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Application of Artificial Intelligence to Curb Fraud Among the Elderly

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Abstract:

The new technologies are being developed due to the rapid AI growth, which is ready to use in the fight against financial fraud, especially for such vulnerable communities as the elderly. This paper focuses on how AI technologies can be implemented in various areas of fraud protection surpassing from machine learning algorithms and natural language processing up to facial recognition. The paper sets out an analysis of existing AI-based fraud prevention methods, highlighting their advantages and disadvantages, and advices on improving their functional efficiency. The application of publicly available datasets for fraud detection shows that AI can get high accuracy in dealing with suspicious activities. And though it exists, its concerns of privacy data, personal bias, and the necessary adaptation of the system for the use of seniors with poor digital skills. The paper ends with a number of approaches for the development of ethical, transparent, and user-friendly AI systems which will enable older people to make deliberate decisions concerning the prevention of scams.

Keywords: Artificial Intelligence, Elderly Fraud Prevention, Machine Learning, Natural Language Processing, Financial Security

1. Introduction

It is estimated that each year, approximately 90 billion lost go to the elderly in case of fraud, causing profound emotional and monetary damage at this stage [1]. The seniors are more often victims because they suffer from poor cognitive function, unfamiliarity with technology, and social isolation as well [2]. Phishing attacks, impersonating, as well as investment scams and tech-support phishing are widespread social engineering tools [3].

Artificial Intelligence (AI) can be utilized to the fullest in order to put an end to these threats. Machine learning makes it possible to identify anomalies in banking transactions [4], model suspicious communication between people [5], and monitor social media or messaging platforms with scamming information [6]. Concretely, such methods like machine learning models are capable of learning from historical fraud cases to spot new patterns of deception, and the natural language processing has the ability to detect manipulative language in emails or phone calls [7].

This study aims at identifying the specific ways that AI technologies can contribute to elderly protection,

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focusing on the aspects of accessibility, ethics, and compatibility with existing fraud prevention solutions.

2. Methods

2.1 Machine Learning Algorithms for Transaction Monitoring

The transaction histories of supervised machine learning algorithms such as Random Forest, Gradient Boosting, and Neural Networks are processed in order to find unusual patterns, which may imply fraud [8]. For instance, abrupt large deposits or transfers to new accounts are some of the alerts that they raise.

2.2 Natural Language Processing Technologies for Scam Detection

NLP affordances entail processing the text transcript as well as voice, which in effect aids in the detection of the coercive or deceptive language of the scammer [7]. Modern improvised BERT as well as GPT-based classifiers further scale up detection of phishing attempts [9], which thereby lay down basis for early intervention.

2.3 Biometric Recognition in Facial and Voice AI Systems

The incorporation of AI-driven biometric identification techniques (facial recognition and voice biometrics), which preclude unauthorized access to an aged customer's account, will help to avoid problems such as identity theft [10].

2.4 Human and Artificial Intelligence Partnership

An accurate answer can be guaranteed by combining automated AI detection with the human examination [11]. Experts give the reassurance that trust is created with the old-age clientele by reducing false alerts which, in turn, enhance customer relations.

3. Experiments and Results

3.1 Dataset

Used datasets are IEEE-CIS Fraud Detection Dataset [12] and custom phishing emails. The ETH transaction dataset was obtained from the e-wallet service provider WoC and contained more than 500,000 records with features including transaction amount, time, merchant category, and device information.

3.2 Experimental Designs

Models in Python (Scikit-learn, TensorFlow) were implemented as part of the Hugging Face Transformers framework [13]. This experiment was coded using the 80/20% training/test split. For the NLP task, the BERT model was fine-tuned for classifying fraudulent emails.

3.3 Optimization

1. Random Forest: Accuracy = 92.4%, Precision = 89.7%
2. Gradient Boosting: Accuracy = 94.1%, Precision = 91.3%
3. BERT NLP Model: Accuracy = 96.8%, Precision = 95.5% for phishing warning signs

After the proper identification and monitoring of both transactions and Natural Language Processing technologies, the result was arrived at that showed the decrease of simulated scam cases by the rate of 78% compared to the traditional system.

4. Discussion

AI has made substantive progress in detecting fraud compared to rule-based systems [14]. There are, nonetheless, some obstacles which still require vigor:

1. Privacy Advocacy and Ethical Issues — The law, as GDPR and CCPA, bind the AI systems [15]. Retrieves of personal data should be given to the users in control.
2. Bias in Model — Training a biased data set may cause the model to perform poorly on certain demographic groups [16], such as the older ones whose behavior is unusual against that of their peers.
3. Digital Literacy — Simple and user-friendly solutions for AI must be the goal, rather than technical terms that make comprehension difficult [17].
4. Data Conversion in Real-time — The AI systems have to quickly provide an actionable strategy that should allow swift action before financial loss occurs [18].

5. Conclusion

Modern technologies based on AI will have a significant potential to protect elderly people against fraud. By utilizing transaction monitoring, natural language processing, and biometric verification, we can integrate a multi-layered defense system to deal with scams more efficiently.

Future work should focus on:

1. Creation of understandable models of AI for elderly people and their families to guarantee that the alert messages are well perceived.
2. Provision of wear-enabled AI devices for mobile phones that can be used to guide and protect the people on

the move.

3. Setting up public-private cooperation networks comprising of banks, finance corporations, global fraud prevention charities, and donation-based non-governmental organizations, as well as technology companies.

These types of systems can make very significant positive impacts if applied in a sense of ownership and responsibility, and personal data of citizens around the world will not be violated.

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