

Personal Debt Management Web-Application

CONTROL SYSTEMS AND INSTRUMENTATION ENGINEERING PROGRAM

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Introduction

Problem

The use of Buy Now, Pay Later (BNPL) services among university students has increased significantly, making it difficult to track payments and manage debt. Many young users lack financial awareness and understanding of their repayment capacity. The use of multiple BNPL platforms (e.g., SPayLater, LazPayLater) reduces visibility, leading to hidden debt and increased financial risk.

Objectives

- To make users aware of their total debt across multiple BNPL platforms.
- Provide personalized debt management based on capacity and risk
- To reduce the risk of hidden debt, missed payments, and long-term financial stress.

Scope

- Target:** University students using BNPL in Thailand
- Features:**
- Financial tracking
 - Debt risk prediction (ML)
 - Personalized recommendations (GenAI)
 - Financial Dashboard

Method

System Overview

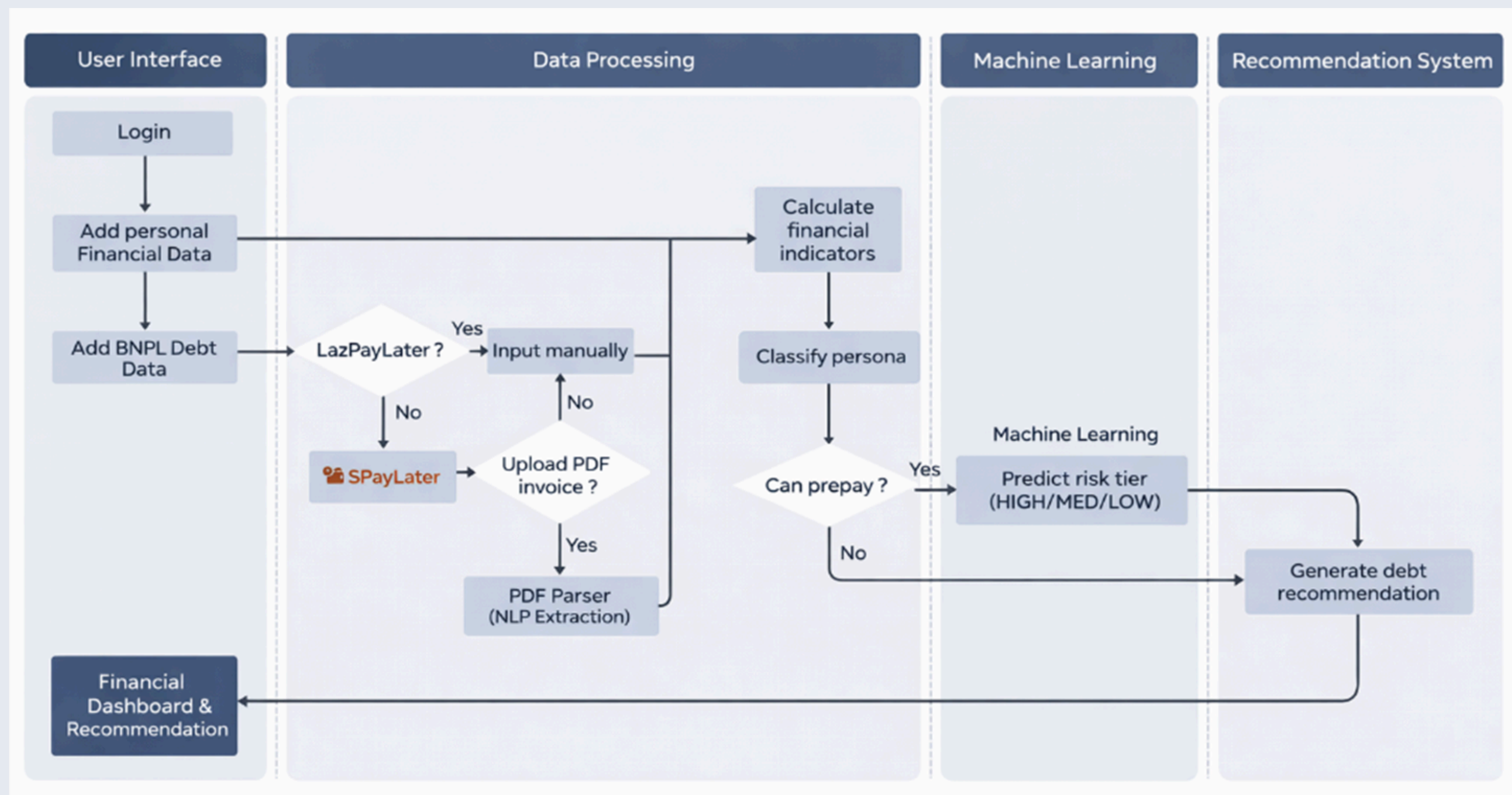


