



Crime Report and Reward Management System Using Machine Learning

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Abstract: This paper presents an AI-Driven Crime Reporting and Reward Management System to improve crime reporting efficiency and transparency. The system allows citizens to report crimes digitally with optional anonymity, while Machine Learning techniques are used for crime classification, fake report detection, and hotspot analysis. A reward mechanism encourages responsible reporting by evaluating the accuracy of submitted information. The system enhances decision-making, reduces response time, and strengthens trust between citizens and law enforcement.

Keywords: Artificial Intelligence, Crime Reporting, Machine Learning, Reward System, Crime Analysis

I. INTRODUCTION

Crime is a major concern in modern society, affecting public safety and social stability. However, people still face several challenges while reporting crimes. One of the biggest issues is hesitation in reporting due to fear, lack of anonymity, and complicated procedures. Even when crimes are reported, delays in verification and inefficient case handling reduce the effectiveness of the system.

Most existing crime management systems focus on only one aspect, such as:

- Recording crime reports digitally
- Tracking case status
- Providing emergency helpline services

However, these systems do not integrate intelligent analysis, fake report detection, or reward-based motivation for citizens. Due to this limitation, public participation remains low and decision-making is often slow and reactive.

With the advancement of Artificial Intelligence, Machine Learning, and smart governance technologies, it is now possible to analyze crime data, identify patterns, and support faster and more accurate decision-making.

This project proposes an **AI-Driven Crime Reporting and Reward Management System** using Machine Learning. The system follows a multi-layer architecture. In the first stage, user-submitted crime data is preprocessed and analyzed using machine learning models for crime classification, duplicate detection, and hotspot identification. In the second stage, a verification and reward management module ensures authenticity and allocates rewards based on the usefulness of the information.

Unlike existing systems, this project not only enables digital crime reporting but also integrates intelligent analysis with a structured reward mechanism. The proposed system encourages responsible citizen participation, improves transparency, reduces response time, and supports efficient law enforcement, contributing to safer and smarter communities.

II. LITERATURE REVIEW

2.1 Existing Research on Crime Management Systems

Existing research in crime management mainly focuses on digital crime reporting systems, surveillance technologies, and data analysis techniques. Many systems provide online platforms where citizens can register complaints and track case status, reducing dependency on manual processes.



Machine Learning and data analytics have also been applied in crime analysis to identify patterns, predict crime-prone areas, and support decision-making. Techniques such as classification algorithms and clustering methods are used to analyze historical crime data and detect trends.

Some studies also explore anomaly detection and fraud detection techniques to identify suspicious or false information in reporting systems. Additionally, smart city and e-governance initiatives integrate digital platforms to improve communication between citizens and law enforcement agencies.

However, most existing systems focus only on crime recording or analysis, rather than providing a complete solution that integrates intelligent analysis with citizen engagement and reward-based participation.

2.2 Limitations of Existing Research

Despite advancements, existing research has the following key limitations:

1. Lack of reward-based participation:

Most systems do not include mechanisms to encourage citizens to report crimes, leading to low public involvement.

2. Limited intelligent analysis integration:

Many platforms focus only on report submission and tracking, without using machine learning for classification, fake report detection, or prioritization.

3. Absence of fake/duplicate report detection:

Existing systems often lack proper verification support to identify misleading or repeated reports, reducing reliability.

4. No structured decision-support system:

There is limited support for assigning risk levels or prioritizing cases based on data-driven insights.

5. Weak integration between citizens and authorities:

Most systems do not provide a seamless and transparent connection between users and law enforcement, affecting trust and efficiency.

2.3 Research Gap Identified

There is no system that integrates:

- AI-based crime analysis
- Fake/duplicate report detection
- Reward-based citizen participation
- Data-driven case prioritization

Therefore, the gap is the lack of an intelligent crime reporting system that combines machine learning with real-time reporting and reward mechanisms. The proposed system addresses this by providing a unified AI-driven platform for efficient and transparent crime management.

III. PROPOSED METHOD

3.1 System Architecture

The proposed system is designed as an intelligent pipeline that integrates crime reporting with machine learning-based analysis and reward management. The process begins when a user submits a crime report through a mobile or web interface, providing details such as description, location, date, and optional media evidence. This input acts as the primary data for analysis.

The system then applies preprocessing techniques such as text cleaning, normalization, and duplicate detection to ensure data quality. The processed data is passed to the Machine Learning module, where algorithms analyze the report to perform crime classification, detect fake or duplicate entries, and identify risk levels (Low, Medium, High).

