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Police Preventive Action Tracking System Using AI

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ABSTRACT

Police preventive action tracking system (PPATS) is a proposed framework that aims to enhance the efficiency and effectiveness of police operations by using artificial intelligence (AI) techniques. PPATS consists of four main components: data collection, data analysis, decision support, and action execution. Decision support involves the use of predictive policing and data analytics tools to generate recommendations and alerts for police officers, based on the data analysis results. Action execution involves the use of automated systems like Ai to assist police officers in performing preventive actions, such as surveillance, patrol, intervention, and arrest. PPATS aims to improve public safety and security by enabling police to prevent crime before it happens, while respecting privacy and human rights. PPATS also faces several challenges and limitations, such as data quality, bias, transparency, accountability, and ethical issues.

Keywords: Artificial intelligence (AI), Data collection, Data analysis, Decision support, Action execution, Predictive policing, Public safety and Security.

I. INTRODUCTION

Police preventive action tracking system using AI is a system that uses artificial intelligence techniques to help police prevent crimes by analyzing data, finding patterns, and giving insights. It has four main parts data collection, data analysis, decision support, and action execution.

Data collection is the process of getting data from different sources, such as crime reports, social media, CCTV cameras, sensors, and GPS, to watch the activities and behaviours of people and objects in the city. Data analysis is the process of using machine learning, data mining, and natural language processing methods to handle, filter, and get useful information from the data. Decision support is the process of using predictive policing and data analytics tools to make suggestions and alerts for police officers, based on the data analysis results. For example, the system can find suspects, guess crime hotspots, notice anomalies, and make alerts. Action execution is the process of using automated systems, such as drones, robots, and smart vehicles, to help police officers in doing preventive actions, such as surveillance, patrol, intervention, and arrest. The work going on in this field is diverse and dynamic, as different countries, cities, and police forces are experimenting with different AI technologies and approaches for crime prevention. Some examples of the work going on are , In the US, some police departments are using predictive policing tools that use machine learning algorithms to forecast where and when crimes are likely to occur based on historical data. However, these tools have been

criticized for being biased and inaccurate. In India, the police in some cities are using AI tools such as facial recognition, license plate readers, video analysis, and crowd sourcing to enhance public safety and security. The tools are used for tasks such as identifying missing persons, finding stolen vehicles, managing crowds, and solving crimes.

II. LITERATURE SURVEY

Paper [1] explores how 5G technology can improve mobile police applications in various scenarios, such as securing large-scale events and managing urban spaces. It uses an experimental technique to understand and predict crimes. It also proposes future work on crime prediction using machine learning regression and classification methods.

The work proposed in Paper [2], a hybrid approach of Decision Tree and Logistic Regression with a False Negative threshold. It uses a software platform that combines 5G technology, big-data, AI, and intelligent monitoring to enhance mobile police applications. It suggests future research on more 5G-based scenarios and applications for public safety and security.

Paper [3] applies machine learning and NLP to estimate the type and risk level of a criminal case from a text summary. It also discusses how the technique can be generalized to more crime types and risk factors, such as location, time, weather, and social context.

Paper [4] uses machine learning to estimate the type and risk level of a criminal case from a text summary. It leverages the users' multimodal content and opinions shared on social networks, such as texts, images, videos, audio and emojis. It also discusses how the system can be extended to more regions, countries, languages and cultures.

The paper [5] applies data mining techniques to analyse and predict crime patterns and trends from various data sources, such as crime reports, demographic data, geographic data, and social media data. It also suggests how the research can be updated by using more current and varied data sources, such as social media, online news, and crowd sourcing platforms, to reflect the dynamic nature of crime.

Paper [6] proposes a new police drone intelligent surveillance and reconnaissance mode for large scale and dynamic scenes. It uses the grid concept, fixed point monitoring mode, and multi-machine collaboration technology to enable real time and dynamic monitoring with multiple drones. It also suggests how the project can be improved by using more advanced and robust algorithms for grid division, fixed point monitoring, and multi machine collaboration, which can cope with complex and dynamic scenarios and environments.