Figure 1 System Overview

1. User Interface

- Users log in and input personal financial data
- Add BNPL debt data from platforms such as SPayLater and LazPayLater
- Supports:
 - Manual input
 - PDF invoice upload
- Outputs are displayed in the Financial Dashboard & Recommendation

2. Data Processing

- Calculate key financial indicators (e.g., DTI, credit utilization)
- Use an NLP-based PDF parser to extract data from invoices
- Perform persona classification based on financial behavior

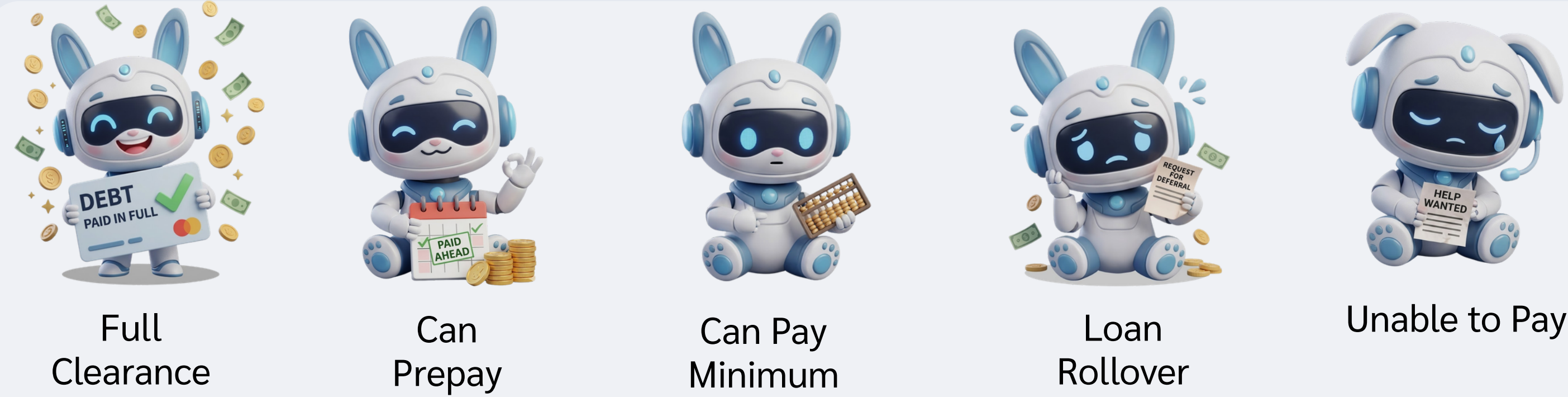


Figure 2 Persona

- Assess repayment capability (e.g., likelihood of prepayment or default), focusing on “can prepay” persona as input for machine learning to predict debt risk tier.
- #### 3. Machine Learning
- Models used: Logistic Regression and Gradient Boosting
 - Predict debt risk tier: HIGH / MED / LOW
 - Output reflects the user’s financial risk level

4. Recommendation System

- Uses Gemini 2.5 Flash (Generative AI)
- Generates personalized debt repayment recommendations

