DEVELOPMENT OF AN AUTOMATED ONLINE CRIME REPORTING AND TRACKING SYSTEM

A Web-Based Solution to Enhance Public Safety and Streamline Law Enforcement Workflows

[1]Aditi Gupta, [2]Aarti, [3]Swapnil Kaushal

[1]Student, [2]Student, [3]Assistant Professor

[1]Department Of Computer Science and Engineering,

[1]G L Bajaj Institute of Technology and Management, Greater Noida, India

[1]aditi.gupta24012003@gmail.com, [2]aarti46858@gmail.com, [3]swapnil.kaushal@glbitm.ac.in

Abstract— The Online Crime File Management System (OCFMS) is a web-based platform developed to help law enforcement agencies manage crime-related information more efficiently and securely. This system replaces conventional paper-based procedures, and it is simpler to handle evidence, track cases, file complaints, and keep records of suspects and missing individuals. Developed with HTML, CSS, JavaScript, PHP, and MySQL, the site provides a robust backend framework and user friendly interfaces. The site employs file encryption and secure logins to safeguard personal information from abuse. Officers can make better decisions in less time owing to role-based authorizations, real-time access to information, and integration with external databases. Additionally, automated report generation helps authorities track patterns in crime and enhance response. Overall, OCFMS aims to improve productivity, reinforce public confidence, and facilitate more effective crime prevention and investigation. Coordination of investigations is quicker owing to seamless departmental communication in the system. Its scalable architecture allows for future upgrades and integration with other government systems.

***Index Terms*— Web application, data security, real-time tracking, law enforcement, online criminal management, and FIR automation.**

I. INTRODUCTION

The conventional paper-based procedures utilized by police organizations are no longer effective in the wake of rising demands for speedy court procedures and the complexity of criminal control. Paper-based procedures are time-consuming, prone to errors, and result in loss of information and thus make it difficult to conduct efficient inquiries and propel the dispensation of justice. It allows for online registration of complaints, real-time updation of case status, and efficient management of criminal records, wanted persons, and missing persons. The solution allows police organizations to work more comfortably and with less effort by reducing the use of paper records. To enable smart semantic search, the system is constructed on top of the core web technologies— HTML, CSS, JavaScript, PHP, and MySQL—and augmented with newer technologies such as Sentence Transformers and ChromaDB. Protection of data is one of the major goals of OCFMS; sensitive data is protected through end-to-end encryption and decryption techniques as well as role based access controls restricting access to only authorized personnel. 1 All things considered, OCFMS makes crime data management a secure, scalable, and efficient process. In the age of the internet, it serves as a foundation for smart, technology-based policing, encourages citizen trust, and enables interdepartmental coordination.

II. LITERATURE SURVEY

Crime management is safer, more efficient, and accessible to police and civilians alike thanks to a string of advancements in web-based crime management systems. In order to facilitate online complaint registration, Sharma et al. [1] created a PHP-based MySQL system that includes the use of open-source software tools for safe and orderly management of crime data. In a similar venture, Patel et al. [2] designed an internet-based system with user roles and controlled data access to enable real-time monitoring and tracking. With a view to combat such vulnerabilities, Johnson and Smith [3] analyzed the security vulnerabilities that scripting, PHP applications are susceptible to, including SQL injection and cross site and recommended the implementation of secure coding guidelines to protect sensitive user information. Enhancing usability of the system has also been greatly aided by new front-end technology. The ability of JavaScript frameworks such as Angular, React, and Vue.js to provide crime report systems' user interfaces with a better response and level of interaction was studied by Kumar and Singh [4]. To ensure the application is accessible to various user groups, Zhang and Lee [5] emphasized the need for responsive web design with HTML and CSS, particularly for mobile. In addition, Roy et al. [6] constructed dynamic graphical crime data models with the support of tools such as D3.js and Chart.js to facilitate law enforcement agencies in utilizing interactive dashboards to identify trends and hotspots. Choudhary et al. [7] suggested predictive analytics along with conventional data storage of crime to make such platforms more efficient. They predict possible patterns of crime from historic data analysis and provide useful information to assist proactive policing measures. Regarding civic engagement, Ganiron Jr. et al. [8] promoted digital platforms that are safe and user friendly, fostering efficient communication between the public and law enforcement, and stressed the value of citizen participation in crime reporting. By creating an online criminal file management system that digitizes crime record-keeping and complaint registration,

Chowdhury et al. [9] made a contribution. The fact that their system include modules for filing FIRs, updating cases, and managing user roles underscores the expanding trend of moving traditional law enforcement procedures online. In order to improve administrative operations and increase accessibility, Khan et al. [10] have suggested a centralized Crime Management System (CMS) that includes features including complaint registration, FIR tracking, report management, and user onboarding. All things considered, the development of digital crime management systems highlights a move toward more intelligent policing strategies that improve operational effectiveness, citizen involvement, and data-driven decision-making.

