

RAPTOR - CENTRALISED WEB-APP FOR POLICE

Santhosh Thomas¹, Sandeep Salmon¹, Megan Jacob Kunnumyayil¹, Sandra Stephen¹,
JikkuThomas²

¹UG Student, Dept. of CSE, SJCET, Palai, Kerala, India

²Assistant Professor, Dept. of CSE, SJCET, Palai, Kerala, India

Abstract - Policing job demands are high levels of interaction with the public to ensure the highest level of citizen satisfaction. The Indian Police Department has ever since remained manually driven for most of its routine chores. The officials have been adopting the basic fundamental methods of carrying out the proceedings with the traditional "pen and paper" method being highly prevalent. Today's India, when the evil elements of the society are in a boom and so many cases being registered every day, it has become a very tedious task to manage the case and all its related documents, manually. Digitization in the Police department is the need of the hour. Raptor is a centralized system for policing that consists of an efficient and advanced face recognition system. Our web-based app incorporates complete data on stolen or suspicious vehicles across the country and will help police trace the database of the vehicles. There is also a need to have a uniform countrywide template for Police App, which would have common features to ensure uniformity in the services provided in the platform. We aim to facilitate easier access to citizens to the services provided by the department. We believe that this innovation will be of great help to the general public and police department for the safety and security of the citizens anywhere anytime.

Key Words: Web-based App, centralized system, Application

1. INTRODUCTION

In the digital world of ubiquitous online presence of everyone, all the Indian police organizations too have gone online. Police Apps and websites have become a popular platform for Indian Police organizations to disseminate information and connect with the citizens through various online services. They are now an integral part of good governance, community policing and are also very helpful in making the police operations transparent and more accessible to the public in various ways. Although there is large avoid number of police Apps for citizens but there are very few mobile Apps related to the internal functioning of the police department, such as:

- Create a Database for criminals
- Register online complaints.

- Search stolen vehicles
- Criminal Face identification
- Emergency Communication among the police officers.

In the digital world, where more and more citizens are now having access to smart phones and cheap data connectivity, it should be our endeavor to deliver as many police services and interaction with citizen's using mobile Apps, as is possible.

2. PROJECT PURPOSE

In the digital world, wherever additional and additional voters square measure currently having access to sensible phones and low-cost knowledge property it ought to be our endeavor to deliver as several police services and interaction with citizen's victimization mobile Apps, as is feasible. aside from individual interactions between the lawman and also the citizen, the web site and connected web-presence of the local department is one key component that defines this communication. Having a social media/website presence will profit the local department and community by building a trustworthy relationship and a way of belongingness by participating with one another, leverage police department's reputation with the community, providing a forum for folks to raise queries and for the department to share tips which might otherwise not be shared, unfold data quickly layout and also the contents obtainable. The content and layout outline the core essence of what's being wanted to be communicated to the general public generally. A static web site is just a 1 manner of communication. The subject services should be user friendly so the subject will register complaints on-line at the click of a button, transfer informative photos thereby creating the web site interactive and user friendly.

3. OBJECTIVE AND SCOPE

The main objective of this Web-App laptop application is to produce a completely practical police app that edits each voter and also the police. We have a tendency to propose a closely integrated internet App which may be deployed within the cloud wherever the official or users might login and report crimes. The police area unit is expected to be the most accessible, interactive and

dynamic organisation of any society. Their roles, functions and duties within the society are naturally varied, and multifaceted on the one hand; and complex, knotty and complicated on the opposite. Our project chiefly helps in raising productivity and creating use of technology. there's no duplication of labour as this wasn't the case once done manually. so it reduces labour and will increase morale. The system intends easy operations which can resolve ambiguity. Many unfit vehicles are unit plying on roads which ends up in taking thousands of lives per annum. Criminals are mistreatment the taken vehicle to commit alternative offences like snatch murder etc. Most criminals have a past criminal history. With sensible criminal information police will hunt for criminals with a photograph or sketch. The planned system offers additional security to knowledge. It ensures knowledge accuracy, reduces paperwork and so makes the data flow economical. There are unit choices to store and filter the main points criminals, missing cases of individuals and vehicles. Our system jointly facilitates the police track and store the main points of cops supporting their locations. The project facilitates a user friendly, reliable and quick management system. The super admin or the most officer will carry info of the remainder of the police and manage records.

