

1. Literature Search and Summary

To inform the development of our mini project on **Predictive Cash Flow & Expense Alerts** and **AI-Powered Pre-Budgeting**, I conducted a literature search focusing on relevant research papers. Below are summaries of three selected studies that provide insights into these topics.

- **Paper 1: "Using a Cash Flow Model to Predict Future Cash Flow from Historical Cash Flow: A Malaysian Perspective" by Kamalia Mohamed Ali, Universiti Teknologi MARA, 2021**
 - **Main Findings:** This study investigates the role of historical cash flows in forecasting potential future cash flows for Malaysian publicly traded companies. The research found that using a cash flow model significantly improves the accuracy of predictions, particularly when historical data is analyzed over a three-year lag.
 - **Methods:** The study utilized financial statements from 159 companies across various industries, including construction, energy, and property. Historical cash flow data was collected from the Bursa Malaysia website, and a cash flow model was applied to predict future trends.
 - **Conclusions:** The findings indicate that historical cash flows are crucial for accurate forecasting, which can guide management decisions regarding capital allocation and financial planning. This aligns with our project's goal of developing predictive alerts for users based on their spending history.
- **Paper 2: "AI as a Budgeting Tool" by Valle-Cruz et al., Public Finance Journal, 2024**
 - **Main Findings:** This paper explores the application of artificial intelligence (AI) in public budgeting processes, emphasizing its potential to enhance financial data management and forecasting capabilities. The authors highlight how AI tools can empower local governments to make informed fiscal decisions.
 - **Methods:** The research involved case studies of small local governments utilizing AI tools like ChatGPT for budgeting purposes. It assessed the impact of these tools on data processing efficiency and decision-making.
 - **Conclusions:** The study concludes that AI can significantly improve budgeting processes by providing timely insights and recommendations. This is relevant to our mini project as it suggests that AI-powered pre-budgeting tools could offer real-time spending recommendations to users based on their financial health.
- **Paper 3: "Model on Cash Flow Forecasting and Risk Analysis for Contracting Firms" by Poon et al., International Journal of Project Management, 2002**
 - **Main Findings:** This paper presents a computer model designed for cash flow forecasting in contracting firms, analyzing the impact of various risk factors on cash flows. The model demonstrated good predictive capabilities regarding internal rates of return (IRR) and capital requirements.

- **Methods:** The authors developed a program that utilized sensitivity analysis to evaluate how five major risk factors affected cash flow predictions. Data from actual projects were used to validate the model's effectiveness.
- **Conclusions:** The results showed that the model could accurately predict future cash flows and provide advance warnings about potential capital requirements. This insight can inform our project by highlighting the importance of incorporating risk factors into predictive models for cash flow management.

These findings collectively inform our mini project by providing evidence of the benefits of predictive analytics and AI in personal finance management, particularly in enhancing user engagement and decision-making.

2. Identifying Gaps in Existing Research

Despite advancements highlighted in the literature, several gaps remain in current research related to predictive cash flow alerts and pre-budgeting recommendations:

- **Limited Focus on Personal Finance Applications:** Most studies emphasize corporate finance or public budgeting without addressing individual user needs in personal finance applications. Our mini project could fill this gap by developing tailored predictive models specifically designed for individual users based on their spending habits.
- **Integration of Real-Time Data:** While some research discusses historical data analysis, there is limited exploration of how real-time data can be integrated into predictive models for personal finance applications. Our project aims to incorporate real-time spending data to provide users with timely alerts about potential cash shortages.

By addressing these gaps, our mini project can significantly contribute to enhancing personal finance management tools.

3. Critical Analysis of a Selected Study

Focusing on **Paper 2**, "AI as a Budgeting Tool," we can critically analyze its strengths and weaknesses:

- **Strengths:** The use of case studies provides practical insights into how AI tools can be applied in real-world scenarios. The paper effectively demonstrates the potential benefits of AI in enhancing budgeting processes through improved data management.
- **Weaknesses:** One limitation is the focus on small local governments, which may not fully represent the broader applicability of AI tools across different sectors or larger organizations. Additionally, the paper does not extensively discuss potential challenges or limitations associated with implementing AI technologies.

Insights gained from this analysis suggest that while our project can benefit from the application of AI tools, we should also consider challenges such as user adoption and data privacy concerns when developing our predictive features.

4. Methodology Comparison

Comparing methodologies from **Paper 1** and **Paper 3**, we observe notable differences:

- **Paper 1's Methodology:** Utilizes a quantitative approach with historical data analysis to develop predictive models for cash flow forecasting. This method provides robust statistical insights but may overlook qualitative factors influencing financial decisions.
- **Paper 3's Methodology:** Employs a sensitivity analysis approach to assess risk factors affecting cash flow predictions. This method offers valuable insights into how external variables impact financial outcomes but may require complex modeling techniques that could be challenging for average users.

For our mini project, we might adopt elements from both methodologies by combining quantitative analysis with user-friendly interfaces that allow users to input qualitative factors influencing their financial decisions.

5. Citation and Attribution in Research

The following sources were used in this literature review:

1. Kamalia Mohamed Ali, "Using a Cash Flow Model to Predict Future Cash Flow from Historical Cash Flow: A Malaysian Perspective," Universiti Teknologi MARA, 2021.
 - Included for its insights into using historical cash flows for accurate forecasting in personal finance applications.
2. Valle-Cruz et al., "AI as a Budgeting Tool," Public Finance Journal, 2024.
 - Provided valuable information on how AI can enhance budgeting processes and decision-making.
3. Poon et al., "Model on Cash Flow Forecasting and Risk Analysis for Contracting Firms," International Journal of Project Management, 2002.
 - Offered critical insights into forecasting models that incorporate risk factors affecting cash flows.

Proper attribution is essential in academic research as it acknowledges the contributions of other scholars while maintaining academic integrity. It also enhances credibility by demonstrating thorough engagement with existing literature.