
SuperCop: Android Based Smart Policing System for e-FIR, Location Sharing and Crime Prediction

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Abstract: In the recent past, the number of accidents and transgressions are uprising which is afflicting our society. By using the SuperCop application citizens can indisputably file e-FIR without paying a visit to the police station. This paper also narrates how location figures can be used for delineating accidents and crimes so that a quick response can be taken by police. Using this framework, citizens can send and receive the locality of the crimes including the images, videos, and audios to the nearest police station or a central police station. Using this application police to citizens and police to police communication will become easy due to which the communication gap will diminish. Sometimes the information provided by the people is not authentic. So all the facts and figures provided by the people will get verified by the police officials. Security of documents, as well as evidence, is a must so that no one can meddle with it. Crime analysis based on advanced technology will help police to take safety measures for crime prevention. Crime analysis will make police investigation indisputably. A crime alert system is important to make citizens conscious of crimes taking place in their area. This system also embraces that all the data provided by the people will be in safe and secure hands.

Key Word: e-FIR, Police Communication, Location tracking, Documents and Evidence Security, Crime Analysis.

I. Introduction

In the 21st century, mobile and information have become an integral part of our lives. The gradual growth in the crime rate is the biggest problem nowadays. A new area where mobile integration with technology is handy for crime reporting there is a huge communication interlude between police and citizens. Sometimes because of some hesitation, people are not able to pay a visit to the police stations so with the help of this app the communication becomes easy. In this application, we are inaugurating a platform for exchanging information between citizens and police. Since willingly accessible information is not available at any point this is a snag in the police department. Thus, using the cloud, we will try to make all the information related to crime available at one place to the police during their investigation which would speed up the entire process of tracking down the criminal⁴. This mobile application will help police to track down the crimes. This app will also give notifications about the crimes⁵. The information provided by the common people will first get verified by the police officials to avoid any false incidence to be notified to others³. In the present scenario filing, FIR/complaint is a hectic task since one must go through a very huge process for justice or have to wait until the cops take upon the request in the police station. So in this application, we are also providing the prerequisite to file an e-FIR. This app will also track the location of the crime which is provided by the citizens. Crime analysis is necessary to prevent crimes by identifying patterns between them⁶. As well as document security is also needed for the security of evidence.

II. Literature Survey

There are existing apps like UP police, Maharashtra police for filing FIR but these platforms don't provide other facilities like crime analysis, evidence storage, crime alert, location tracking, etc. integratedly. In the paper "Using Data Mining for Intelligence-Led Policing and Crime Analysis" the author Dmytro Uzlov et al.⁵ said that using data mining methods in the work of criminal analysts in the national police by the procedure of developing and implementing proactive police activities for the prevention and investigation of crimes⁵. It also narrates data mining tools for enhancing the efficacy of information-analytical work of the law-enforcement agencies through the modelling of automated intelligent technological tools. We think that crime analysis, the prevention, and inspection of crime can also be done with the help of technologies like Machine Learning as well as Data Mining⁵. In the paper "A Usable and Secure Crime Reporting System for Technology Resource-Constrained users have different perspective about the value of the security offered by their mobile device"⁴. In the Paper "Intellectual and Enhance Digital Solution for Police Station" the author Jay Patel et al.³ said that the System will reduce the load of the policeman as well as local traffic in a police station for queries like a missing person, accidents, status of their case, etc. It will also reduce paperwork which will, in turn, save trees³.

III. Existing System

In the existing system victim (citizens) needs to visit the police station which is not always possible. There are some apps for e-FIR. There are emergency numbers for help, by which we can contact the police. There are systems for the storage of evidence in physical form as well as digital form. Police communicate with each other by telephones and walkie-talkies etc.

IV. Gap Analysis

Traditionally in the current system, more time is needed in searching the required information, bulks of hard copies are required to be referred. Access to information is not available to police everywhere but by using our system it will be possible. The increasing crime in our country is a big issue for us. Various systems are developed to solve this issue, but they cannot find the area where the crime will happen. In our app crime analysis and prevention is possible. It is also not possible to keep all the records in memory or a file because of large data. To solve this problem we are going to use a distributed database. In our system, police and citizens can communicate securely. For any emergency, it will require just a few clicks to share the victim's location with the police which was not in any existing system⁸.

V. Proposed System

In the proposed system, we are introducing an application that will be going to forecast the particular area which has more crime rate through a crime analysis system. This forecast is based on attributes like a criminal record, education, occupation, friend circle, family background, and other various factors. We are going to develop a platform for citizens to file e-FIR and inform police about any crime without going to the police station. This will provide security for important documents. This will make communication secure between police stations. Sending the location of a person to the police directly just on a single click who is involved in any accident or victim will be possible because of this application. Police can alert citizens. Adhar card no. of every user will be available for police to verify a person.

Architecture:

A distributed database is used for the security of evidence and important information. Machine learning is used for crime analysis. This architecture will make police to citizen communication easy. Private cloud is used to make communication secure between police¹². For crime analysis, we used the supervised machine learning algorithm SVM.

