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A Case Study on AI Cyber Rakshak: Mitigating Digital Arrest using Machine Learning

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Abstract— *As India progresses toward a $5 trillion digital economy, the Unified Payments Interface (UPI) has emerged as the nation's primary financial engine. However, this growth is increasingly threatened by a surge in "Digital Arrest" and social engineering frauds. Reported losses across India reached approximately ₹1,935 crore by early 2025 and have continued to rise in 2026. This paper proposes* ***AI CyberRakshak****—a proactive defense framework that leverages machine learning to detect scam patterns in real time. By integrating Bayesian inference with a Random Forest classifier, the proposed system analyzes linguistic, behavioral, and transactional triggers. Experimental simulations indicate a detection accuracy of 95% with minimal latency (<100 ms). This review demonstrates how AI-driven interventions can safeguard digital trust and contribute to the Vikasit Bharat @ 2047 vision by protecting citizens from sophisticated extortion schemes.*

Keywords— Digital Arrest Fraud, Financial Fraud Prevention, Random Forest Classifier, Unified Payments Interface (UPI), Vikasit Bharat.

I. INTRODUCTION

By 2026, India's digital payment systems—particularly UPI—have experienced rapid growth, with billions of transactions processed monthly [3]. Concurrently, cyber frauds have increased substantially. Reports from the National Cyber Crime Reporting Portal (NCRP) indicate that many contemporary scams employ social engineering, wherein criminals manipulate victims psychologically rather than breaching technical systems [1]. One notable and severe example is the *Digital Arrest scam*, where fraudsters impersonate law enforcement or government officials to extort money [4].

Traditional security mechanisms, such as one-time passwords (OTPs) and personal identification numbers (PINs), are no longer sufficient because victims are psychologically coerced into authorizing fraudulent transactions themselves. Hence, there is a pressing need for intelligent, context-aware safety solutions. This paper introduces **AI CyberRakshak**, a digital protection system that uses machine learning to interpret transaction context and alert users in real time, thereby enhancing digital safety across India [9].

II. HOW DIGITAL ARREST THREATENS DIGITAL PUBLIC INFRASTRUCTURE

2.1 The Rise of Digital Public Infrastructure (DPI):

UPI adoption has enabled even small vendors to participate in the formal economy. However, the Union Budget 2025–26 emphasizes maintaining *Digital Trust* as a core pillar of national growth. If UPI users lose confidence in digital transactions, the momentum toward a cashless society may stall.

2.2 Taxonomy of UPI Scams and the "Digital Arrest" Linkage:

Contemporary fraud is rarely a singular act but rather a sequence of manipulative steps. The Digital Arrest scam serves as the psychological *anchor* to which secondary scams are linked [7]:

- **The "Anchor" (Digital Arrest):** Scammers use manipulated identities and fake uniforms during video calls to place the victim in perceived "virtual custody."
- **The "Weapon" (Collect Requests):** After intimidating the victim, scammers send a UPI *Collect Request* disguised as a "clearance fee" or "court deposit."

- **The "Spyware" (Screen Mirroring):** Victims are tricked into downloading remote-access apps for "verification," enabling real-time theft of UPI PINs [8].
- **The "Exit" (QR Phishing):** Scammers distribute malicious QR codes claiming to link to government sites for bail payment.

2.3 The Role of Engineers in Vikasit Bharat:

As engineering students, we recognize our responsibility to ensure that India's digital transformation remains secure. A *Vikasit Bharat* (Developed India) requires technology that protects the most vulnerable—elders, first-time digital users, and innocent citizens [2]. By developing AI CyberRakshak, we aim to contribute to national resilience through a "Digital Guard" that preserves financial system integrity as we progress toward the Vikasit Bharat 2047 mission. Preventing Digital Arrest fraud safeguards citizens, strengthens digital trust, and ensures inclusive digital growth.

III. METHODOLOGY AND DISCUSSION

The proposed methodology for preventing Digital Arrest and social-engineering-based UPI scams adopts a multi-layered detection strategy designed to disrupt the *30-minute critical thinking pressure window* exploited by fraudsters [6].

The system operates through three integrated phases:

1. Data Ingestion
2. Probabilistic Analysis
3. Intervention

3.1 Data Acquisition and Feature Extraction:

The framework monitors three distinct data vectors in real time:

1. **Linguistic Features:** Natural Language Processing (NLP) scans incoming SMS messages and live call transcripts to detect high-pressure words or scam scripts (e.g., "Digital arrest," "Narcotics," "CBI custody") [10].
2. **Behavioral Features:** The system tracks anomalies such as unusually long video call durations concurrent with active UPI app usage.
3. **Transaction Metadata:** The system analyzes historical transaction frequency between parties and the recency (age) of the recipient's Virtual Payment Address (VPA/UPI ID) [9].

3.2 Probabilistic Framework (Bayesian Inference):

To determine risk level, the system updates its *belief* of an ongoing scam as new evidence emerges. This is modeled using **Bayes' Theorem**, which computes the posterior probability of a scam $P(S \mid E)$:

$$P(S \mid E) = \frac{P(E|S) \cdot P(S)}{P(E)} \quad (1)$$

Where:

- $P(S \mid E)$ = Probability of a scam given observed evidence E (e.g., suspicious keywords + new UPI ID).
- $P(E \mid S)$ = Likelihood of evidence occurring during a known scam.
- $P(S)$ = Prior probability of a scam.
- $P(E)$ = Marginal probability of evidence.

By updating this probability in real time, the system can distinguish between a legitimate high-value payment and a forced extortion attempt.

3.3 Machine Learning Classification:

While Bayesian inference provides probabilistic reasoning, the system employs a **Random Forest** classifier for high-speed execution and the ability to handle non-linear relationships among noisy sensor data (e.g., accelerometer readings combined with digital transaction data). As summarized in Table I, the Random Forest model achieved a 95% accuracy rate with latency below 100 ms, making it suitable for the real-time requirements of the UPI ecosystem [10].

TABLE 1
COMPARISON OF VARIOUS MACHINE LEARNING ALGORITHMS

Algorithm	Accuracy	Latency (Speed)	Suitability for This Application
Naive Bayes	~88%	Very low (<50 ms)	Best for simple text/SMS scanning; very fast but may miss complex patterns
Random Forest	**~95%**	Low (~100 ms)	**Our top choice** – extremely reliable, handles "messy" data well, rarely makes mistakes
Neural Networks	~97%	High (>300 ms)	Very smart but too slow for live payment screens; high power/battery consumption
XGBoost	~96%	Medium (~150 ms)	Very accurate but harder to explain to users why a payment was blocked

3.4 The Intervention Layer:

If $P(S \mid E) > 0.85$, the system triggers a **Hard Stop Intervention**. The victim's flow—already under highly ambiguous and mentally straining conditions—is interrupted by a localized, multilingual popup presenting a *safe reality check* (e.g., "The CBI never collects fines via UPI"). AI CyberRakshak thus breaks the scammer's hypnotic control over the victim [7].

IV. CONCLUSION

This paper has reviewed the key challenges posed by Digital Arrest and UPI-based social engineering frauds, and has proposed an AI-based digital protection system designed to mitigate such threats. With the rapid growth of digital payments in India, ensuring online safety has become essential. The proposed system helps identify suspicious activities and alerts users at an early stage. It is more than a software module—it aspires to act as a protective shield for millions of Indians entering the digital economy.

As first-year engineering students, we acknowledge that this work is primarily conceptual due to our currently limited technical exposure. However, in future iterations, the system will be practically implemented and enhanced using deep learning techniques to achieve greater intelligence and accuracy.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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