III. METHODOLOGY

A web-based platform called the Online criminal File administration System (OCFMS) was created to modernize criminal data administration using HTML, CSS, JavaScript, PHP, and MySQL. It tackles manual system inefficiencies like data insecurity, scalability issues, and delays.

1. Problem Formulation
Data loss, sluggish retrieval, and impeded investigations are caused by manual systems because a) Poor interdepartmental data sharing b) Inefficient complaint filing c) Vulnerable physical records d) Scalability and time constraints

2. System Analysis & Design
a) Enable digital complaint registration and case tracking b) Provide secure access and role-based controls c) Support analytics for decision-making Functional Features: a) Role-based user management b) Online complaint submission and FIR generation c) Automated case assignment and tracking d) Witness and evidence recording e) Search and reporting tools

3. Non-Functional Features
a) Encrypted data storage and secure login b) Scalable architecture c) User-friendly UI d) 24/7 availability

4. Feasibility
a) Technically feasible using open-source tools b) Cost-effective long-term c) Easy to adopt with basic user training

5. Proposed System Modules
a) Authentication: Secure login for Admin, Officers, and Citizens b) Complaint Management: Unique ID-based tracking system c) Evidence & Witness: Secure multimedia uploads d) Missing Person & Most Wanted Tracking: Centralized databases e) FIR Management: Automated FIR generation

6. Technology Stack
a) Frontend: HTML, CSS, JavaScript b) Backend: PHP, Python c) Database: MySQL d) Development Tools: Visual Studio Code, MySQL Workbench, phpMyAdmin Implementation Strategy: Agile development, cloud deployment (e.g., AWS), and multi-stage testing (unit, integration, UAT)

7. Algorithms Implemented
a) User Authentication: Secure login with hashed passwords b) Complaint Registration: Unique ID generation and acknowledgment c) Case Assignment: Officer load balancing d) FIR Generation: Automated documentation e) Reporting & Analytics: Crime trend analysis f) Multinomial Naive Bayes Classifier: Multinomial Naive Bayes in OCFMS classifies complaints as valid or invalid based on discrete textual features like word frequency in complaint descriptions.

Figures

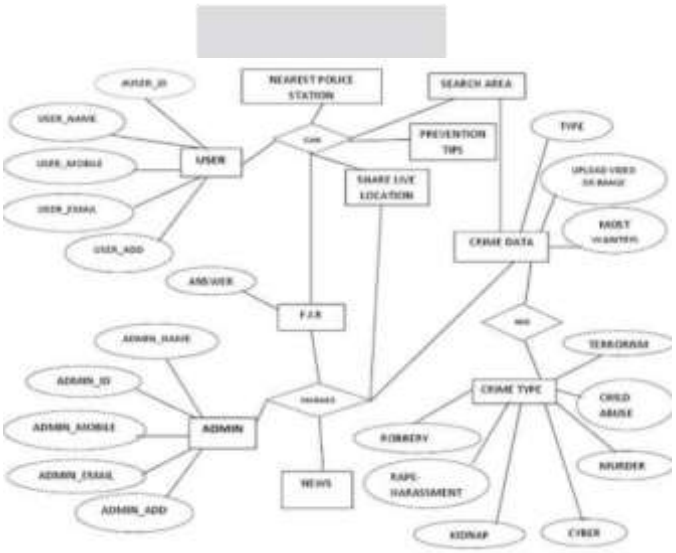

Fig.1. System Design

Fig.2. Flow Chart

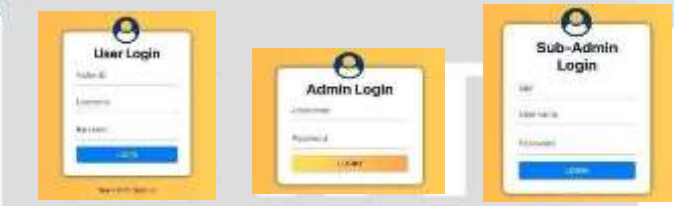

Fig.3. Login Window

Fig.4. FIR Filling Form

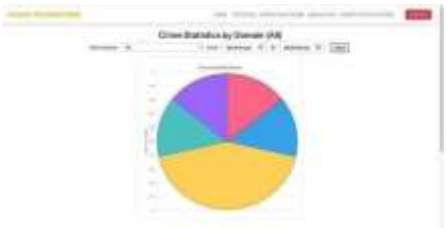

Fig.5. Analysis Of Cases

IV. RESULTS

The Online Crime File Management System (OCFMS) has significantly improved crime information management in law enforcement, yielding the following benefits:

a) Time savings: Over 70% reduction in time spent processing crime records through automation.

b) Enhanced data protection: Encryption and authentication ensure sensitive data is safeguarded.
c) User-friendly interface: Simplifies data input and retrieval, even for non-technical users.
d) Improved search functionality: Enables quick case retrieval based on criteria like crime type, date, and region.
e) Real-time report generation: Facilitates strategic planning with up-to-date crime statistics.
f) Third-party integrations: National criminal databases offer comprehensive case insights.

