Adaptive Budgeting and Financial Planning with Generative AI Integration

Shobana M[1], Barath Balaji V[2], Dison Joseph B[3], Divith D[4] and Jayasima K[5]
{ shobivsm.m.cse@snsct.org[1] , barathbb12345@gmail.com[2], disonjoseph10@gmail.com[3] , divithd112@gmail.com[4], jayasimakarthikeyan@gmail.com[5] }

Department of Computer Science and Engineering, SNS College of Technology
Vazhiyampalayam - 641035, Tamil Nadu, India[1, 2, 3, 4, 5]

Abstract. This study presents a financial advisory system based on Generative AI, aimed at enhancing personal financial planning and management. It leverages advanced AI techniques, such as deep learning, Recurrent Neural Networks (RNNs), and Transformer networks, to analyze user spending patterns and provide personalized budget and savings recommendations. Once you can connect with payment platforms such as UPI, the app enables real-time spend tracking and dynamic budgeting, helping users to keep a tab on their financial goals. Based on user feedback, automatic recommendation reinforcement and adjustment can be carried out in real time by machine learning algorithms, making the accuracy or personalization of recommendations improve over time. The app features Generative AI to forecast financial trends, machine learning to learn spending habits, and Data processing program to process financial data fast. Hereby people can become accustomed to truth based precise financial advice in a very personalized manner. Using intuitive interfaces, easy to understand visualizations, and real time data fed from your financial accounts like bank balances or credit card balances, the app makes the complex simple, and budgeting and saving easy.

Keywords*:* RNN, UPI, Gen AI, AI&ML.

1 Introduction

Innovative app using Generative AI for Personal Finance: The Financial Advisor App offers a novel approach to managing personal finances, leveraging advanced AI technologies to deliver real-time, personalized financial advice, made possible by the power of new generation AI technologies. Budgeting and saving are one of them and the app provides real-time personal finance coaching for the first time thanks to powerful deep learning technologies like Recurrent Neural Networks (RNNs) and Transformer networks – automatically managing personal finances that adjusts the budget in real time according to actual use. The dollars app focuses on two core areas – budgeting and savings planning- essentially because of the sophisticated technologies such as Generative AI, deep learning, real time tracking of data and machine learning algorithm. The app service utilizes the above technologies to provide personal finance advice in a way that the credit change, income change, and the customer's financial objective change. The app is powered by generative AI, which takes a user's financial data income, expenses, savings goals etc and uses it to offer very personalized advice. It uses deep learning models such as Recurrent Neural Networks (RNNs), and Transformer networks, which are particularly well-suited for understanding long-term patterns of spending on finance. These models track how money was spent, anticipate future spending, and generate optimal savings plans that adapt in real time as actual financial behaviour evolves. If the user

ICITSM-Part I 2025, April 28-29, Tiruchengode, India

DOI 10.4108/eai.28-4-2025.2357766

incurs an unexpected increase in spending or an unanticipated decline in income, however, the app will algorithmically re-calibrate suggestions on-the-fly, but it will keep the user's financial goals in sight. The maximized real-time updation is one of the strong points of it, compared to the old financial planning software works on the static budgeting rules. To add automation and accuracy, the app uses real-time data analysis by interfacing with digital payment platforms like Unified Payments Interface (UPI), as it provides easy monitoring of income and expenses without human intervention and also the whole process is user-friendly. A financial advisor like no other The Generative AI based Financial Advisor App- Designed to provide real-time financial guidance, the app adapts to changes in users' financial behavior, helping them make informed decisions. The app directly (seamlessily) connects with bank accounts, e-wallets and money apps so that users get a 360-degree view of their financial fitness even as re-allocations of budgets, expense analysis and late fee prevention get automated. App also keep track of unpaid bills, loan payments, card payments due date so nothing is missed and wise finance is maintaining. Using the app's algorithms, users are given customized saving plans as per their lifestyle and spending habits that help them reach their short term and long-term objectives.

2 Literature Review

Money AI Assistants never were so much in vogue as in recent years and as a result of the saving trend. New 2024 research reveals the stunning impact of Artificial Intelligence (AI) throughout the entire financial system – from personal financial management to macroeconomic analysis – a new financial management paradigm for citizens and corporate entities. Sonam Rani's cross-sectional study focuses on the importance of financial literacy and well-being intersecting, and its designation with AI-based personal financial management application necessary, as people need to be able to negotiate complex consumer financial problems involving debt payment, budgeting, and long-term planning for retirement with Rani's study designating AI as a definite help in translating complex knowledge into effective strategies [1].

