iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** IV **Month of publication:** April 2026

DOI: https://doi.org/10.22214/ijraset.2026.81430

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue IV Apr 2026- Available at www.ijraset.com

AI-Based Expense Tracker and Budget Planner

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Abstract: ***Managing Personal expenses has become difficult in today's fast-moving lifestyle. Many people are unable to track their daily spending properly. Which leads to poor budgeting and unnecessary expenses. Most traditional methods on manual data entry and do not provide smart insights or future predictions. This project proposes an AI-Based Expense Tracker System that helps users manage their finances in a simple and efficient way. The system allows users to record expenses, categorize them, and view reports through charts. It also includes an AI- based feature that analyzes past expenses and predicts future spending patterns. The application is developed as a web-based platform, making it easy to access and use. By combining simple design with intelligent features, the system helps users understand their spending habits and improve financial planning.***
Index Terms: Artificial Intelligence (AI), Expense Tracking, Budget Management, Data Visualization, Web Application, Financial Analysis

I. INTRODUCTION

Nowadays, managing personal finances has become more complex due to the increasing number of daily expenses and changing lifestyles People often spend money on multiple categories such as food, transport, shopping, and bills, which make it difficult to keep track of their overall spending. Nonetheless, lack of proper expense tracking leads to poor budgeting and financial instability. An expense tracking system put, is a tool that helps users record and monitor their income and expenses in an organized manner. These types of systems not only help in managing daily spending but also assist in identifying unnecessary expenses and saving money. However, traditional methods or basic applications often fail to provide deeper insights or future predictions. Sometimes, improper financial planning can lead to overspending, debt, or serious financial problems.

For these reasons, tracking and managing personal expenses effectively has become essential not only for maintaining financial stability but also for improving overall financial planning. Traditional expense tracking systems mainly rely on manual methods or simple applications that store basic data without providing meaningful insights. Although such systems are useful for recording expenses, they face limitations when it comes to transactions increases, it becomes difficult for users to manage and review their financial data regularly. Moreover, tracking is not only time-consuming but may also lead to errors and missed records. These limitations make it challenging to identify unnecessary spending and prevent financial mismanagement.

Recently, advancements in artificial intelligence (AI) and data analytics have made it possible to develop smarter expense tracking systems with improved capabilities. Due to their ability to process large amounts of financial data, AI-based models are effective in identifying spending patterns and trends from user transactions. In fact, these systems can automatically analyze past expenses and extract meaningful insights that traditional methods may overlook. Furthermore, such intelligent systems can assist users in understanding their financial behavior and making better decisions. Therefore, AI-based approaches are highly promising in enhancing the accuracy and efficiency of personal finance management. This project presents an AI -driven Expense Tracking System that utilizes analytical techniques to monitor users expenses and predict future spending patterns for better financial planning.

Financial data such as daily expenses, categories, and timestamps are used to represent user spending behavior. Subsequently, these attributes serve as input for analytical and AI-based models that evaluate spending patterns and predict future expenses. Besides improving financial management, the system is equipped with a web-based, user-friendly interface that allows users to enter expenses details and instantly view reports and insights. While the main focus of the proposed solution is to enhance accuracy in tracking and prediction, it is also designed to be efficient and scalable for handling large volumes of financial data. The use of AI techniques enables the system to uncover hidden patterns in user spending and identify potential areas of overspending that may not be easily noticed through traditional methods. This feature can greatly assist individuals in planning their budgets effectively, reducing unnecessary expenses, and maintaining better financial discipline. Additionally, the system encourages users to develop better financial habits by providing clear insights and timely suggestions. It also helps in improving decision-making by offering a structured and organized view of personal financial activities.

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Today, in the era of increasing digital transactions and advanced computational technologies, the development of intelligent financial management systems has become essential to support better decision-making. AI-based expense tracking systems can transform the way individuals manage their finances by providing automated insights, accurate predictions, and continuous monitoring of spending patterns.

The system that we are introducing focuses on improving personal financial management using AI -based expense tracking and analysis. The main aims of this study are given below: O1: Develop a system to accurately track and manage user expenses. O2: Analyze spending patterns using categorized financial data. O3: Improve prediction of future expenses using AI techniques. O4: Provide a user-friendly and scalable web-based platform.

