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Machine Learning Based Credit Score prediction system for Financial Institutions

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CSA1024-Software Engineering for Automation

Introduction

•**Overview:**Efficient and accurate credit scoring is crucial for financial institutions to assess borrower risk, reduce loan defaults, and enhance lending decisions.

•**Problem Statement**:Traditional credit scoring methods rely on limited financial data and rule-based models, often leading to inaccurate risk assessments, bias against new borrowers, and slow loan approval processes.

•**Purpose**: This project aims to develop an AI-driven credit scoring system that enhances the accuracy, fairness, and efficiency of credit risk assessment.

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Objectives

- Develop an Machine Learning credit scoring framework to improve risk assessment accuracy.
- Leverage machine learning algorithms to analyze both traditional and alternative financial data.
- Enhance financial inclusion by providing fair credit scores for individuals with limited credit history.
- Improve fraud detection by identifying suspicious financial behavior using anomaly detection techniques.

Literature Review / Background

- **Existing Research**: Previous research on credit scoring has primarily focused on rule-based models like FICO and VantageScore, which rely on traditional financial data such as credit history and outstanding loans.

- **Theoretical Foundation**: This system leverages machine learning algorithms such as Logistic Regression, Random Forest, XGBoost, and Neural Networks to predict credit scores based on financial behavior.
- **Research Gap**: Existing credit scoring methods primarily focus on traditional financial metrics and rule-based models, which often lack adaptability and fairness.

Methodology

- **Tools & Frameworks**: python, XGBoost,
- Google colab
- **Development Approach**: Implementation of machine learning algorithms to enhance credit scoring accuracy, fairness, and real-time decision-making for financial institutions.
- **Data Collection**: Financial transaction records, credit history, alternative data sources

System Design / Architecture

- **Flowcharts & Block Diagrams** – Illustrating the machine learning-based credit scoring workflow and decision-making process.
- **Technology Stack** – Showing the core technologies used, including ML frameworks, databases, and cloud platforms.
- **Backend:** AI-driven credit risk assessment models using Python, TensorFlow, and XGBoost.
- **Frontend:** Web-based or mobile application interface for financial institutions and borrowers.
- **Database:** Storing financial records, credit history, and alternative data for real-time analysis.
- **System Architecture:** Integrating machine learning models, Explainable AI (XAI), and automated credit decision-making.

Implementation

- **Key Features & Functionalities**:
  - Alternative Data Integration – Considers mobile payments, e-commerce transactions, and social media behavior.
  - Fraud Detection & Risk Analysis – Identifies suspicious financial behavior using anomaly detection
  - .
- **Screenshots / Demos**: Graphical representation of energy

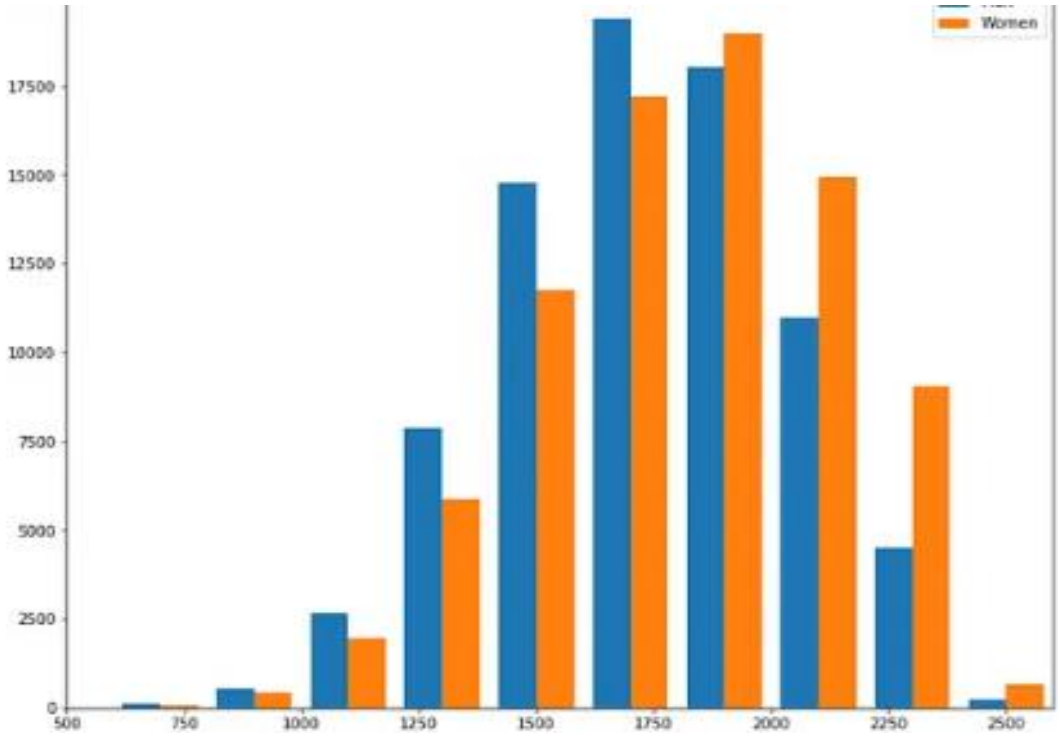

```
Task 1 added to the queue | Priority: 3 | Energy Cost: 10mWh
Task 2 added to the queue | Priority: 1 | Energy Cost: 20mWh
Task 3 added to the queue | Priority: 2 | Energy Cost: 15mWh
Task 4 added to the queue | Priority: 4 | Energy Cost: 25mWh

Starting Energy-Efficient Task Scheduler...

Executing Task 2: App Update | Energy Cost: 20mWh
Battery Level After Execution: 30%

Executing Task 3: Media Playback | Energy Cost: 15mWh
Battery Level After Execution: 15%

Executing Task 1: Background Sync | Energy Cost: 10mWh
Battery Level After Execution: 5%

Battery Too Low to Execute Task 4. Skipping Task...

All tasks completed or battery depleted!

=== Code Execution Successful ===
```