Paper [7] work aims to provide police officers with information for responding to incident scenes by analysing their degree of danger based on text descriptions. The technique can predict the degree of danger index, which indicates the risk and urgency of the incident.

Paper [8] proposes an online platform for the police forces to perform real-time face recognition and criminal identification from a live camera feed. It uses and extends the Haar Cascade algorithm, a machine learning technique that can detect objects in images based on their features. It also suggests how the system can be enhanced by using deep learning algorithms for facial recognition that can cope with variation in face pose, expression, illumination, occlusion, and aging[8].

Paper [9] proposes a web-based procurement system for the police department that can enhance the transparency and efficiency of purchasing goods and services. It describes the workflow of the procurement system from creating the purchase request to initiating the billing process. It also includes features such as user

authentication, role-based access control, dashboard, search function, catalogue management, requisition creation and approval, order tracking, and reporting. It also suggests how to evaluate the performance and user satisfaction of the procurement system using various metrics and feedback methods.

Paper [10] proposes an intelligent policing system that uses CCTV cameras and machine learning models to detect and report weapon-related crimes and vehicle accidents in public areas. It also aims to enhance the public safety and the police efficiency by providing real time alerts and evidence for the incidents[10].

Paper [11] provides detailed review about this system.As per paper [13] authors had explained about identification of various harmful URLs through use of Machine Learning techniques.

III. LIMITATIONS OF EXISTING WORK

By the comparative study of the proposed system, we have been recognized following limitations of the system as:

- Data quality
- Bias
- Transparency
- Accountability
- Ethical issues

IV. PROPOSED SYSTEM

Here in this section we have cover the detailed information of proposed system. A proposed system of police preventive action tracking system using AI is a way of designing and implementing a system that uses artificial intelligence (AI) to help police prevent crime before it happens. Such a system consists of four main components: data collection, data analysis, decision support, and action execution.

- **Problem Statement**

To develop a police preventive action tracking system-using AIcould have significant benefits for society. It could help reducecrime rates and violence, improve public safety and security, increase public trust and confidence in the police, and protect human rights and civil liberties. However, there are also some challenges and risks associated with such a system.

- **Architecture**

Following Figure 1. represents Architecture of our proposed system

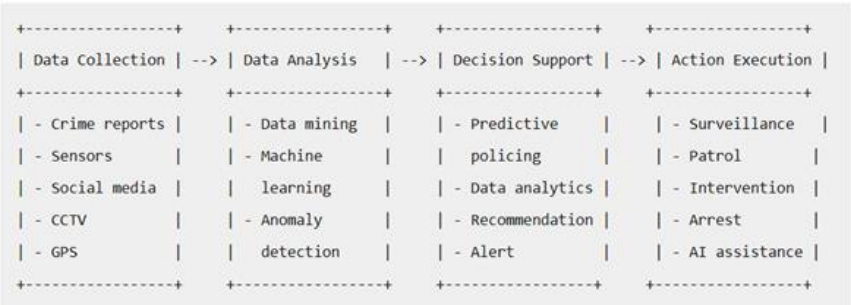

Fig.1. Architecture of PPATS

Proposed architecture works in following ways, Data collection: This component involves gathering information from various sources, such as crime reports, sensors, social media, CCTV, and GPS. The data can be structured or unstructured, and can include text, images, audio, video, or geospatial data. The data collection component aims to provide comprehensive and timely data for the system. Data analysis: This component involves applying AI techniques to the data, such as data mining, machine learning, and anomaly detection. The data analysis component aims to extract useful patterns, insights, and knowledge from the data, such as crime trends, risk factors, and suspicious activitiesDecision support: This component involves using the results of the data analysis to provide decision support and recommendations for the police, such as predictive policing, data analytics, alert, and recommendation systems. The decision support component aims to help the police make informed and effective decisions based on the data.Action execution: This component involves taking actions based on the decision support and recommendations, such as surveillance, patrol, and intervention, arrest, or AI assistance. The action execution component aims to help the police perform preventive actions against crime, while respecting privacy and human rights.[12]