4.EXISTING SYSTEMS

There are some sources that provide an online platform for Police assistance

4.1 Delhi Police ...One Touch Away

It caters all the police related apps to the general public on a single touch. Developed for mobile platforms to ease public use. It has been developed keeping in mind the needs of the internal Police department as well as the public. People might not always be aware of the governments already existing Apps and sites therefore this App provides them with this interface to put their grievances forward. Also, the police department can notify the public regarding any plans, actions or law.

4.1 Delhi Police ...One Touch Away

It caters all the police related apps to the general public on a single touch. Developed for mobile platforms to ease public use. It has been developed keeping in mind the needs of the internal Police department as well as the public. People might not always be aware of the governments already existing Apps and sites therefore this App provides them with this interface to put their grievances forward. Also, the police department can notify the public regarding any plans, actions or law.

4.2 Rajcop - Mobile application

Raj Cop - Mobile application only to be used by authorized Rajasthan Police Officials. It is aimed at providing real-time assistance to cops on duty, allowing them to collect evidence while giving them access to details of vehicles and their owners. The app lets you reach police personnel for various crime reporting, tenant verification, servant verification, women helpline and stolen vehicle search, among others. You can also use the app to seek police assistance

4.3 UPP Lost Report App

The app lets you report articles or documents lost in the state with the UP Police. You can report lost identity cards, credit and debit cards, PAN cards and mobile phones, among others. Users can lodge a complaint by registering with UP Police and then providing personal details, time and place of the loss. The app will issue a lost report number, and the agency which will reissue the lost document will first verify the lost report number online, before issuing a new document.

4.4 Crime Scene Tracker

This app was developed to help law enforcement professionals create digital recordings of hints, reminders and convenience of your home [9]. They also provide you with timely reports [9]. It's tough to remember to refill every month, especially in the case of chronic diseases [4]. You will get a reminder and pieces of evidence from crime scenes. Crime scene information is superimposed on a Google Map for pinpoint accuracy and can be emailed or printed to be used by other officers.

4.5 Uttarakhand Police

The app lets residents of Uttarakhand report crime, verify tenants, servants or employees and alert police in emergencies including roadblocks and natural disasters. You can use the app to reach the nearest police station or outpost in case of eve-teasing, accidents, organized crime, stalking, cyber stalking, kidnapping, nuisance at public places, fire and traffic problems. There is also an option for providing information on criminals and terrorist activities. In emergencies, the app can alert police with your GPS location.

4.6 Saathi

These apps can help users in the two districts call for seek help in natural disasters and accidents. It provides information on traffic rules, penalties, signs and license fees, besides data on wanted criminals, missing persons and unclaimed vehicles. It also offers assistance to report cybercrimes.

5. MODULES

These apps can help users in the two districts call for seek help in natural disasters and accidents. It provides information on traffic rules, penalties, signs and license fees, besides data on wanted criminals, missing persons and unclaimed vehicles. It also offers assistance to report cybercrimes.

The system is divided into four modules:

- (1) Login
- (2) Crime registration
- (3) Location-based incident report
- (4) Face recognition
- (5) Vehicle tracking

5.1 Login

The Login Module is a portal module that allows users to type a username and password to log in. The login module consists of username and password. In order to create a new account, the user has to specify his/her username, name, email id, password and phone. The accessibility of user is checked and only authorized are given the permission depending on their role. In Raptor there is separate login for the police officials and citizens.

5.2 Crime registration

The criminal databases will be a key part of the background screening method, serving to to catch unsuitable candidates by employing a wider pool of data than is instantly accessible for traditional criminal history searches. We have a tendency to propose a platform that helps the police to collect criminal knowledge, primarily the knowledge that's associated with crime. The knowledge may well be collected and related to manually. The crime registration primarily embraces defendant details, incident details and therefore the grievance details. The defendant details could embrace the physical description of the defendant, specifically height, color of the eyes, color of the hair and finger-print. The incident details could embrace details like location, time, date of the incident etc. and at last the grievance details embrace the fees against the defendant.