Objective	Metric	Outcome
O1	Tracking Accuracy	Accurate expense recording
O2	Data Categorization	Clear spending analysis
O3	Prediction Accuracy	Improved future predictions
O4	System Usability	Easy and real-time usage

Table: Objective Mapping

II. LITERATURE SURVEY

It has been suggested that digital financial management systems can assist individuals in effectively tracking their expenses and improving budgeting practices. Early systems in this domain mainly relied on manual data entry and simple record-keeping methods, where users maintained logs of their daily expenses. These systems helped in basic tracking but lacked automation and intelligent analysis. [1].

Later, research focused on developing rule-based financial applications that categorized expenses into predefined groups such as food, transportation, and bills. These systems provided structured way of organizing financial data, making it easier for users to track their spending across different categories. However, they were limited in offering deeper insights, automation, or predictive capabilities, as they mainly depended on fixed rules and user input without intelligent analysis. [2].

Subsequently, several studies explored the use of data analysis techniques to understand spending patterns. Statical methods were applied to identify trends, seasonal variations, and frequent expense categories in user data. These techniques helped in generating summary reports, visual insights, which improved financial awareness among users and enabled them to make informed decisions regarding their spending habits. [3].

With the advancement of technology, machine learning algorithms such as Linear Regression, Decision Trees, and Random Forest were introduced to predict future expenses based on historical data. These models were capable of identifying complex patterns and relationships within the data, leading to more accurate predictions compared to traditional approaches. As a result, users could better plan their budgets and anticipate future financial needs.[4].

Further developments included the use of data visualization tools such as charts and graphs to present financial information in a more understandable format. Visualization techniques enabled users to quickly interpret Their spending habits and make informed decisions. In addition, graphical representations such as bar charts and pie charts help in comparing expenses across different categories and time periods. These visual tools improve user engagement and make financial data easier to understand even for non-technical users. [5].

Recent research has emphasized the role of Artificial Intelligence (AI) in personal finance management. AI-based systems are capable of analyzing large volumes of financial data and identifying hidden patterns in user spending behavior. These systems can automatically detect unusual spending habits and provide meaningful insights to users. As a result, they help in improving financial awareness and support better budgeting decisions. [6].

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Deep learning techniques have also been explored for financial prediction tasks. Neural networks can model complex relationships in financial data and provide more accurate predictions compared to basic machine learning approaches. These models are especially useful in capturing non-linear patterns in user expenses, which improves the reliability of future expense predictions and enhances financial planning. [7].

Some studies have focused on real-time expense tracking systems that automatically update financial records as transactions occur. These systems improve efficiency and reduce the need for manual input by synchronizing data instantly. In addition, real-time updates help users monitor their spending continuously and take immediate actions to control unnecessary expenses. [8].

Cloud-based financial applications have gained significant popularity as they allow users to access their financial data anytime and from anywhere using internet connectivity.

These systems provide better scalability, cloud platforms ensure secure data storage through encryption and backup mechanisms, reducing the risk of data loss and improving reliability. [9].

Researchers have also investigated the integration of mobile applications with expense tracking systems, enabling users to manage their finances conveniently through smartphones. Mobile-based systems provide real-time access to financial data, instant updates, and notifications, which help users stay aware of their spending habits. This approach enhances user engagement and makes financial management more accessible and user-friendly. [10].

Another important area of research involves personalized financial recommendations, where AI systems analyze individual spending patterns and behavior. Based on this analysis, the system can suggest customized budget plans, saving strategies, and spending limits. Such intelligent recommendations help users make better financial decisions and improve their overall financial stability. [11]. Research into multimodal integration of financial data has become an important direction for improving personal finance systems.

These approaches combine data from multiple sources such as daily expenses, bank transactions, user inputs, and financial goals to build more comprehensive analytical models. By integrating different types of financial information, the system can gain a better understanding of user behavior.

Through such multimodal analysis, the system can provide more accurate insights and reliable predictions, ultimately supporting better financial decision-making.[12].