Results

Web Application

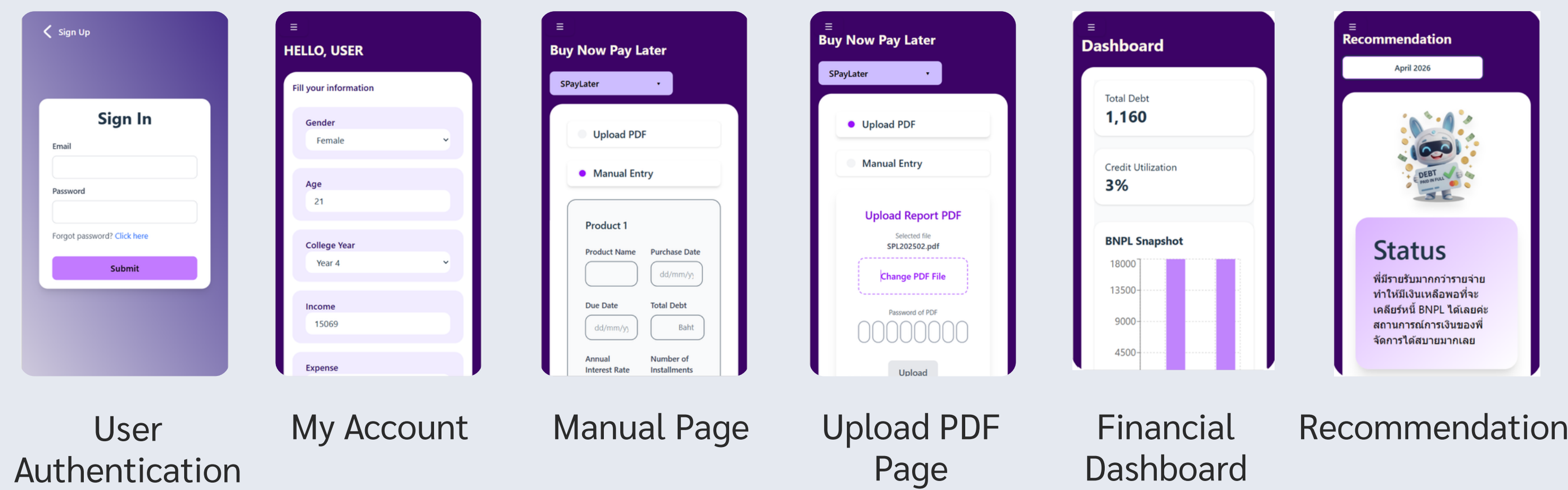


Figure 2 Web Application

The web application demonstrates system workflow, where users authenticate, input financial and BNPL debt data, and view financial status through a dashboard. Based on analyzed data and predicted debt risk levels, the system generates personalized repayment recommendations.

Machine Learning for Credit Risk Assessment

Model	Precision	Recall	F1-score
Logistic Regression	0.5517	0.5862	0.5338
Gradient Boosting	0.5577	0.6192	0.576

Table 1 Model Performance Comparison

From Table 1, Gradient Boosting achieves higher overall recall and F1-score, indicating more balanced performance across all risk tiers. While Logistic Regression attains higher recall for the HIGH-risk class, it does so at the expense of significantly lower performance in LOW-risk detection. Given the objective of minimizing missed high-risk cases, greater emphasis is placed on HIGH-risk recall. However, maintaining reasonable performance across other classes remains important. In this context, Gradient Boosting provides a better trade-off between high-risk detection and overall model stability, and is therefore selected as the final model.