5.3 Location Based Incident Report

The main agenda of the location-based incident report is that the police could share the location among its peers digitally. We aim to ease the police duty and provide a way of communication within the police. Here, we use native

device capabilities to capture the location. The Super Admin could contact the police officers and provide necessary messages to the police officers, based on the incidents occurring in a particular locality. This would provide an easier mode of communication among the police officers and helps to take action immediately. The Super Admin only can notify the police officers at that location if any emergency occurs. The admin module has the provision to view the locations of the police

5.4 Face recognition

Most of the criminals have a past crime history. With a wise criminal info, the police will link the criminal with the past crime. We are able to blacklist a private with criminal background, in order that the police might establish the criminals and missing persons. The police might add the criminal details to the info. The small print could embody given name, last name, date of birth, and also the image. For our sensible criminal info, we offer text search in addition as by uploading images. We are able to even search the criminal with the police sketch. A face recognition system is anticipated to spot faces gift in pictures and videos mechanically. It will operate in either or each of 2 modes: face verification and face identification. The FaceNet system is often accustomed to extract high-quality options from faces, known as face embeddings, that may then be accustomed to train a face identification system. The FaceNet model is often used as a part of the classifier itself, or we are able to use the FaceNet model to pre-process a face to form a face embedding that may be kept and used as input to our classifier model. We have a tendency to produce a face embedding vector that represents the options extracted from the face. this will then be compared with the vectors generated for different faces.

5.5 Vehicle Tracking

Many unfit vehicles are plying on roads which end in taking thousands of lives once a year. Criminals are victimization the taken vehicle to commit alternative offences like snatch, murder etc. To mitigate this result, we have a tendency to propose AN application that connects to the databases of the taken vehicles and noncurrent mortar vehicle data that is maintained by the Police forces. Also, this may modify US to notice the quantity plate of the taken or blacklisted vehicle. This can facilitate the checking officers to validate whether the vehicle he/she is checking is allowed or not. If it's a taken vehicle then the closest police office is notified and the critical registrar can get a notification to go to the police officer. The application provides central information of all inputs received by the police across Asian countries for any search of vehicles any time. The chassis variety is additionally enclosed within the information. We propose to link Mobile and Aadhar variety with every vehicle for chase and facilitate authorities and public to succeed in owner instantly with call/SMS. It'll be

used solely by the officers for chasing and reaching house owners. For the API purpose and web-server we've got used Python Flask. In order to ascertain the authority of the vehicle we'd like to produce the license number, Chassis variety and also the Engine variety of the vehicle to app. If the vehicle isn't valid, we are able to directly report back to the police office and also the owner as there are probabilities that the vehicle may well be taken. The main advantage of this technique is that the police needn't undergo immeasurable procedures before taking action.

6. SYSTEM DESIGN

6.1 Use Case Diagram

The use case diagram, given in figure, for the proposed system is described as follows: The Different users in the systems are Super -Admin and Police, who perform the different types of use cases such as Manage case, criminal records, police, investigations and users. The relationships between and among the actors and the use cases of Police App:

- Super Admin Use cases of super admin are search criminal records, track real-time location of police, messaging application and uploading and searching vehicle details.
- Police Use case of Police include create crime records, search records, and search vehicle details.

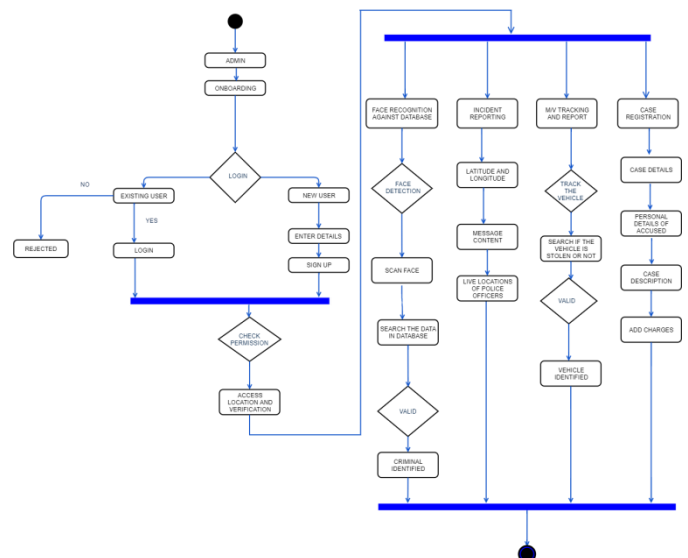


6.2 Activity Diagram

Activity diagram for the policing app given in the figure is depicted below. It shows the flows between the activity of the department, police, case, crime, compliant. After login users can manage all the operations on case, department, police etc. The diagram below helps demonstrate how the login page works in a police app. The user will not be able

to access this page without verifying their identity. Feature of the Activity UML Diagram of Police app