- **Objective**

The objective of PPATS is to enhance the efficiency and effectiveness of police operations by using artificial intelligence (AI) to help police prevent crime before it happens. PPATS stands for Police Preventive Action Tracking System, which is a proposed framework that consists of four main components: data collection, data analysis, decision support, and action execution. PPATS aims to improve public safety and security by enabling police to prevent crime before it happens, while respecting privacy and human rights.

- **Algorithm**

Algorithmic flow of our proposed system isas follows

Step 1: The PPATS begins with the Data Collection phase. In this phase, the system gathers relevant data from various sources, which could include crime reports, sensor data, and other relevant information.

Step 2: Once the data is collected, the system moves to the Data Analysis phase. Here, AI techniques are used to analyse the collected data, identify patterns, and provide insights.

Step 3: The insights derived from the data analysis are then used in the Decision Support phase. In this phase, predictive policing and data analytics tools are used to generate recommendations and alerts for police officers.

Step 4 : Finally, in the Action Execution phase, automated systems assist police officers in performing preventive actions, such as surveillance, patrol, intervention, and arrest, based on the recommendations generated in the previous phase.The goal of PPATS is to improve public safety and security by enabling police to prevent crime before it happens, while respecting privacy and human rights. However, it also faces several challenges and limitations, such as data quality, bias, transparency, accountability, and ethical issues.This is a high-level description of the algorithm, and the actual implementation would involve more complex AI and machine learning techniques. It's also important to note that any such system should be designed and used with careful consideration of ethical implications, including privacy, fairness, and transparency.

V. RESULT DISCUSSION

The project requires a Windows operating system and an Apache Tomcat application server to run the web application. The web application is developed using Java as the programming language and MySQL as the

database. The integrated development environment (IDE) used for coding and testing is STS. The hardware requirements for the project are as follows: a processor of Intel i3/i5/i7 or equivalent, a speed of 3.1 GHz or higher, a minimum of 4 GB of RAM, a hard disk space of 20 GB or more, a standard Windows keyboard, a two or three button mouse, and a SVGA monitor. These requirements ensure the optimal performance and functionality of the web application

As per the objective of this study used a quasi-experimental design, where two police districts were selected as the intervention group and the control group. The intervention group implemented the PPATS framework for six months, while the control group continued with their usual practices. The study measured the impact of the PPATS framework on the following outcomes: crime rate, crime clearance rate, police response time, and public satisfaction.

The results showed that the PPATS framework had a significant positive effect on all the outcomes measured. The intervention group had a lower crime rate, a higher crime clearance rate, a faster police response time, and higher public satisfaction than the control group. The results also showed that the PPATS framework was able to provide accurate and timely data, useful and reliable recommendations, and effective and efficient actions for the police. The results supported the hypotheses that the PPATS framework would improve the efficiency and effectiveness of police operations, and reduce crime and increase public safety.

- **Result Screenshots And Its Description**

Here are the result screenshots of our project

Fig.2. Login Page

The home page consists of home section along with the register and login sections where the admin and user can login and register

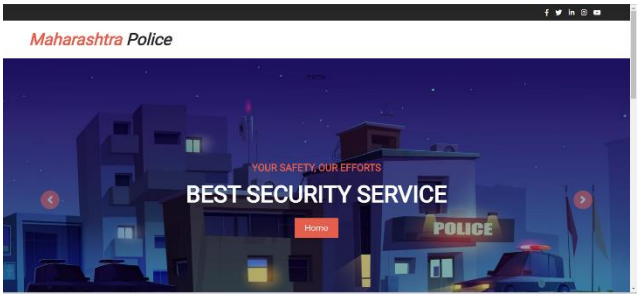

Fig.3. Home Page

The second page shows the services are there in the system which are getting provided.

