Nature Inspired Computing Research Proposal: Transaction Fraud Detection

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***Abstract*—This proposal outlines our approach to Transaction Fraud Detection using a combination of nature inspired computing and machine learning techniques. Our goal is to develop a robust system that efficiently identifies fraudulent transactions.**

***Index Terms*—Nature Inspired Computing, Fraud Detection, Machine Learning.**

I. Project Proposal

A. Project Idea

Our project focuses on detecting fraudulent transactions in financial systems. The system combines nature inspired computing algorithms with classical machine learning to improve detection accuracy.

B. Method/Technique

We propose a hybrid approach that employs natural phenomena-inspired algorithms (e.g., genetic algorithms, swarm intelligence) alongside supervised learning models to optimize both feature selection and model performance.

C. Dataset

The primary dataset is available on Kaggle: https://www.kaggle.com/c/ieee-fraud-detecon/overview. Additional implementation details and resources are provided in the related GitHub repository: https://github.com/pmacinec/transacons-fraud-detecon.

D. Timeline

- **Week 1-2:**
  - Project kickoff and requirement gathering.
  - Initial dataset inspection and preprocessing setup.
- **Week 3-4:**
  - Development and prototyping of nature inspired computing algorithms.
  - Setup of baseline machine learning models.
- **Week 5-6:**
  - Integration of the hybrid approach.
  - Continuous testing and refinement of algorithms and models.
- **Week 7-8:**
  - Comprehensive system testing and performance evaluation.
  - Documentation, final report preparation, and project presentation.

E. Individual Contributions

- **Nikita Zagainov:**
  - Data preprocessing and exploratory data analysis.
  - Building the initial data cleaning and transformation pipelines.
- **Dmitry Tetkin:**
  - Design and prototyping of nature inspired computing algorithms.
  - Iterative improvement and integration of algorithms throughout the timeline.
- **Alisher Kamolov:**
  - Implementation and tuning of machine learning models.
  - Integration of model outputs with nature inspired methods.
- **Nikita Tsukanov:**
  - End-to-end system testing and performance evaluation.
  - Comprehensive documentation and final report preparation.

F. References

REFERENCES

[1] Kaggle, "IEEE Fraud Detection," Available: https://www.kaggle.com/c/ieee-fraud-detecon/overview.

[2] GitHub, "Transacons Fraud Detection," Available: https://github.com/pmacinec/transacons-fraud-detecon.