After analysis, the system triggers a verification and decision-making mechanism. Authorized authorities review the reports, validate their authenticity, and update the case status. Based on the verification and usefulness of the information, the reward management module allocates rewards to users in a structured manner.



This architecture ensures a smooth flow from crime report submission to intelligent analysis, verification, and reward allocation, improving efficiency, transparency, and decision-making in crime management.

3.2 Methodology

The methodology of the proposed system is centered on AI-driven crime analysis using machine learning techniques. When a user submits a crime report, the system performs preprocessing such as text cleaning, normalization, and duplicate removal to prepare the data for analysis.

Machine learning algorithms are applied to classify crime type, detect fake or duplicate reports, and assign risk levels (Low, Medium, High) based on severity and location. A rule-based decision mechanism then forwards reports for verification and allocates rewards based on accuracy and usefulness.

By combining machine learning with structured verification and reward mapping, the system ensures efficient, reliable, and intelligent crime management.

3.3 Implementation Overview

The proposed system is implemented using a multi-layered technological framework. The user interface is developed using Angular to allow farmers to upload crop images and receive recommendations easily.

The crop quality classification model is implemented in Python using TensorFlow and Keras. A MobileNetV2-based transfer learning model is trained and saved for prediction purposes. The backend logic and marketplace routing are handled using Node.js, where the predicted quality category is mapped to corresponding buyer segments.

Marketplace data is stored and managed using a MySQL relational database, ensuring structured storage and efficient retrieval of exporter and industry information.

IV. RESULTS AND DISCUSSION

The proposed AI-Driven Crime Reporting and Reward Management System was tested using a simulated dataset of crime reports to evaluate its performance and effectiveness. The system demonstrated efficient report submission with minimal time delay, ensuring a smooth user experience. Real-time data synchronization enabled quick updates in report status and improved system responsiveness.

The machine learning module successfully classified crime reports, detected duplicate or fake entries, and identified crime-prone areas based on data patterns. The risk-level assignment helped in prioritizing cases effectively, supporting faster decision-making by authorities.

The reward management module functioned accurately by allocating rewards only after successful verification, ensuring fairness and preventing misuse. Overall, the system showed reliable performance in terms of accuracy, transparency, and scalability.

The results indicate that integrating AI with crime reporting improves operational efficiency, encourages citizen participation, and supports smarter and more proactive crime management.

V. APPLICATIONS

The proposed system can be used for efficient online and anonymous crime reporting, improving public participation and transparency. It supports crime analysis, hotspot identification, and case prioritization using machine learning. Additionally, it helps authorities in better decision-making and can be integrated with smart city systems for enhanced public safety.

5.1 Helping Citizens Report Crimes Easily

The system helps citizens report crimes efficiently through a digital platform. Instead of relying on manual processes, users can submit crime details and receive intelligent insights about case priority. For example, high-risk cases are prioritized for immediate action, while lower-risk cases are handled accordingly, ensuring better decision-making and faster response.



5.2 Risk-Based Case Prioritization

The system supports case prioritization based on risk levels. By categorizing reports into Low, Medium, and High levels, it ensures that each case is handled according to its severity. This reduces the chances of critical cases being delayed or less important cases consuming unnecessary resources.

5.2 Risk-Based Case Prioritization

If a report is identified as fake or duplicate, the system does not prioritize it for action and instead flags it for review. This helps avoid incorrect decisions, reduces unnecessary workload on authorities, and improves overall system reliability.

5.4 Supporting Digital Crime Management Platforms

The system can be integrated into mobile applications and smart governance platforms. It can serve as a feature in digital public safety systems where citizens can report crimes and authorities receive intelligent analysis and real-time updates. The proposed AI-Driven Crime Reporting and Reward Management System presents an integrated approach that combines digital crime reporting with machine learning-based analysis and structured reward allocation. The system analyzes crime reports to perform classification, detect fake or duplicate entries, and assign risk levels such as Low, Medium, and High. Based on this analysis, a verification and decision-making mechanism ensures proper case handling, while the reward module encourages responsible citizen participation.

The experimental evaluation demonstrates efficient system performance, accurate analysis, and reliable reward allocation. By integrating AI-driven crime analysis with real-time reporting and verification, the system provides a structured framework for transparent and effective crime management.

For future enhancement, the system can be improved by incorporating advanced predictive models for crime forecasting and real-time alert systems. Integration with CCTV surveillance, image/video analysis, and smart city infrastructure can further enhance system capabilities. Additionally, features like multilingual support, web platform expansion, and advanced data visualization dashboards can improve accessibility and decision-making.

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