Recently, researchers have been focusing on making expenses tracking systems more scalable and efficient. As the volume of financial data generated by users continues to grow, systems must be capable of handling large datasets and multiple transactions effectively. Modern approaches aim to optimize data processing and improve system performance, ensuring that applications remain responsive and reliable even under heavy usage conditions. [13].

In addition, the effectiveness of AI-based financial systems also depends on the interpretability of the models used. Users often need clear explanations for the insights and predictions provided by the system. Therefore, researchers are working on explainable AI techniques that help in presenting understandable reasons behind spending analysis and predictions. This improves user trust and allows individuals to make more informed financial decisions. [14].

However, despite these advancements, personal finance management still remains a challenging task. Accurately predicting future expenses and understanding complex spending behavior require advanced models and high-quality data. As a result, there is a need for more intelligent and adaptive systems that can analyze large-scale financial data and learn complex user patterns. Such systems can further enhance the effectiveness of expense tracking and provide better support for financial planning. [15].

III. PROPOSED METHODOLOGY

A. System Overview

The architecture of the AI-Based Expense Tracker System is designed in a modular manner to ensure scalability, ease of maintenance, and efficient processing of financial data. The system is organized in such a way that different components interact smoothly through a central flow, which manages data processing and user interactions. In addition to handling communication between the frontend interface and backend services, the system also integrates analytical and AI-based modules for processing expenses data. The architectural design follows a layered approach consisting of presentation, application logic, and data storage layers. Each layer is responsible for specific tasks in the expense tracking workflow.

These components include:

- data collection
- data processing
- expense categorization

- data analysis and visualization
- AI-based expense prediction

Such a modular structure allows individual components to be updated or improved without affecting the overall system performance. It also ensures flexibility and reliability, making the system capable of handling increasing amounts of financial data efficiently.

B. AI Architecture and Data Analytics Integration

The system architecture incorporates basic AI and data analytics techniques, which analyze user financial data and spending patterns to predict future expenses.

Some key features for integration are:

- Direct interaction between frontend (HTML, CSS, JavaScript) and backend (Flask) for processing user inputs.
- Data processing and categorization of expenses based on user-provided details.
- Use of python-based logic for analyzing historical expense data and generating predictions.
- Ability to handle financial data such as expense categories, amounts, and timestamps as input features.

An AI-based expense prediction approach is developed using historical expense data, which is capable of identifying spending patterns and estimating future expenses. This helps users understand their financial behavior and make better budgeting decisions.

C. Expense Tracking and Prediction Workflow

The system is based on a multi-stage workflow for the expense tracking and prediction process:

- The system takes expense details entered by the user through the web interface as input.
- Financial data such as category, amount date, and time are collected and stored in the database.
- The system processes and organizes the data by categorizing expenses and preparing it for analysis.
- The processed data is then used as input for the AI-based model to analyze spending patterns and predict future expenses.

D. Financial Data processing and Feature Extraction Engine

The financial data processing component plays a crucial role in accurately representing user spending behavior expense analysis and prediction are performed. To be precise, this module:

- Data Analysis: The system processes user-entered data and extracts key information such as expense categories, amounts, and timestamps.
- Feature Generation: Important financial features such as total spending, category-wise expenses, and monthly trends are generated.
- Pattern Identification: Various spending patterns are identified by analyzing frequency, category distribution, and time-based variations in expenses.

The above-mentioned features help the AI- based model to effectively represent user financial behavior and improve the accuracy of expense analysis and future predictions.

E. Expense Prediction and Budget Planning Engine

The prediction engine analyzes user financial data to estimate future expenses and is the core component of the system, performing:

- Model Analysis: Historical expense data such as categories, amounts, and timestamps are used as input for the prediction logic.
- Expense Prediction: The system estimates future expenses based on past spending patterns and trends.
- Pattern Identification: Spending behavior is analyzed to identify frequent expenses and areas of overspending.

The system is not only capable of analyzing past expenses but also helps in predicting future spending and supporting effective budget planning.