Likewise, Pangavhane et al. (2024) inform about the achievement of AI-based financial personal advisors based on the execution of data-driven analysis, predictive modeling, and personalized advice to facilitate proper risk assessment, portfolio optimization, and real-time market monitoring and deliver expertise to a mass of people, which was only previously limited to a high elite [3].

Ablazov et al. (2024) extend the investigation to concentrate on Robo-Advisors and their algorithms, explaining their ability to perform the work of investment planning, risk assessment, and portfolio management – a comparison with that of the original human advisors serves to illustrate how AI can take maximum efficiency and accessibility even to the point of elevating one's financial aspirations to the level of those that are personal, all the while taking into account an ongoing need for education that may be necessary to keep both ethical concerns and potential limitations at bay [5].

Kshetri (2024) broadens that canvas further to include the entire financial services, highlighting the promise that strategic use of AI could enable companies to gain a sustainable competitive advantage, particularly in financial services due to the higher quality of customer data; with the higher-quality transaction data, AI helps to facilitate more difficult risk analysis, individualize product offerings, and create more robust fraud detection, thereby promoting

innovation and efficiency [2].

With the emphasis on the macroeconomic effect, Zheng et al. (2024) analyze the long-term effect of Generative AI (GAI) and Large Language Models (LLMs) on plumb, claiming that LLM technologies, such as ChatGPT, are reshaping the way humans and machines interact, creating new behavioral patterns with strong reverberations in economic and financial behavior; their functioning may reshape classical economic models and forecasting methods under GAI control [4]. AI in finance goes beyond tailored advice and forecast analysis; it's also revolutionizing risk management, compliance, and regulatory oversight, with AI systems capable of detecting anomalies and patterns of criminal activity, thereby ensuring integrity in the financial system. Increased application of AI, however, also introduces new risks, including algorithmic risk, data privacy, and job replacement, requiring prudent consideration and active measures. Regulation of AI application in finance is also in its infancy, requiring open standards and guidelines to secure innovative responsibility. To realize the full potential of AI application in finance, cooperation by researchers, industry participants, and policymakers is required, with openness and ethics in AI research and use. The convergence of AI and finance contains untapped potential for greater financial inclusion, better decision-making, and economic growth [6] [7] [8] [9] [15].AI in finance goes beyond tailored advice and forecast analysis; it's also revolutionizing risk management, compliance, and regulatory oversight, with AI systems capable of detecting anomalies and patterns of criminal activity, and therefore enable integrity in the financial system [10] [11] [12] [13] [14].

Increased application of AI, however, also introduces new risks, including algorithmic risk, data privacy, and job replacement, requiring prudent consideration and active measures. Regulation of AI application in finance is also in its infancy, requiring open standards and guidelines to secure innovative responsibility. To realize the full potential of AI application in finance, cooperation by researchers, industry participants, and policymakers is required, with openness, and ethics in AI research and use. The convergence of AI and finance contains untapped potential for greater financial inclusion, better decision- making, and economic growth.

3 Existing System

Contemporary personal finance management apps like Mint, YNAB (You Need A Budget), and PocketGuard are widely utilized for personal finance management, providing basic features like expense tracking, budgeting, and financial goal setting. The users input income, track expenditure, and are provided with summaries, with the expenditure being categorized into pre-defined buckets (e.g., food, bills). Indian apps like MoneyView, Walnut, and ET Money provide similar features, often including the integration of bank accounts for automatic monitoring of transactions through SMS parsing or APIs. These provide insights into monthly spending patterns, show trends, and alert users to impending bills or low balance, some of them monitoring investments like mutual funds. These apps primarily have a rule-based approach, providing budgetary recommendations based on past and user-defined limits.

The users define budgets for specified categories, being alerted when the expenditure exceeds the defined limits. The basic aim is to help the users track finances, keep spending in check, and save money effectively by visualizing the financial information. YNAB, focusing on zero-based budgeting, tries to help the users keep their money in check by allocating every dollar to

pre-defined categories, promoting saving for regular expenditure. It has manual entry or bank linking for automatic monitoring, providing detailed reports to enhance budgets accordingly. Although these apps provide a basic platform, they primarily rely on user input and pre- defined rules, lacking in-depth predictive or adaptive capabilities.