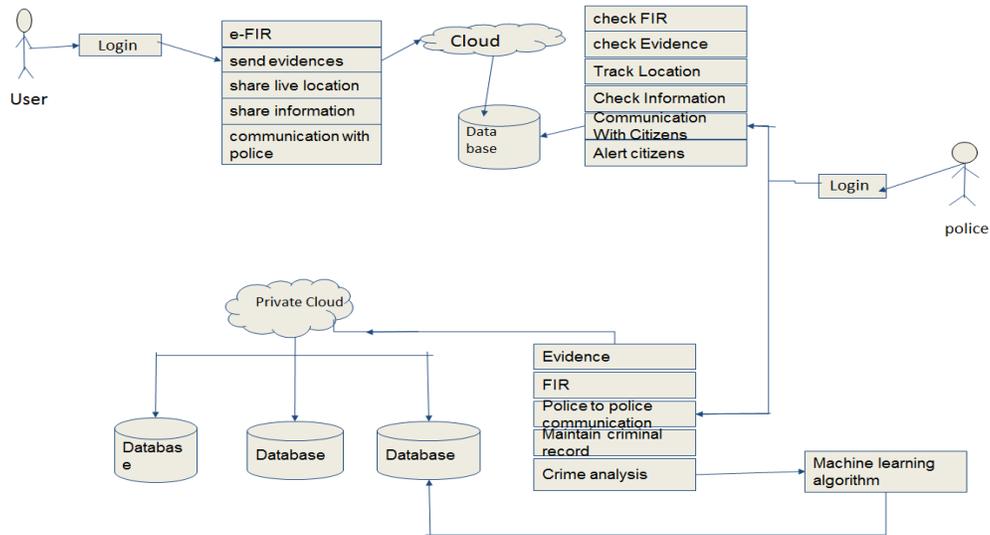


Fig. 1: The Overall Architecture of the System.

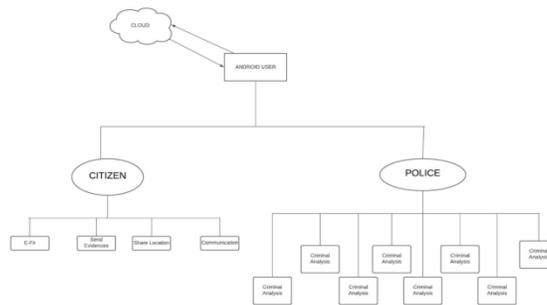


Fig. 2: Functionalities of the System.

SVM:

SVM is used for crime analysis and crime prediction. Based on previous data about crime we can classify places depending on the crime rate. By analyzing previous data we can use it for crime prediction⁶. SVM is used for supervised learning. The support vector machine algorithm is a predictive analysis data classification algorithm that assigns new data elements to one of the labeled categories⁶.

The dataset additionally contains data about the beat, which is the smallest territorial division by the Chicago Police, Community Area, the year wherein the crime happened, scope and longitude. Every one of these traits gave us a tremendous extension for mining the dataset for valuable examples. The distinctive arrangements of items having class participations are isolated by the decision plane. A limit isolates the two decision planes. The representation is done beneath where the items are ordered into two, the Green part and the Red part. At the point when another lands into the decision plane, its parameters are checked and after that, it is arranged into either green or red.

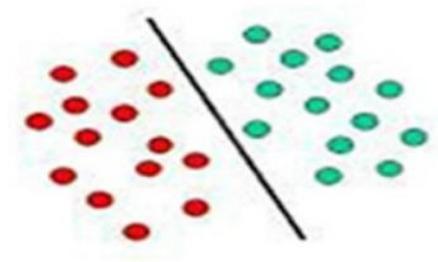


Fig. 3: SVM Algorithm.

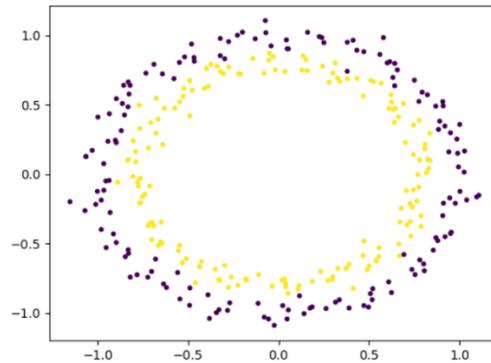


Fig. 4: SVM Algorithm Example.

The accuracy of the algorithm can be defined as the percentage of correctly classified instances,

$$\frac{TP + TN}{TP + TN + FP + FN}$$

Where,

TP = True Positives

TN = True Negatives

FP = False Positives

FN = False Negatives

SVM Classifiers supply sensible accuracy and perform quicker prediction compared to the Naïve Bayes algorithm. They additionally use less memory as a result of they use a subset of training points within the decision phase. SVM works well with a transparent margin of separation and with high dimensional space.