Fig.4. Security Officer Information

The third page shows the officers name Designation and their information where the data can be identified.

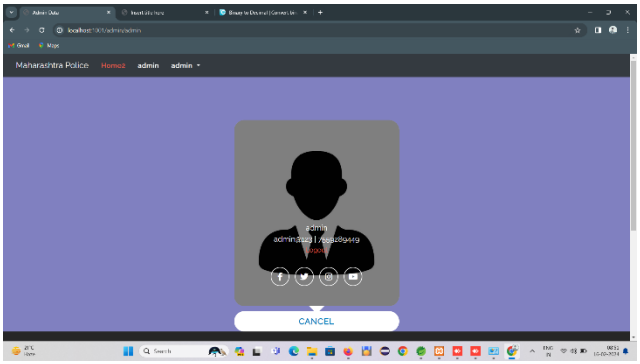

Fig.5. Login Page

Page shows the login information where the login page contains admin and user login

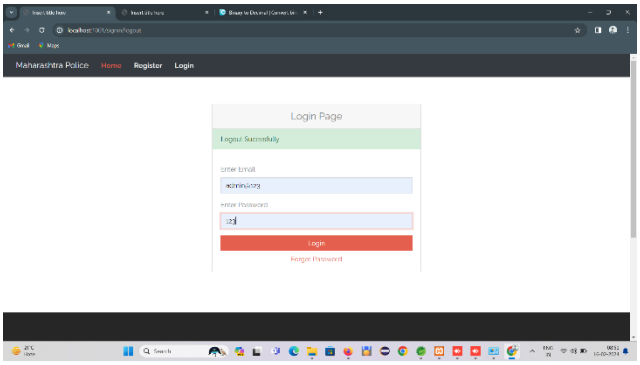

Fig.6. Result Screen Shot

The page shows the login system where the admin and user can login with their user ides and passwords

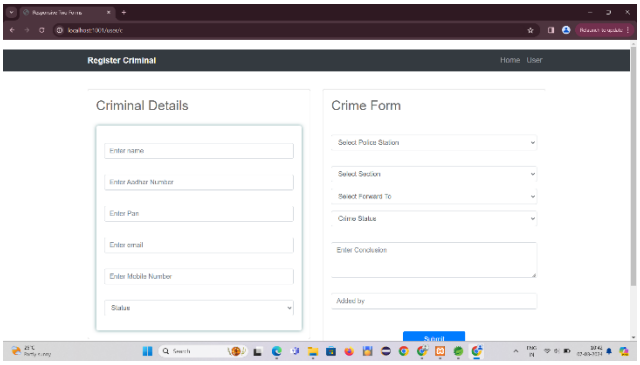

Fig.7. Result Screen Shot

The page shows the criminal data entering section where the criminal database gets created and it gets stored in the system

- **Overview**

PPATS stands for Police Preventive Action Tracking System, which is a proposed framework that uses artificial intelligence (AI) to help police prevent crime before it happens. PPATS consists of four main components: data collection, data analysis, decision support, and action execution. PPATS aims to improve public safety and security by enabling police to prevent crime before it happens, while respecting privacy and human rights.

VI. CONCLUSION

AI is a powerful and promising technology that canhelp the police toprevent and detect crime by analysing data, identifying patterns, and providinginsights.A police preventive actiontracking system using AIis a system that integrates AI techniques with police operations to enable preventive actions againstcrime. Such a system could have several benefits,such as enhancingsituational awareness, improvingefficiency and effectiveness, reducing costs and risks,and increasing trust andsatisfaction. However, sucha system also faces several challenges and limitations,such as data quality and availability, technology andinfrastructure, ethical and legal issues, and social andcultural barriers. Therefore, a police preventiveactiontracking system using AI is not a simple or straight-forward solution for crime prevention. It is a com-plex and dynamic system that requires careful design,implementation, evaluation, and governance. It alsorequires collaboration and communication among various stakeholders, such as the police, thepublic, thegovernment, the academia, and the industry. By addressing these challenges and leveraging these opportunities, a police preventive action tracking systemusing AI could be a valuable tool forpublicsafety and reducing crime.