Results & Discussion

•**Outcomes**: Improved credit scoring and optimized task execution.

•**Comparison with Existing Solutions**:

- Traditional credit scoring relies on rule-based models with limited data sources.
- Existing methods struggle with financial inclusion, whereas ML-based scoring considers credit-invisible individuals.
- **Real-Time Energy Monitoring**: The system enables real-time credit assessment by continuously analyzing financial data and updating credit scores dynamically.
- **Data Visualization**: Graphs and charts compare traditional vs. machine learning-based credit scoring, showcasing accuracy improvements, risk prediction efficiency, and fraud detection rates.



Challenges & Limitations

Issues Faced:

•Implementing an ML-based credit scoring system requires handling large, diverse datasets, including alternative financial data sources. Ensuring fairness, transparency, and bias mitigation in machine learning models is challenging.

•**Possible Constraints:**

•Some financial institutions may have limited access to alternative data sources, affecting prediction accuracy.

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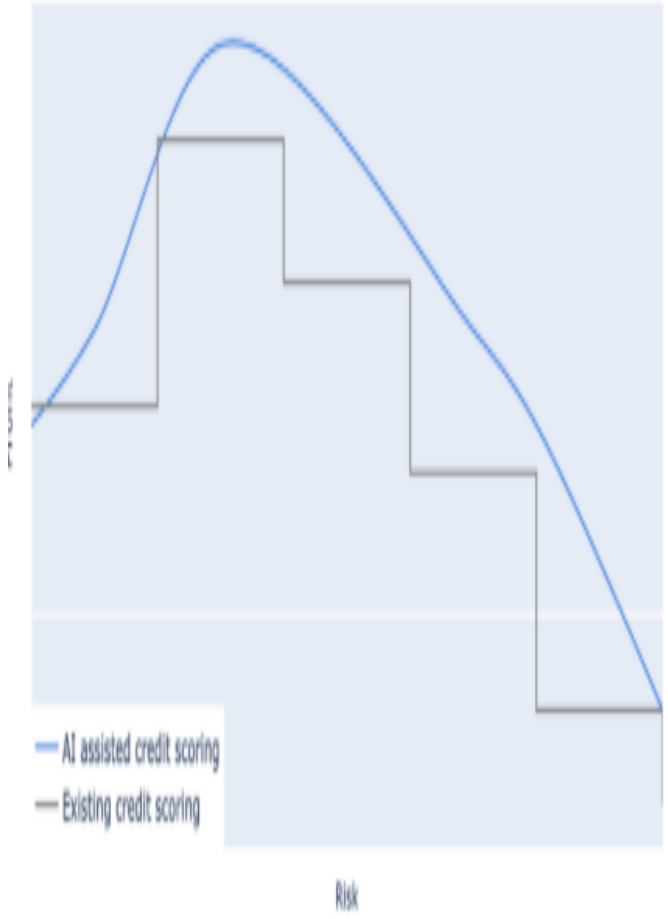
Future Scope

- Integration with AI-driven credit decision systems – Enhancing loan approvals with real-time predictive analytics.
- AI-powered risk assessment – Continuously learning from borrower behavior to improve credit scoring accuracy.
- Adaptive fraud detection models – Using AI to dynamically detect and prevent emerging financial fraud patterns.



Conclusion

- **Summary**:This project presents a machine learning-based credit score prediction system that enhances accuracy, fairness, and efficiency in financial decision-making.
- **Key Takeaways:**Improved credit scoring accuracy, Faster and fairer loan approvals, Enhanced fraud detection,Greater financial inclusion .

References

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ThankYou!