Algorithm:

- 1) Bring in the dataset.
- 2) Reconnoitre the data to figure out what they look like.
- 3) Pre-process the data.
- 4) Rupture the data into attributes and labels.
- 5) Diverge the data into training and testing sets.
- 6) Educate the SVM algorithm.
- 7) Make some predictions.
- 8) Estimate the results of the algorithm

VI. Conclusion And Future Work

This study has found that generally how technology resource-constrained environments currently go about reporting crime we also justify that there is a need for a system that will facilitate the report of a crime in a secured and covert way.

This study has found that there is a lack of security for documents and evidence so we will provide a secure place for storing these documents. According to this study, there are multiple applications for a different security, crime reporting, location tracking, and other crime and accident-related events. But there is not any single platform having all these features combined. We need an application that provides these features integratedly.

The lawyer module can be added to this system so that evidence and reports can be easily available to lawyers in the future. We can implement this project at a national level. We can use AI-based cameras in particular areas where crimes are more based on our crime analysis system. We can also use Blockchain to secure e-FIRs and evidences^{7,13}.

References

- [1] A. Tundis, H. Kaleem and M. Muhlhauser, "Tracking Criminal Events through Iot Devices and an Edge Computing Approach," 2019 28th International Conference on Computer Communications and Networks (ICCCN), Valencia, Spain, 2019, pp. 1-6, DOI: 10.1109/ICCCN.2019.8846956.
- [2] A. B. Sakpere, A. V. D. M. Kayem and T. Ndlovu, "A Usable and Secure Crime Reporting System for Technology Resource Constrained Context," 2015 IEEE 29th International Conference on Advanced Information Networking and Applications Workshops, 2015, pp. 424-429, doi: 10.1109/WAINA.2015.97.
- [3] J. Patel, H. Wala, D. Shahu and H. Lopes, "Intellectual and Enhance Digital Solution For Police Station," 2018 International Conference on Smart City and Emerging Technology (ICSCET), 2018, pp. 1-4, doi: 10.1109/ICSCET.2018.8537378.
- [4] J. Shen, T. Zhou, D. He, Y. Zhang, X. Sun and Y. Xiang, "Block Design-Based Key Agreement for Group Data Sharing in Cloud Computing," in IEEE Transactions on Dependable and Secure Computing, vol. 16, no. 6, pp. 996-1010, 1 Nov.-Dec. 2019, doi: 10.1109/TDSC.2017.2725953.
- [5] D. Uzlov, O. Vlasov and V. Strukov, "Using Data Mining for Intelligence-Led Policing and Crime Analysis," 2018 International Scientific-Practical Conference Problems of Infocommunications. Science and Technology (PIC S&T), 2018, pp. 499-502, doi: 10.1109/INFOCOMMST.2018.8632122.
- [6] Y. V. K. D. Bhavani, "The Data Mining Support Vector Machine Algorithm used for Detecting and Forecasting of Crimes," 2019 International Journal of Engineering and Advanced Technology (IJEAT), vol. 9, issue-1, October 2019, doi:10.35940/ijeat.A9386.109119.
- [7] N. D. Khan, C. Chrysostomou and B. Nazir, "Smart FIR: Securing e-FIR Data through Blockchain within Smart Cities," 2020 IEEE 91st Vehicular Technology Conference (VTC2020-Spring), 2020, pp. 1-5, doi: 10.1109/VTC2020-Spring48590.2020.9129428.
- [8] T. Mantoro, Feriadi, N. Agani, M. A. Ayu and D. Jatikusumo, "Location-Aware Mobile Crime Information Framework for Fast Tracking Response to Accidents and Crimes in Big Cities," 2014 3rd International Conference on Advanced Computer Science Applications and Technologies, 2014, pp. 192-197, doi: 10.1109/ACSAT.2014.41.
- [9] S. Sathyadevan, M. S. Devan and S. S. Gangadharan, "Crime analysis and prediction using data mining," 2014 First International Conference on Networks & Soft Computing (ICNSC2014), 2014, pp. 406-412, doi: 10.1109/CNSC.2014.6906719.
- [10] T. Almanie, R. Mirza and E. Lor, "Crime Prediction Based on Crime Types and Using Spatial and Terminal Criminal Hotspots," 2015 International Journal of Data Mining and Knowledge Management Process (IJDKP) Vol.5, No.4, July 2015, doi: 10.5121/ijdkp.2015.5401.
- [11] S. Yadav, M. Timbadia, A. Yadav, R. Vishwakarma and N. Yadav, "Crime pattern detection, analysis & prediction," 2017 International conference of Electronics, Communication and Aerospace Technology (ICECA), 2017, pp. 225-230, doi: 10.1109/ICECA.2017.8203676.
- [12] Wendy and G. Wang, "Measuring Information Security and Cybersecurity on Private Cloud Computing," 2019 Journal of Theoretical and Applied Information Technology vol.96, No. 1, ISSN: 1992-8645

- [13] M. Shah, M. Shaikh, V. Mishra and G. Tuscano, "Decentralized Cloud Storage Using Blockchain," 2020 4th International Conference on Trends in Electronics and Informatics (ICOEI)(48184), 2020, pp. 384-389, doi: 10.1109/ICOEI48184.2020.9143004.