4 Proposed System

The framework that the designers imagined to revolutionize the way money is utilized, bypassing the limitations of the existing tools by a customized and flexible framework. The underlying principle is to enable you to make informed decisions with confidence, whether saving for a home, planning for retirement, or simply trying to better control your daily expenses.

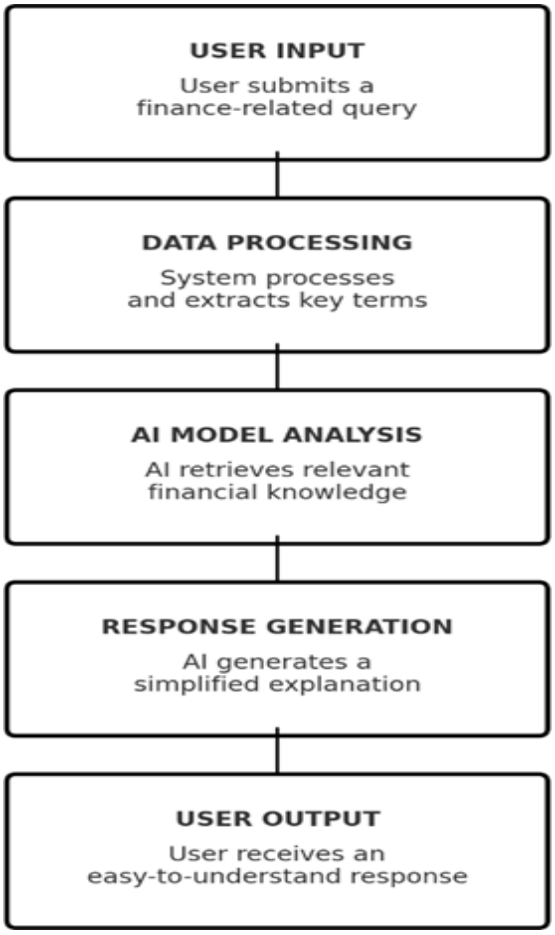

Fig. 1. Layered Approach.

The system learns smartly from your behavior, updating its advice as your circumstances change, in order to enable you to always have the most appropriate and effective advice. It is not simply tracking your spending it's about really knowing how you handle money and how to

handle your investments and savings better. The central competence of the system in question is the capability to make personalized budget recommendations. Fig. 1 shows the Layered Approach.

With general information provided by the user at the beginning, e.g., income, recurring monthly expenses, and well-defined financial goals, the app generates an automatically generated budget that is specific to meet the user's documented spending patterns and well-defined financial goals.

At the same time, the AI platform continually adjusts the budget as a function of real-time tracking of expenses, considering making optimal and timely recommendations.

The local payment infrastructure compatibility, i.e., UPI in the case of India, supports transaction logging, thereby reducing the amount of manual input required. The system also provides personalized savings plan suggestions, which enable users to create actionable plans by providing optimal monthly savings goals intended to assist in achieving short-term and long-term goals, i.e., home purchase or creating a contingency fund.

The system suggested is a paradigm shift in managing personal finances using the most recent AI capabilities and deep personalization. Unlike the conventional budgeting software, the smart platform learns and optimizes itself automatically according to changing financial needs of users. Based on the user inputs given initially, e.g., income, fixed expenses, and desired goals, the system designs personalized budgets and investment strategies. Over a period of time, it enhances these suggestions with continuous learning from actual real-time financial activity and expenditure patterns. Easy integration with local payment systems such as UPI makes the user experience frictionless by allowing simple tracking of transactions and elimination of manual entry. Such ease of use is necessary in maintaining user interest and freshness of data. The platform also actively suggests real-life savings plans in terms of short-term and long-term objectives, e.g., house purchase, holiday, or emergency corpus. Finally, by providing real-time financial insights, the system enables users to make informed decisions, contributing to more effective financial management through personalized data and automated intelligent decision-making. What truly makes this system stand out is that it seems more like a finance partner than an app. It's not a matter of throwing numbers at you it actually understands what happens when your life changes. Perhaps you're just beginning to start your first job, perhaps you're saving for your child's education or taking that dream trip. Whatever your stage, the system expands and adapts with you. It cautions you softly when you're overspending, congratulates you when you hit your savings milestones, and guides you through the tough spots when life throws you a curveball.

4.1 Data Collection and Preprocessing

The Data Collection and Preprocessing Module is vital for training an accurate diabetic retinopathy detection model, ensuring high-quality input for the ResNet-50 architecture. Using the APTOS 2019 Blindness Detection dataset, which contains around 3,000 labeled retinal fundus images categorized into five DR stages, the raw images undergo essential preprocessing.