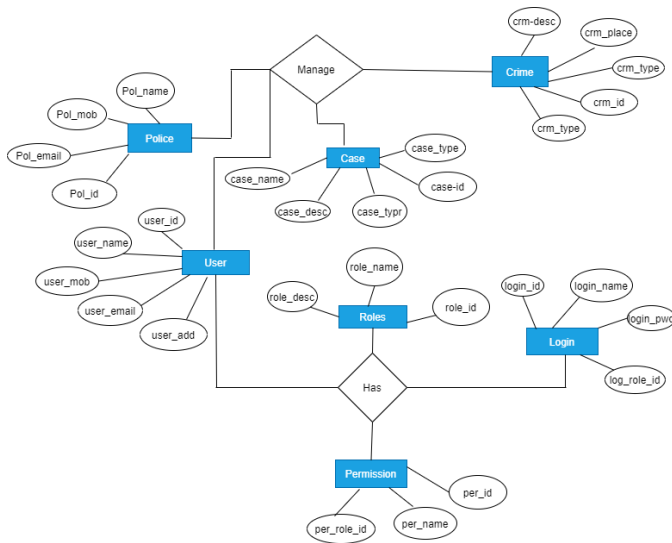
- It shows the activity flow of editing, adding and updating of police.
- Police will be able to search and register criminal details.
- It shows the full description and flow of the department, crime, Complaint, Case, Police.
- Face recognition, incident reporting, M/V tracking and reporting and case registration flows are shown.



6.3 ER Diagram

Entity relationship diagram depicts the model of police web-based App. The ER diagram of Raptor shows all the visual instrument of database tables and relations between Criminal, Department, Case, Crime, Police and Complaint. Rapture entities and their attributes are:

- Case Entity: Attributes of case entity are case id, Case crime id, case name, case desc.
- Crime Entity: Attributes of crime entities are crime_id, Crime_type, crime_desc.
- Police Entity: Attributes of Police entities are police_id, Police_name, police_mob, police_email.
- User Entity: Attributes are user_name, user_id, user_mob, user_mail, user_add.



7. SOFTWARE IMPLEMENTATION

7.1 OpenCV

An OpenCV (Open Source Computer Vision) is a library of python functions developed to solve the computer vision problems. The OpenCV-Python uses NumPy, which is a highly optimized library for numerical operations. All the OpenCV array structures are transformed to and from the NumPy arrays. So whatever operations performed in NumPy can be combined with OpenCV. The OpenCV supports many algorithms associated with computer vision and machine learning etc.. and it is growing day-by-day. As of now, the OpenCV is being supported by a huge variety of programming languages such as Java, Python, C++ etc and is out there on different platforms such as iOS, Linux, Windows, OS X, Android etc. Hence, OpenCV- Python is an appropriate tool for fast prototyping of computer vision Problems.

7.2 MTCNN

MTCNN or Multi-Task Cascaded Convolutional Neural Networks is a neural network which detects faces and facial landmarks on images. It consists of 3 neural networks connected in a cascade. MTCNN is a python (pip) library which proposes a deep cascaded multi-task framework using different features of “sub-models” to each boost their correlating strengths

7.3 TensorFlow

Entity relationship diagram depicts the model of police web-based App. The ER diagram of Raptor shows all the visual instrument of database tables and relations between Criminal, Department, Case, Crime, Police and Complaint. Rapture entities and their attributes are:

TensorFlow is a free and open-source software library for machine learning. It can be used across a range of tasks but

has a particular focus on training and inference of deep neural networks. TensorFlow is a symbolic math library based on dataflow and differentiable programming. Among the applications for which TensorFlow is the foundation, are automated image-captioning software, such as DeepDream. TensorFlow provides stable Python and C API and without API backwards compatibility guarantee. Some more functionality is provided by the Python API.

7.4 Support Vector Machine(SVM)

Support vector machines (SVMs) are a set of supervised learning methods used for classification, regression and outlier's detection. It is effective in high dimensional spaces. SVM is till effective in cases where number of dimensions is greater than the number of samples. It uses a subset of training points in the decision function (called support vectors), so it is also memory efficient.

