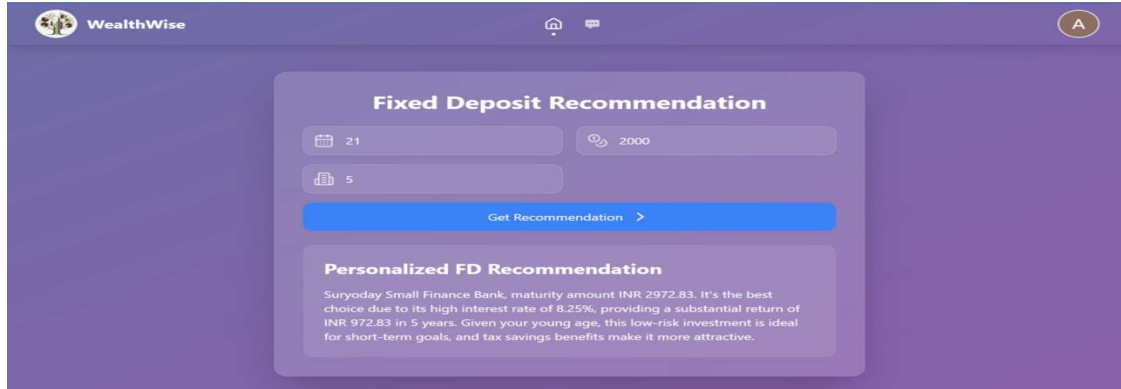
Screenshot 1: Sign-in Page



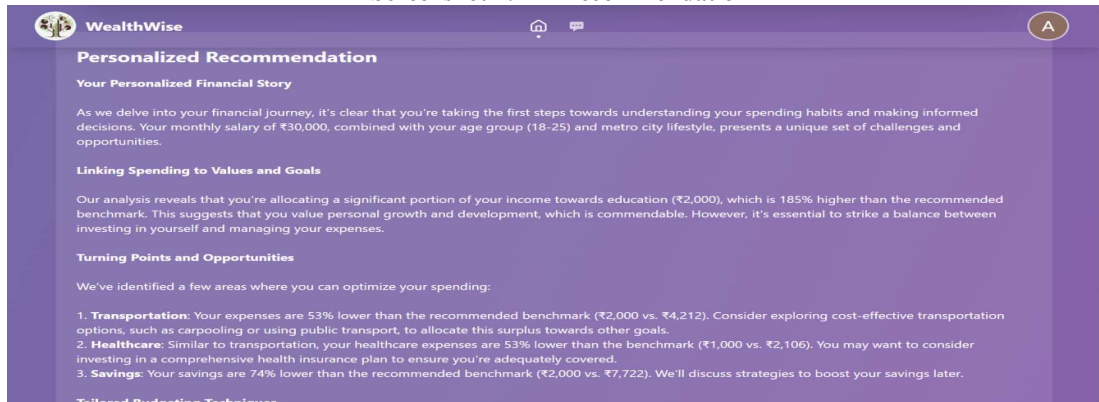
Screenshot 2: Home Screen



Screenshot3: Chatbot



Screenshot 4: FD Recommendation



Screenshot 5: Personalized Recommendations

## Conclusion

The **WealthWise** project demonstrates an effective application of Artificial Intelligence in the domain of personal finance management and investment advisory services. The platform integrates multiple financial functions such as expense monitoring, budget planning, personalized investment suggestions, and intelligent chatbot assistance within a single digital environment. By analyzing user behavior and financial preferences, the system delivers real-time recommendations that help individuals make informed and practical decisions regarding savings, spending, and long-term wealth creation. In addition to advisory capabilities, the inclusion of a virtual stock market simulator and educational modules improves financial literacy by allowing users to learn concepts through practical interaction. The platform is designed with a secure, scalable, and user-friendly architecture, making it suitable for users with varying levels of financial knowledge. Overall, **WealthWise** provides a modern solution that simplifies financial planning, encourages responsible money management, and supports smarter investment behavior.

## Future Scope

The future development of **WealthWise** can significantly enhance its usefulness and market reach. Integration with advanced financial APIs can

provide more accurate market data, automated transaction imports, and deeper investment analytics. Improvements in machine learning models may enable highly precise recommendations based on changing user behavior, economic conditions, and predictive trends. A dedicated mobile application can extend accessibility by allowing users to manage finances anytime and anywhere. Additional features such as multilingual support would make the platform usable across diverse regions and communities. Stronger security mechanisms including biometric authentication and advanced fraud detection can further improve trust and privacy protection. Gamification elements such as rewards, progress badges, and financial challenges may also increase user engagement while making learning more interactive. Future versions may additionally include retirement planning tools, tax optimization guidance, cryptocurrency portfolio analysis, and voice-enabled advisory assistance.

## 9. REFERENCES

- [1] Markowitz, H. M., "Portfolio Selection," *The Journal of Finance*, vol. 7, no. 1, pp. 77–91, 1952.
- [2] Fama, E. F., "Efficient Capital Markets: A Review of Theory and Empirical Work," *The Journal of Finance*, vol. 25, no. 2, pp. 383–417, 1970.

- [3] Sharpe, W. F., “Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk,” *The Journal of Finance*, vol. 19, no. 3, pp. 425–442, 1964.
- [4] Vaswani, A. et al., “Attention Is All You Need,” *Advances in Neural Information Processing Systems*, 2017.
- [5] Lewis, P. et al., “Retrieval-Augmented Generation for Knowledge-Intensive NLP Tasks,” *NeurIPS*, 2020.
- [6] Brown, T. B. et al., “Language Models are Few-Shot Learners,” *NeurIPS*, 2020.
- [7] Dean, J., and Ghemawat, S., “MapReduce: Simplified Data Processing on Large Clusters,” *Communications of the ACM*, vol. 51, no. 1, pp. 107–113, 2008.
- [8] Google Developers, “Firebase Authentication and Firestore Documentation,” 2024.
- [9] Groq Inc., “Groq LPU Inference Engine Documentation,” 2024.
- [10] MongoDB Inc., “MongoDB Manual,” 2024.