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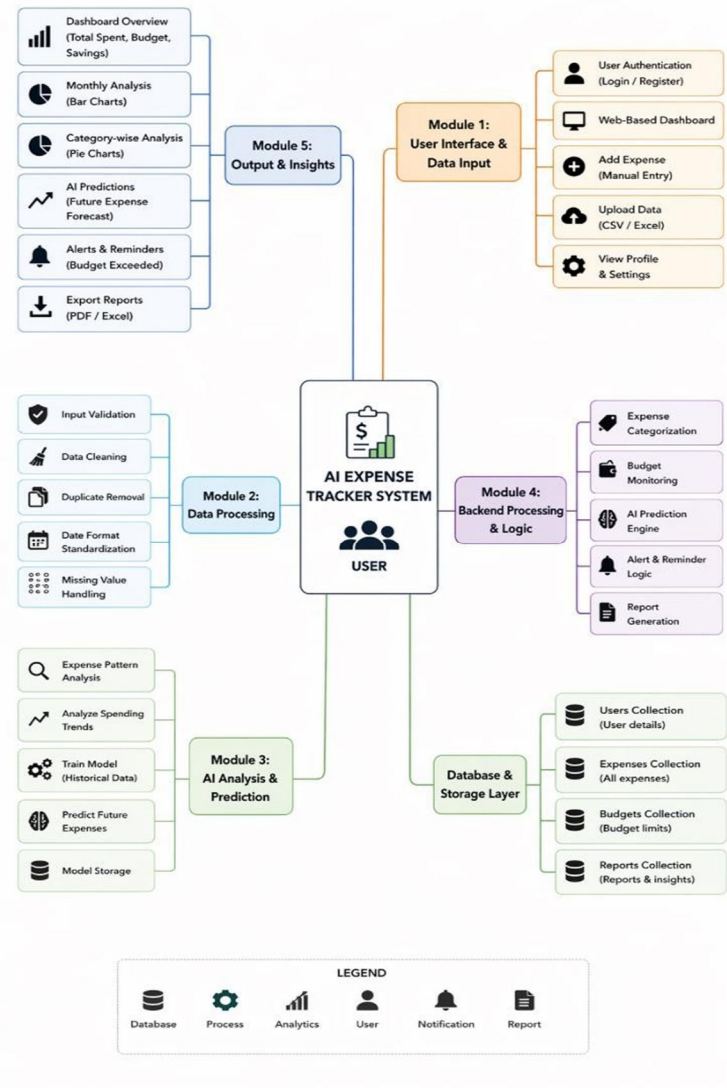


Fig. 1. System Architecture

A. *Security and Data Protection*

To ensure the safety of user financial data, the system implements basic security and data protection mechanisms:

- User Authentication: The system requires users to register and login using a username and password to prevent unauthorized access.
- Data Storage Security: User expenses data is securely stored in the database (Mongo DB) and accessed only through the application.

These measures help in protecting user data and maintaining privacy within the system.

B. *Performance Requirements*

The system is designed to deliver fast and efficient performance in tracking expenses and generating insights, The main performance requirements are:

- Response Time: Expense recording, data retrieval, and chart generation are completed quickly with minimal delay.
- System Availability: The system maintains stable performance and reliable operation during regular usage.
- Data Processing Efficiency: The system efficiently handles multiple expense entries and performs analysis without affecting performance.

IV. IMPLEMENTATION

A. System Architecture

We have constructed an AI-Based Expense Tracker and Budget Planner System around the client-server model with a web front-end and a python flask backend that is integrated with data analysis and prediction logic. The architecture has broken down into modules very clearly and distributed across different components or functional layers, which helps in efficient data processing and easy scalability. The key layer of the system is the User Interaction Layer, which acts as the front-end allowing users to register, login, enter expenses, and view financial insights.

Initially, the data processing layer collects and organizes user expense data into meaningful categories. The analysis layer identifies spending patterns using historical data. The prediction layer estimates future expenses using simple AI-based logic. The database layer manages user details and expenses records, while the modular design allows easy updates without affecting the entire system.

B. Front-End Implementation

The frontend part of our system is developed using HTML, CSS, and JavaScript, which provides a simple interactive interface for users. The user interface includes components such as: the Home Page, which introduces the system and its features. The Login and Registration Page allows users to securely access their accounts. The Dashboard enables users to add expenses, view record, and track their financial activities.