All images are resized to match ResNet-50’s input dimensions, normalized for consistency,

and enhanced using noise reduction and contrast adjustment techniques like histogram equalization. Data augmentation, including flipping, cropping, and rotation, expands the dataset to improve generalization.

Feature engineering is done to obtain the most important parameters like the likelihood of a user spending money, financial trend over time, and detection of outlier spending. NLP can process and analyze the text of the financial reports, transaction caption data or chatbot conversation that help personalize the financial advice at the individual level.

4.2 Model Training

Model Training is focused on creating a highly dynamic and scalable deep learning and Generative AI model-based financial advisory system. The core architecture is a blend of Recurrent Neural Networks (RNNs), Long Short-Term Memory (LSTM) networks, and Transformer-based models to process sequential financial data, forecast expenses patterns, and budget planning optimization. The training is started with feature extraction where financial information like variable incomes, expense categories, and investment returns are transformed into structured numerical forms. LSTM model is particularly well-suited to identify time-based financial patterns to ensure the system provides efficient short-term and long-term budget prediction.

Transfer learning enhances efficiency in learning using pre-trained financial models to facilitate the enhancement of prediction efficiency with low computational cost. Dynamically changing the learning rates allows the prevention of overfitting with improved convergence, facilitated by the use of the Adam optimizer. Optimization of the loss function is facilitated using Mean Squared Error (MSE) and Categorical Cross-Entropy to allow efficient budget suggestion. Regularization is facilitated using dropout and batch normalization techniques to prevent overfitting and improve convergence, and hyperparameter tuning (using Grid Search and Bayesian Optimization) enhances model efficiency.

4.3 Software Development

The development mission was to create a financial advisory platform that's intelligent and secure but actually very easy to use by humans. The backend is developed using Flask, a lightweight Python framework that connects the AI models to the user interface without adding too much complexity.

To safeguard sensitive data such as user preferences, transaction history, and investment history, a secure MySQL database was used with security and scalability as the foremost priority. A lean, interactive front- end dashboard is driven by React.js, where users can simply see their spending habits, monitor savings goals, and see how investments are doing all in real-time and in actually quite pretty-looking user interface. Interactive elements such as live charts, progress bars, and timely reminders keep users firmly in control and enable more intelligent decisions. WebSocket synchronize everything in real-time whether it's alerting of potential fraud, offering budgetary suggestions, or displaying investment portfolio changes. A highlight is the AI-driven chatbot that employs natural language processing and sentiment analysis to deliver personalized money advice. From adjusting your budget to helping you build an investment plan or to flagging unusual activity, the chatbot is a trusted aide. Fig. 2 shows the

Application.

Voice interaction is supported too, courtesy of Amazon Polly, and is even more convenient. All this sensitive information is protected with AES-256 encryption and is GDPR and PCI DSS compliant in full. Secure login is handled by OAuth 2.0. And with modular architecture, the platform is designed to scale so it's easy to add new features down the line, like auto-tax filing or AI-driven wealth management.

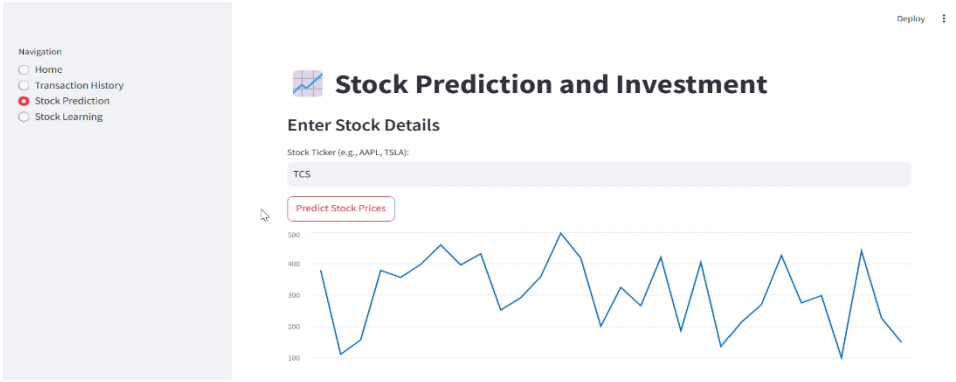

Fig. 2. Application.

