\*\*Project Title:\*\* Hidden Markov Model for Credit Fraud Detection

\*\*Group Number:\*\* [Insert Group Number]

\*\*URL of Project’s Website:\*\* [Insert URL]

### Team Profile

\*\*Team Members:\*\*

1. [Member 1 Name] - [Qualifications and Strengths] (e.g., programming, design, statistical analysis)

2. [Member 2 Name] - [Qualifications and Strengths]

\*Note: It is expected that every team member shall be involved in all project activities; this only indicates individual strengths, not their sole responsibilities.\*

\*\*Team Leader:\*\* [Name of the elected team leader] (if applicable)

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### Proposed Project Description

\*\*1. Introduction\*\*

Credit fraud is a significant and growing issue that impacts individuals and organizations globally. Current systems often struggle to keep up with sophisticated fraudulent activities. This project proposes to develop a system using Hidden Markov Models (HMM) to effectively detect credit fraud in transactions.

\*\*2. Problem Diagnosis\*\*

The problem domain involves detecting fraudulent transactions in credit systems. The issues with current practices include:

- \*\*High False Positive Rates:\*\* Legitimate transactions are often flagged as fraudulent, leading to user dissatisfaction.

- \*\*Inability to Adapt:\*\* Current systems may not adapt quickly to evolving fraudulent techniques.

- \*\*Data Volume:\*\* Financial transactions generate massive datasets that are challenging to analyze in real-time.

\*Example scenarios of these issues might include interviews with financial institutions that discuss their current challenges with fraud detection.\*

\*\*3. Proposed Treatment\*\*

To address the diagnosed problems, we propose the following interventions:

- \*\*Implementation of HMM\*\* that models the sequence of transactions to identify unusual patterns indicative of fraud.

- \*\*Real-time Monitoring\*\* to analyze transactions as they occur and flag suspicious ones for further review.

- \*\*User-Friendly Dashboard\*\* for analysts to view flagged transactions and insights.

\*Metrics for success will include reduced false positives, increased detection rates, and improved analyst response times. Example scenarios could illustrate how the HMM will flag a suspicious transaction for further investigation.\*

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### Plan of Work

\*\*1. Initial Steps (Next Few Weeks):\*\*

- Research existing HMM algorithms and their application to fraud detection.

- Gather requirements from potential users in the financial sector to tailor the solution to real needs.

\*\*2. Functional Features:\*\*

- \*\*Transaction Analysis:\*\* Detect patterns in transaction sequences.

- \*\*Alerts Generation:\*\* Notify users of flagged transactions based on predefined thresholds.

- \*\*Reporting Tools:\*\* Generate reports showing detection rates, false positives, and other relevant metrics.

\*Each team member will be responsible for specific functionalities, such as:\*

- [Member 1 Name]: Development of the transaction analysis module.

- [Member 2 Name]: Implementation of the alerts generation mechanism.

\*\*3. Product Ownership:\*\*

Each team member’s contributions will be clearly defined to ensure accountability, with an emphasis on functional feature ownership rather than subsystems.

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### Conclusion

This proposal aims to leverage the HMM to provide a robust solution to credit fraud detection. By thoroughly diagnosing the problem, prescribing a targeted treatment, and outlining a clear plan of work, we aim to create a beneficial system for financial institutions.

### Important Considerations:

- Confirm the availability of datasets required for model training and validation.

- Outline any additional resources or expertise needed (e.g., access to financial transaction data, knowledge in data security).

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