The Visualization Section displays charts such as bar graphs and pie charts to represent monthly expenses and category-wise distribution. The front-end communicates with the backend through form submissions and dynamic updates, ensuring smooth data flow. Input validation is implemented to handle missing or incorrect data entries. The interface is designed to be user-friendly so that anyone can easily manage their expenses and understand their financial data.

C. Backend Implementation

The backend system is developed using Python with Flask to handle core application operations. It process user requests, manages expense data, and generates analysis results. The User Module handles registration and login functionality. The Analysis Module manages adding and storing user expenses in the database. The Analysis Module Processes historical data to identify patterns and predict future expenses. The Database Module stores user and expense data using MongoDB.

D. Data Processing and Prediction Module

It represents user financial data through structured inputs such as expenses categories, amounts, and timestamps, which are processed using backend logic. Analysis Module-processes historical expenses data to identify spending patterns and trends. Prediction Module-uses simple AI- based logic to estimate future expenses based on past records. Input Handling Module-takes user-entered expense details from the frontend, processes them, and returns analysis and prediction results. Effective and comprehensive error handling ensures system reliability and prevents issues caused by invalid inputs or missing data.

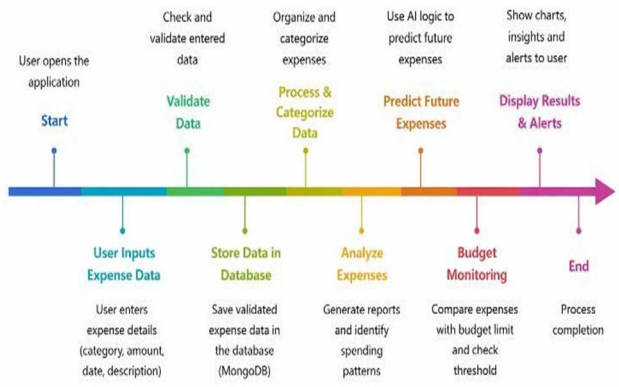


Fig. 2. AI Expense Tracker Workflow

E. Data Processing Pipeline

Our system processes financial data using a structured pipeline consisting of multiple stages. Dataset Workflow: User expense data is collected through the web interface. The dataset is then cleaned by removing duplicates entries and handling missing or incorrect values. Expenses are categorized into groups such as food, transport, and bills. Relevant attributes like amount, category, and date are extracted. These features are organized into structured data formats suitable for analysis and prediction. The pipeline helps in converting raw financial data into meaningful inputs for analytical and AI-based models.

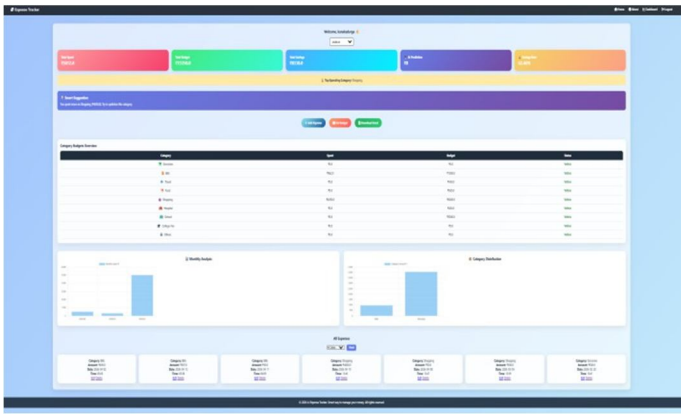
Model Training Workflow the system uses a simple AI-based approach to analyze and predict expenses. Training Process: Historical expense data serves as input for the model. The system analyzes spending patterns across categories and time periods. Basic machine learning or rule-based logic is applied to identify trends. The model estimates future expenses based on past behavior. Performance is evaluated using accuracy of predictions and consistency of results. This process helps users understand spending habits and improve budgeting decisions.

F. Expense Prediction Subsystem

The result represents the user's spending summary and estimated future expense based on past data. The system design allows easy expansion by adding more financial data and improving AI-based prediction techniques in future versions to enhance accuracy, efficiency, and better planning.