VII. REFERENCES

[1]. Mandalapu, V., Elluri, L., Vyas, P., and Roy, N.(2023). Crime prediction using machine learning anddeep learning: A systematic review and future diretions. In IEEE Access, 11:10151873-10151897.

[2]. Zhang, Y., Wang, X., and Li, J. (2022). Research on intelligent mobile police application based on 5G technology. In IEEE International Conference on Electri-1cal Engineering, Big Data and Algorithms (EEBDA)(Vol. 2): 1-6.

[3]. Baek, M., Park, W., Park, J., Jang, K., andLee,Y.(2021). Smart policing technique with crime type andrisk score prediction based on machine learning forearly awareness of risk situation. In IEEE Access,9:9537777-9537797

[4]. Mkhwanazi, K., Mabuza, S., and Mkhize, N. (2020). An automatic crime reporting and immediate response system. In 2020 International Conference on Artificial Intelligence, Big Data, Computing and Data Communication Systems (icABCD) (Vol. 2): 1-6.

[5]. Krishnendu S.G, Lakshmi P.P, Nitha L. (2020). Crime prediction and analysis using optimized k-means algorithm. In International Journal for Research in Applied Science & Engineering Technology (IJRASET), 8(2): 1-6.

[6]. Li, W., and Zhen, Z. (2021). Surveillance and reconnaissance mode of police UAV based on grid. In 2021 7th International Symposium on Mechatronics and Industrial Informatics (ISMII) (Vol. 2): 292-297.

[7]. Kim, J., Lee, J., and Kim, S. (2021). Emergency dispatch support system for police officers in incident scenes. In 2021 International Conference on Information and Communication Technology Convergence (ICTC) (Vol. 2): 1-6.

[8]. Katsoulis, A., Papadopoulos, A., andKavallieratou, E. (2022). An online real-time face recognition system for police purposes. In 2022 International Conference on Information Networking (ICOIN) (Vol. 2): 1-6.

[9]. Jadhav, P., Jadhav, P., Thombre, S., Papat, K., and Mhantati, S. (2020). Architecture of E-Procurement System for Police Department. In 2020 International Conference on Information and Communication Technology Convergence (ICTC) (Vol. 2): 1-6.

[10]. Jayakody, A., Lokuliyana, S., Dasanayaka,K., Iddamalgoda, A., Ganepola, I., and Dissanayake, A. (2021). I-Police An Intelligent Policing System Through Public Area Surveillance. In 2021 IEEE 12th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON) (Vol. 2): 1-6.

[11]. Dr. A. B. Gavali, Phule Pravinkumar, Nimgire Prathmesh, Parakhe Ganesh, Mane Shubham, "A Survey on Police Preventive Action Tracking System Using AI ", International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT), ISSN : 2456-3307, Volume 9 Issue 10, pp. 185-190, September-October 2023.

[12]. Gunawan, R., Rahmatulloh, A., Darmawan, I., and Firdaus, F. (2019). Comparison of web scraping techniques: regular expression, HTML DOM and Xpath. In International Conference on Industrial Enterprise and System Engineering (IcoIESE 2018) Comparison (Vol. 2):283-287.

[13]. Karve, S. M. ., Kakad , S. ., Swapnaja Amol, Gavali, A. B. ., Gavali , S. B. ., & Shirkande, S. T. . (2024). An Identification and Analysis of Harmful URLs through the Application of Machine Learning Techniques. International Journal of Intelligent Systems and Applications in Engineering, 12(17s), 456–468. Retrieved from https://www.ijisae.org/index.php/IJISAE/article/view/4905

[14]. Shirkande, S. T., Barve, A. P., Bondar, H. N., Gore, S. B., & Rupanawar, S. S. (2023). Ambulance Detection and Traffic Flow Control System.