Generative AI for Personalized Financial Recommendations

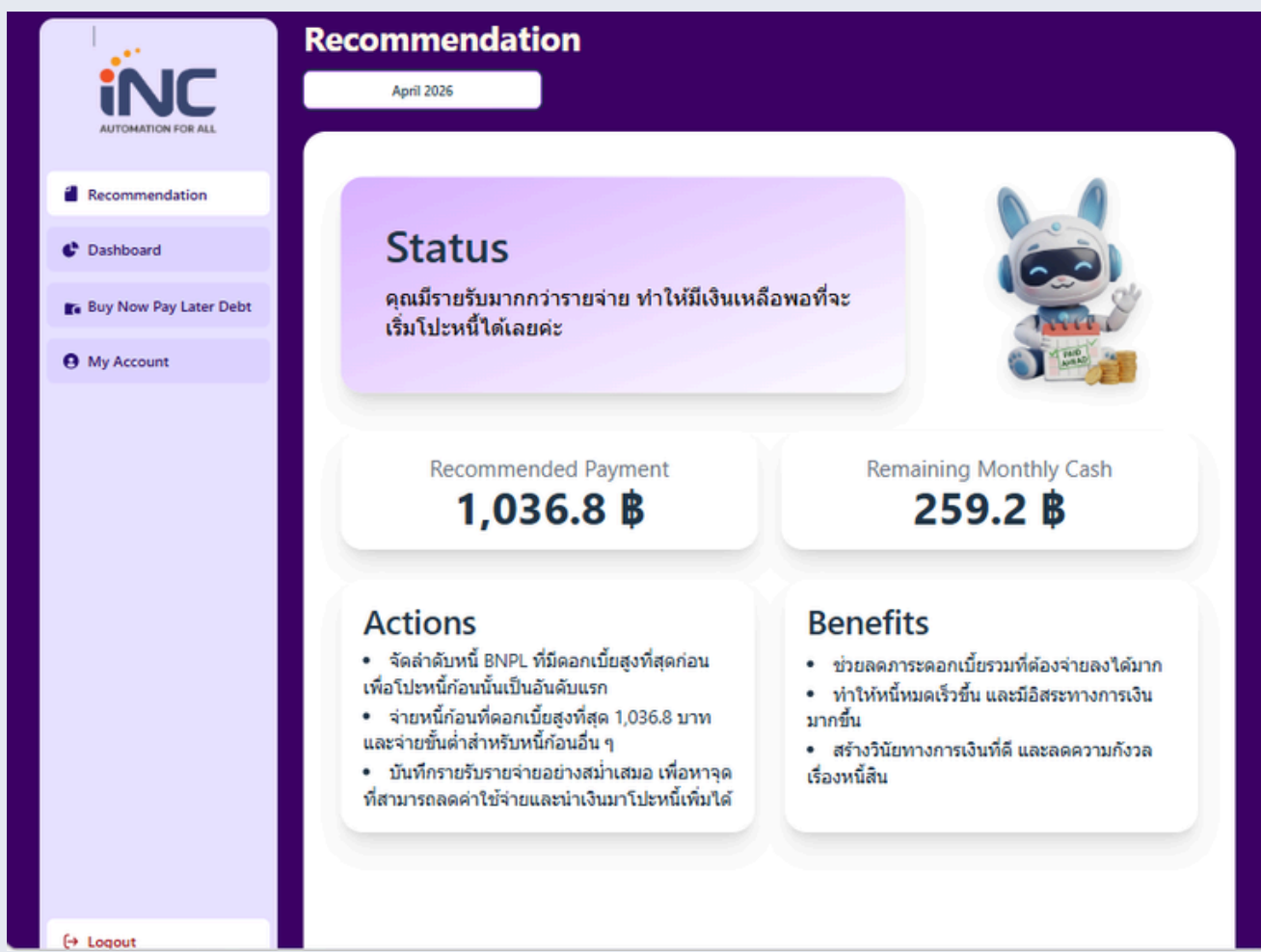


Figure 3 Personalized Financial Recommendations

The dashboard shows Total Debt, Credit Utilization, DTI Trend, and Recent Transactions, reflecting debt, credit use, and spending behavior. Tracking these over time helps evaluate progress—if they decrease, it indicates improved financial health, better spending control, and effective recommendations.

Conclusion

This project presents an AI-powered web application for managing BNPL debt among university students. By prioritizing recall, the system improves the detection of high-risk users, enabling early intervention and reducing potential financial risk. It enhances debt visibility and provides personalized repayment recommendations, supporting more informed and proactive financial decision-making.

Reference

- [1] A. R. Dil, “AI and Machine Learning in Credit Risk Assessment,” 2025.
- [2] M. Suganya et al., “GenAI-Powered Personal Finance Consultant,” in Proc. ICDSBS, 2025.
- [3] M. R. Mahmud et al., “AI-Driven Credit Risk Assessment for BNPL,” J. Bus. Manag. Stud., 2024.