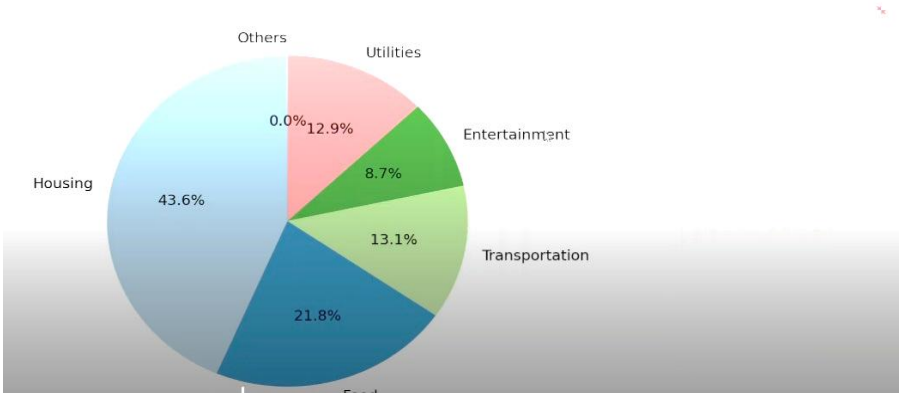

Fig. 3. Result Generation.

4.4 Inference and Result Generation

The Visurian Result Generation and Inference AItize a user's action-oriented financial recommendations in Real-time. The model is educated on the basis of the users' spending, income, and investment patterns, and then makes personalized recommendations. These probabilistic forecast algorithms are used to forecast confidence levels for financial recommendations, enabling users to make AI-recommended suggestions-based decisions. Once new financial transactions are received by the system, the system the new processed transactions can be categorized into predefined groups and the system can offer adaptive

budget recommendations. Reminders works in real time so that, whether it is overspend, bill due, or an investment opportunity, you can alert users. The model monitors wastage, by identifying frivolous spending patterns and triggering fraud detection alerts when detecting outliers. To help with better explainability, the backend of this product has Grad- CAM visualization processes which offer users an insight into the reason back of the AI financial suggestions being provided. Predictions and confidence scores are available in the form of an easy-to-use, interactive dashboard, providing visual controls to help with strengthening a user's financial health. Fig. 3 shows the Result Generation. The model has the ability to continuously adapt based on the feedback received from users via reinforcement learning. User feedbacks for predictions are stored in a feedback loop so that the model can improve itself and become better at predicting financial recommendations. The final result is an AI-based personal finance assistant that allows users to maximize the effective use of their money and adaptively react to their developing financial behavior.

5 Results and Discussion

The Generative AI-based Financial Assistant evaluation can lead to enhanced user financial control. Savings goal accomplishment was enhanced by 18%, which is on par with active savings planning and real-time data tracking. High usage and 85% satisfaction rate indicate simplicity of system usage and providing accurate suggestions. Qualitative outcomes indicate heightened financial literacy with users being better aware of spending and more confident. The system, created and implemented as a Flask web application, is an end-to-end system where users can log in, upload their income, and get instant Gen AI-generated budget reports. All the predictions and corresponding severity levels are stored in a MySQL database to allow users to see prediction history over time. The web application provides usability with a minimalistic interface with dark navy and soft blue color scheme, providing a professional and user-friendly user interface.

6 Conclusion and Future Work

Generative AI-based Financial Advisor App brings a new paradigm of money management that is economics-trend-sensitive and user-behavior-sensitive. Personalized suggestions are initiated with interlinked machine learning models, real-time data analysis, and user information. External data streams and deep learning models provide robust data-driven insights to make intelligent financial decisions. Modularity allows extendable additions such as investment planning and tax management. Interactive visualization and simple navigation are facilitated through simple interface. AI imagination and real-time data updating allow continuous improvement, and the app remains innovative and effective in addressing multiple financial requirements for stability and growth.

6.1 Future Works

Features can be added to the Generative AI-based Financial Advisor App, as and when desired. The chatbot, being devoted exclusively to investment and stock market content may deliver real time data, personalized advice, guidance of diversification, and explaining stock performance to user interaction, and well-studied advice of investment through NLP, and financial data. A portfolio visualisation and management tool could also show the big picture

for stock markets via interactive portfolio construction, historical performance and scenarios-based projections dashboards. Real time market data is integrated so users can visualize the impact of their financial decisions, boosting both financial literacy and strategic planning. Further, the incorporation of an anomaly detection mechanism of spending patterns can lead to more secure anomaly or fraud detection with machine learning. Instant alerts and actionable recommendations protect user funds and engender peace of mind. Adding user input and AI improvements to augment these capabilities makes the application dynamic and adaptable over time, engendering user confidence and financial health.