V. RESULT

The AI-driven system proposed for Expense Tracking and Budget Planning has the ability to analyze user expenses and provide meaningful insights more effectively than traditional manual methods. It evaluates spending patterns based on user-entered data and provide meaningful insights more effectively than traditional manual methods. It evaluates spending patterns based on user-entered data and generates reports and predictions. The results are reflected through charts and summaries that help users understand their financial behavior and make better budgeting decisions.



The system process user financial data by organizing daily expenses into structured categories such as food, transportation, bills, and others. These inputs are stored and transformed into meaningful features like amount, category, and timestamps. This structured data helps in clearly understanding user spending behavior and allows the system to analyze financial patterns effectively.

The AI-based analysis module is implemented using python and simple machine learning techniques. Various evaluation aspects such as accuracy of predictions and consistency of results were considered to measure system performance. Based on testing, the system is able to provide reliable predictions of future expenses and meaningful insights. Compared to traditional manual tracking methods, the system shows better efficiency and improved financial understanding. Analysis of the generated results confirms that the system can effectively identify user spending patterns and highlight areas of high expenditure. It provides clear summaries of expenses across categories and time periods. The system also performs well tested with new expense data, showing its ability to generalize and maintain consistent performance. Moreover, the web-based platform enables users to instantly record expenses and view analysis results through dashboards, charts, and reports. Users can quickly understand their financial status and receive alerts when their spending exceeds predefined budget limits. Overall, the system proves to be an efficient and scalable solution that helps individuals manage their finance and improve budgeting decisions.

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In comparison with traditional expense tracking methods, the proposed system provides significant improvements in usability and insight generation. Manual methods rely heavily on basic record-keeping and do not offer predictions or intelligent analysis. In contrast, the proposed system uses data analysis and AI-based techniques to uncover hidden spending patterns and provide smarter financial guidance.

The proposed system demonstrates several strong advantages in personal finance management. It provides an automated way to record and organize expenses, along with clear data visualization through charts such as monthly analysis and category distribution. The system enables users to easily understand their spending patterns and track financial behavior. It also offers real-time updates through a web-based interface, making expense tracking simple and efficient.

However, certain limitations exist when the system relies on limited historical data, as predictions may not always be highly accurate in such cases. Future enhancements may include the integration of more advanced AI models and large datasets to improve prediction accuracy. Additional features such as personalized financial recommendations and smart budgeting suggestions can further enhance the overall effectiveness of the system.

VI. CONCLUSION

The proposed AI-Based Expense Tracker and Budget Planner provides an efficient way to manage personal finances. It allows users to record expenses, categorize them, and view spending patterns through charts. The system uses basic AI techniques to analyze data and help users make better budgeting decisions. The web-based interface ensures easy access and real-time updates.

However, prediction accuracy depends on the availability of sufficient data. Future improvements may include advanced AI models, mobile integration, and personalized financial suggestions. Overall, the system helps users improve financial awareness and manage expenses more effectively.