7.5 Yolov4

Entity relationship diagram depicts the model of police web-based App. The ER diagram of Raptor shows all the visual instrument of database tables and relations between Criminal, Department, Case, Crime, Police and Complaint. Rapture entities and their attributes are:

Yolo4 is a family of one-stage object detectors that are fast and accurate. Most of the modern accurate models require many GPUs for training with a large mini-batch size, and doing this with one GPU makes the training really slow and impractical. YOLO v4 addresses this issue by making an object detector which can be trained on a single GPU with a smaller mini-batch size. The YOLO detector can predict the class of object, its bounding box, and the probability of the class of object in the bounding box. Each bounding box has the following parameters. The center position of the bounding box in the image (bx, by) The width of the box(bw) The height of the box (bh) The class of object (c).Each bounding box is associated with a probability value (pc), it is the probability of a class of object in that bounding box.

7.6 Nebular

Nebular is an Angular library that simplifies complex rich UI applications development. It consists of the following modules: Theme, Authentication, and Security. Nebular has a root component that wraps all the entire app. This root component has the capability to render components dynamically before the rest content using Component Factory Resolver provided by Angular's core module.

7.7 Angular

Angular is a platform for building mobile and desktop web applications. Angular is a TypeScript-based open-source

web application framework led by the Angular Team at Google and by a community of individuals and corporations. Angular is a complete rewrite from the same team that built AngularJS. HTML is great for declaring static documents, but it falters when we try to use it for declaring dynamic views in web-applications. AngularJS lets you extend HTML vocabulary for your application. The resulting environment is extraordinarily expressive, readable, and quick to develop. Angular is a toolset for building the framework most suited to your application development. It is fully extensible and works well with other libraries. Every feature can be modified or replaced to suit your unique development workflow and feature needs.

7.8 Flask

Flask is a micro web framework written in Python. It is classified as a microframework because it does not require particular tools or libraries. It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions. Flask is a lightweight WSGI web application framework. It is designed to make getting started quick and easy, with the ability to scale up to complex applications. It began as a simple wrapper around Werkzeug and Jinja and has become one of the most popular Python web application frameworks. Flask offers suggestions, but doesn't enforce any dependencies or project layout. It is up to the developer to choose the tools and libraries they want to use. There are many extensions provided by the community that make adding new functionality easy.

7.9 FaceNet

Face Net provides a unified embedding for face recognition, verification and clustering tasks. It maps each face image into a Euclidean space such that the distances in that space correspond to face similarity, i.e., an image of person A will be placed closer to all the other images of person A as compared to images of any other person present in the dataset. And without API backwards compatibility guarantee. Some more functionality is provided by the Python API.

8. CONCLUSIONS

The proposed system helps in detecting criminals and stolen vehicles in a faster and easier way. The system super admin can communicate to a group of police officers in a particular area during emergencies by push notifications. The system offers a centralized system to the superior officer.

ACKNOWLEDGEMENT

I take this opportunity to express my profound gratitude and deep regards to my teachers Prof. Angitha George and Prof. Jikku Thomas for their exemplary guidance, monitoring and constant encouragement throughout the course of this project. The blessing, help and guidance given by them from time to time shall carry me a long way in the journey of life on which I am about to embark.

REFERENCES

- [1] W. Jakkhupan and P. Klaypaksee, "A web-based criminal record system using mobile device: A case study of Hat Yai municipality," 2014 IEEE Asia Pacific Conference on Wireless and Mobile, 2014, pp. 243-246, doi: 10.1109/APWiMob.2014.6920295.
- [2] K. Tabassum, H. Shaiba, S. Shamrani and S. Otaibi, "e-Cops: An Online Crime Reporting and Management System for Riyadh City," 2018 1st International Conference on Computer Applications Information Security (ICCAIS), 2018, pp. 1-8, doi: 10.1109/CAIS.2018.8441987.
- [3] S. Shirsat, A. Naik, D. Tamse, J. Yadav, P. Shetgaonkar and S. Aswale, "Proposed System for Criminal Detection and Recognition On CCTV Data Using Cloud and Machine Learning," 2019 International Conference on Vision Towards Emerging Trends in Communication and Networking (ViTECoN), 2019, pp. 1-6, doi: 10.1109/Vite-CoN.2019.8899441.
- [4] M. Ghazal, S. Ali, M. Al Halabi, N. Ali and Y. Al Khalil, "Smart Mobile-Based Emergency Management and Notification System," 2016. IEEE 4th International Conference on Future Internet of Things and Cloud Workshops (FiCloudW), 2016, pp. 282-287, doi: 10.1109/W-FiCloud.2016.64.
- [5] F. Schroff, D. Kalenichenko and J. Philbin, "FaceNet: A unified embedding for face recognition and clustering," 2015 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015, pp. 815-823, doi: 10.1109/CVPR.2015.7298682.