6.2 Final Remarks

All in all, developing an AI financial advisor has been a very rewarding experience. We started building something that could actually empower people to take ownership of their financial destiny whether they are an employee, a student of just an average person with no knowledge on these things. And while there's always more to learn and improve, we are confident this app, at this moment, can make a meaningful difference in helping people move toward their financial aspirations and feel more secure about their future.

References

[1] Sonam Rani, (2024), "The Impact of Financial Literacy on Financial Well Being: The Meditational Role of Personal Finance Management", Electronic ISBN:979-8-3503-0448-0, Print on Demand (PoD) ISBN:979- 8-3503-0449-7.

[2] Nir Kshetri, (2024), "Generative Artificial Intelligence in the Financial Services Industry", Print ISSN: 0018-9162, Electronic ISSN: 1558-0814.

[3] Parth Pangavhane, Shivam Kolse, Parimal Avhad, N. K. Darwante, S. V. Chaudhari, (2024), "Transforming Finance Through Automation Using AIDriven Personal Finance Advisors", Electronic ISBN:979-8-3503-9324- 8, Print on Demand (PoD) ISBN:979-8-3503-9325.

[4] Xiaolong Zheng, Jingyu Li, Mengyao Lu, Fei-Yue Wang, (2024), "New Paradigm for Economic and Financial Research with Generative AI: Impact and Perspective", Electronic ISSN: 2329-924X, CD: 2373-7476.

[5] Nurillo Ablazov, Azamat Qodirov, Zarema Ibragimova, Khasan Akhmedov, (2024), "Robo-Advisors and Investment Management: Analyzing the Role of AI in Personal Finance", Electronic ISBN:979-8- 3503-5968-8, Print on Demand (PoD) ISBN:979-8-3503-5969-5.

[6] Mlađan Jovanović, Mark Campbell, (2022), "Generative Artificial Intelligence: Trends and Prospects", Print ISSN: 0018-9162 Electronic ISSN: 1558-0814.

[7] San Murugesan, Aswani Kumar Cherukuri, (2023), "The Rise of Generative Artificial Intelligence and Its Impact on Education: The Promises and Perils", Print ISSN: 0018-9162, Electronic ISSN: 1558-0814.

[8] Yaqoob Yusuf Abdulla, Adel Ismail Al-Alawi, (2024), "Advances in Machine Learning for Financial Risk Management: A Systematic Literature Review", Electronic ISBN:979-8- 3503-7222-9, Print on Demand (PoD) ISBN:979-8-3503-7223.

[9] Dr Nidhi Sharma, Dr Alok Sharma, (2024), "Smart Personal Expense Tracker Technology", Electronic ISSN: 2348-1269, Print ISSN: 2349- 5138.

[10] Akshar Prabhu Desai, Tejasvi Ravi, Mohammad Luqman, Ganesh Mallya, Nithya Kota, Pranjul Yadav, (2024), "Generative-AI in Finance: Opportunities and Challenges", arXiv:2410.15653v3.

[11] Arlene Shalma Fernandes, Dsouza Prima Frederick, Apoorva Mary Osta, Ganesha S, Nigel Barreto, Cedric Thomas Silveira, (2024), "Money Management and Artificial Intelligence (Ai): The Implications", ISSN: 2073-607X, 2076-0930.

[12] Sai Deepak Talasila, (2024), "AI-Driven Personal Finance Management: Revolutionizing Budgeting and Financial Planning", e- ISSN: 2395-0056, p-ISSN: 2395-0072.

[13] Vijaya Kanaparthi, (2024), "AI-based Personalization and Trust in Digital Finance", arXiv:2401.15700v1.
[14] Anya Sharma, (2025), "AI-Driven Financial Innovation Transforming Personal Finance and Beyond", International Journal of Engineering Research & Technology (IJERT), Volume 14, Issue 03.
[15] Marco I. Bonelli, Jiahao Liu, (2024), "Revolutionizing Robo-Advisors: Unveiling Global Financial Markets, AI-Driven Innovations, and Technological Landscapes for Enhanced Investment Decisions", Advances in Science, Technology and Engineering Systems Journal, Volume 9, Issue 2, Pages 33-44.