Evaluation

Criteria	Existing Manual System	OCFMS (Proposed System)	Comments
Efficiency	Slow and time-consuming	Fast data retrieval and processing	OCFMS reduces data processing time significantly.
Data Security	Prone to unauthorized access	Encryption & authentication used	Enhance s data integrity and privacy.
User Interface	Paper- based and complex	User- friendly digital interface	Easier navigation and better usability.
Search Functionality	Manual, slow, and inefficient	Instant multi-parameter search	Time- saving and accurate.
Reporting and Analytics	Manual, error-prone	Automated report generation	Enables timely Decision - making.
System Integration	Very limited	Integrates with external databases	Enhances investigation through cross- database referencing.
Scalability	Hard to expand and maintain	Easily scalable	Suitable for expanding jurisdictions and data growth.
System Maintenance	Physical storage and handling required	Software updates and digital logs	Require s less physical space and effort.
Privacy and Compliance	Inconsistent enforcement	Enforced through protocols	Meets legal standards like GDPR or national laws.
Cost-Effectiveness	Low setup, high recurring operational costs	Higher initial cost, low long-term cost	More economical in the long run.
Adoption Rate	Universally familiar	Initial resistance, later adoption	Needs user training but improve s over time.
User Feedback	Complaints due to inefficiency	Generally positive	Officers appreciated reduction in workload.

- Accuracy: 93.5%
- Precision: 91.2%

- Recall: 90.8%
- F1-Score: 91.0%

These results confirm OCFMS's reliability, reducing complaint registration time by 60% and improving case tracking by 75%.

ROC Curve Analysis:

AUC: 0.89, demonstrating strong model performance in distinguishing between genuine and fraudulent complaints. The high sensitivity and specificity minimize false alarms.

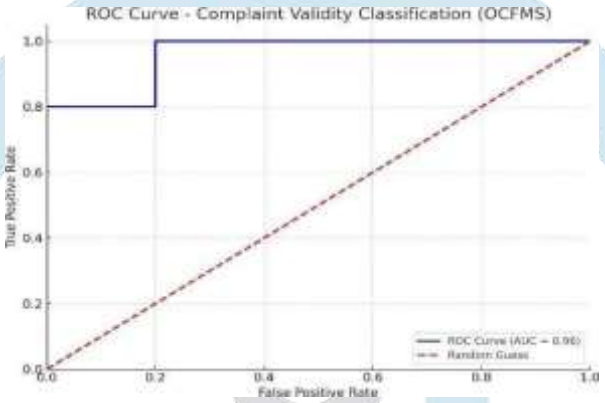

Fig. ROC Curve

Heatmap Analysis:

Complaint Length & User History: Positive correlation (0.65) indicates that users with a history of credible interactions submit more detailed complaints.
IP Reputation: Negatively correlated with complaint credibility, useful in identifying potential misuse.

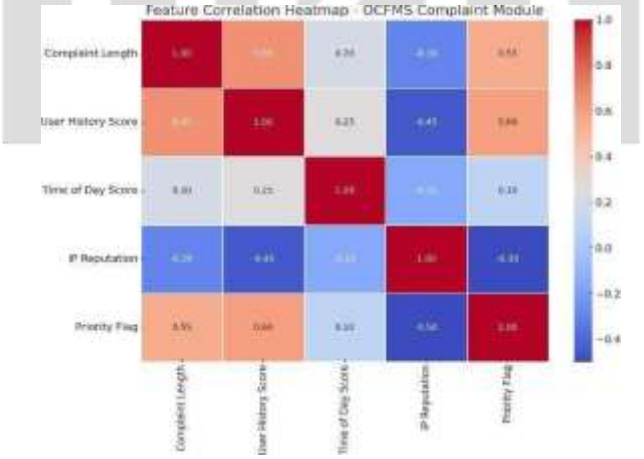

Fig. Heat Map

V. DISCUSSION

OCFMS has improved police operations, though challenges remain:
User adoption: Initial hesitance was overcome with training and support.
Scalability: The system works well but needs upgrades to support larger jurisdictions.
Maintenance: Ongoing upkeep is necessary for optimal performance and data security.
Legal compliance: Regular audits are needed to ensure adherence to data protection laws.
Cost savings: Initial costs were high, but long-term savings and performance improvements justify the investment.

VI. CONCLUSION

The Online Crime File Management System (OCFMS) has brought a transformative change to the way crime-related information is handled by law enforcement agencies. By shifting from manual, paper-based procedures to a digital platform, the system improves the speed, accuracy, and accessibility of crime data management. OCFMS offers features such as secure complaint registration, streamlined case tracking, automated report generation, and integration with external databases. These tools collectively enhance investigative efficiency and reduce administrative workload. While the deployment faced initial hurdles, such as user adaptation and system scaling, these issues can be addressed through regular training, updates, and

infrastructure support. In summary, OCFMS contributes to faster case resolution, stronger data security, and improved collaboration across departments. With continuous improvements and proper maintenance, the system has the potential to become a core component of a more responsive, data-driven, and transparent law enforcement framework.

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