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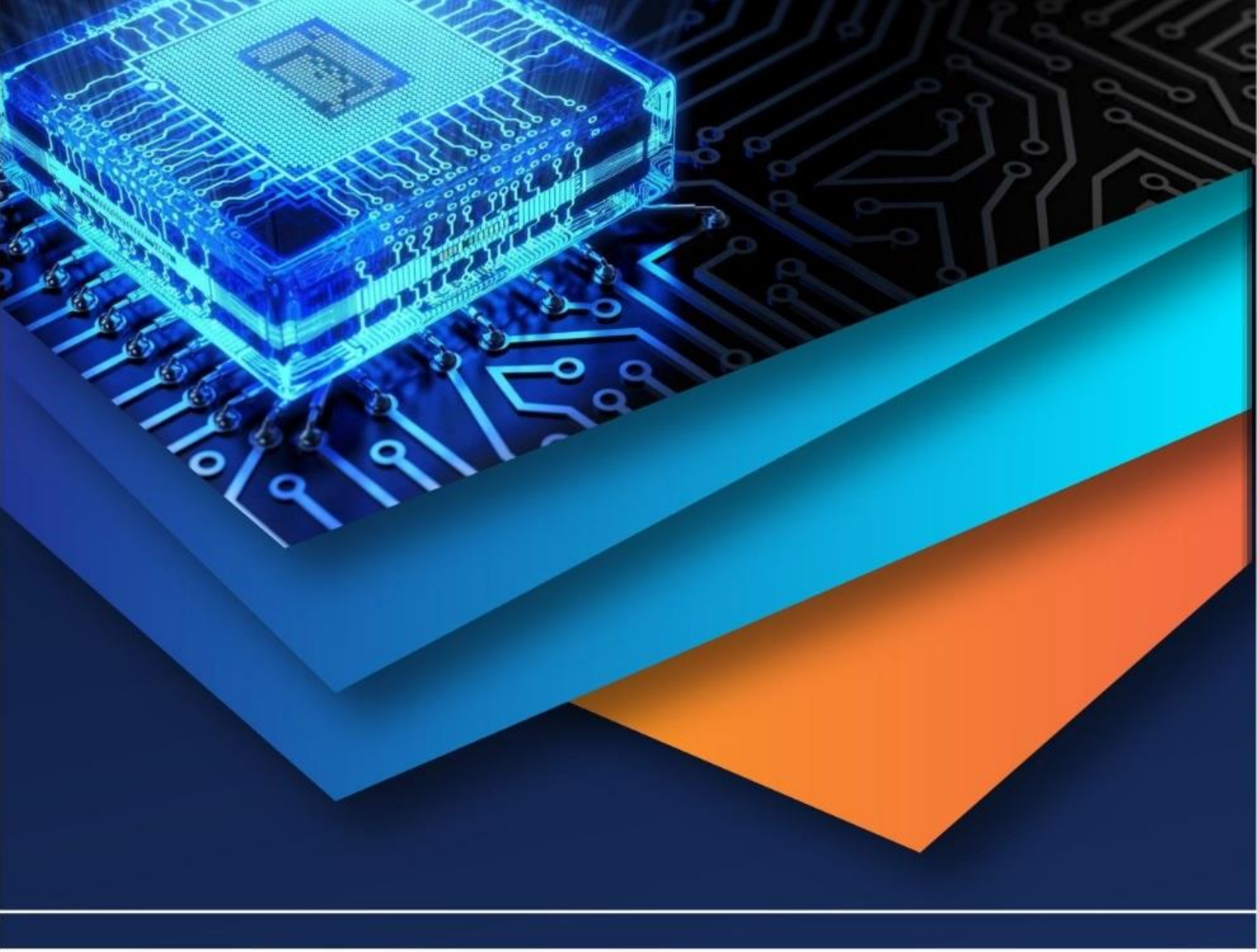
REFERENCES

[1] J. Brownlee explains the use of machine learning techniques for predictive analysis and data modeling (Machine Learning Mastery, 2020).
[2] Python software Foundation provides official documentation for python programing used in backend development (Python Documentation, 2023).
[3] Pallets projects present Flask, a lightweight web framework used for building web applications (Flask Documentation, 2023).
[4] Mongo DB Inc. provides a NoSQL database system for storing and managing application data (MongoDB Documentation, 2023).
[5] Chart.js developers present a simple and flexible JavaScript library for data visualization using charts and graphs (Chart.js Documentation, 2023)
[6] Mozilla Developer Network (MDN) provides comprehensive resources for HTML, CSS, and JavaScript used in frontend development (MDN Web Docs, 2023).
[7] W3Schools offers tutorials and references for web technologies including HTML, CSS, and JavaScript (W3Schools, 2023).
[8] T. Chen and C. Guestrin introduce XGBoost, a scalable machine learning algorithm for predictive modeling (Proc. ACM SIGKDD, 2016).
[9] I. Goodfellow, Y. Bengio, and A. Courville, Deep Learning, MIT Press,2016).
[10] IBM explains the concepts and applications of Artificial Intelligence in modern systems (IBM AI Overview, 2023).
[11] Investopedia explains personal finance management and budgeting techniques for individuals (Investopedia, 2023)
[12] GeeksforGeeks provides programming concepts and data analysis techniques used in software development (GeeksforGeeks, 2023).



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