Android based Application – Missing Person

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Abstract - *The task of finding missing person is not an easy process to chase the kidnappers and find the victim by people or police department. Various steps of filing a report and hard work is there, even manual process consumes a lot of time and there is no guarantee of finding the lost person. This application contains functionality to add complaint of lost person. By using these complaints, Government Officials and local people can put their efforts to find missing person in their areas. To overcome the present problem, an application is made to upload complaints on AWS web server which allows accessing the details by any of the Government Officials and also accessible to local people for matching the faces. This project matches the image of missing people using Face Recognition on any Android platform and hereby, presenting the solution for the problem. Here, we used three modules, User, Police and Admin for getting the desired results. Database Updates automatically as the user uses the application and deletes unnecessary data.*

*Key Words***:** Android, Face Recognition, Python Django, AWS, Java.

1. INTRODUCTION

A report published by National Crime Bureau on October 2019, compared the crime rates that shows around 77%-80% rise in the number of crime cases were observed in the year 2017 as compared to 2016. According to the data on lost persons in crime rates in India, a total rate of around 2.9 lacs people in 2016, 3 lac people in mid-2017, and 3.48 lac people in 2018-19 have been reported as missing and still the counting continues. A report by Manabi Katoch, published in April 30, 2016, "Lost in 1995, Jyotsna Found her Family in 2016. A big thank to Chandrapur Police", are the headlines of a report. A person is found after 21 years. This is an emergency in the country to take strict action in crime cases and use technology to take quick actions. These people could have a list of conditions like anxiety, stroke, depression, dementia, anemia or disorder. Lost person under the influence of kidnappers is a person that likely to have been kidnapped, abducted, raped, murdered or harmed rudely. There could be a number of reasons about their detention against their will and fundamental rights. Some are suspected for people trafficking, beauty, appearance, murder victims, social behavior, etc. They always are at a high risk because they went under threat from the kidnappers or socially unstable person. An OIC has to measure the rate of risk for the persons and rank them individual threatened missing person case i.e. low, mid, high and very high risk, which depends on the situations i.e. a person lost after Friday evening or night, will going to be graded as less risky because there is no actual threat to missing person or the community to which the person belongs. Although, an 8-year-old female should be considered as having more risk because the victim is not secure and may be in serious risk and harm her.

For automating the activity of finding missing person, we have developed an android platform-based application. The application will be used by Government Officials as well as common people by whom they can match faces automatically within minimum time period and less efforts.

Android application is a Java based software program which runs on the Android platform because the Android platform is built for mobiles and tablets. An Android application is basically designed for smartphones, tablets, emulators, PC running on the Android Operating System. The application can be available by developers through their websites, Play Store, or by sharing the .apk file format. These applications are uploaded and published on the Android Market, commonly known as Google Play Store, an online store dedicated to these applications for installing, securing rights and purchasing purpose. The features of Android Market are both free and premium. These applications are written in the Java programming language, which uses Java core libraries and Java Android libraries. The applications are first compiled to generate .class file to run on the Dalvik virtual machine, which is a virtual machine designed for mobile applications. Android technology used SDK tools for building the applications. The android SDK includes tools, sample code and relevant files for creating and building mobile applications. Here, we present an android application that works for finding the missing person using facial recognition. Our application will try to reduce the number of missing person cases and makes it easily available to local people also.

The project on finding Missing Person named as Missing Person, using Face Recognition on Android platform presents a solution for the current problem. Facial recognition works by saving the coordinate points of faces in two dimensional arrays and then matches these points with the face points of searched person. If at least 70-75 percent of points are matched then, it declares as faces matched. It is a process that uses an android mobile for uploading images into the application, results are obtained on the basis of face recognition. We are using Dlib and Face recognition libraries of python for comparing the faces from saved faces and found person. The system ensures 70- 80 percent result on the basis of compared faces of missing person. We are using three modules of User, Police and Admin for getting the desired results. Database Updates automatically and deletes solved cases data. The presented system helps to find out missing person in minimum tenure and less efforts. The application interface is easy to use and free which makes it worth to present in front of others. It also removes the manual system of registering the cases of missing person, hence saving the time.

2. LITERATURE SURVEY

This section compares manual system of finding people with automation and a contrast with their related papers. Each year around 1 lac peoples gets missing and from them only some found easily but most of the cases takes much more time even it may lead to the death of the person. So, manually it is a difficult task to find the person as soon as possible. The manual system takes time to file a case and proceeding the case to execution. Also, manpower is not much efficiently trained to search for the missing effectively. So, there are some steps taken to work in the field of missing persons and for decreasing the crime rate but these applications are not sufficient to fulfil the situation of current scenario.

In Crime Reporter and Missing Person Finder, features like adding and removing complaints, display, search by attributes were given, but lacking the functionality of facial recognition. Similarly, Missing person Finder papers, the working is confined to entering and updating the details. Most of the papers are similar to the above ones.

Therefore, there is a need for automation which automates the task of recognizing the missing person. The server provides a system for saving the images and corresponding details of the missing person. By doing this, we can grab the details of all the missing person at that instant. In this context, we have made an application named Missing Person which avails the features of facial recognition, saving cases to the database and matching the corresponding images from the database. Many applications are providing the service of saving details to the database, but they are not effective to give proper details and takes more time to give the results. Servers like AWS, Alibaba, etc. can be used to store the details of the missing person.

3. PROBLEM STATEMENT

A report published by National Crime Bureau on October 2019, compared the crime rates that shows around 77%-80% rise in the number of crime cases were observed in the year 2017 as compared to 2016. The records are enough to take serious actions on the process of solving crimes in the country. Also, the current scenario of finding missing person is based on manual system which not much efficient to tackle the rapidly increasing cases of missing person. The manual procedure of finding missing person is still a long and time-consuming process. Writing FIR (First Information Report) and then registering to the department book and then circulating it to the other stations takes long time. It wastes the manpower and also the papers. There are some applications which are used to find the missing person, but some of them just saves the cases to the database and some of them do not works properly. Most of the applications do avails face detection, face recognition features of Artificial Intelligence and Machine Learning. In this context, we have made an application named Missing Person which avails the features of facial recognition, saving cases to the database and matching the corresponding images from the database. We are using Dlib and Face recognition libraries of python for analyzing missing person faces, the system ensures 70-80 percent result on the basis of analyzed faces. The server provides a system for saving the images and corresponding details of the missing person.

4. RELATED WORK

This section compares the different applications related to the missing person Applications in the market. The advancement of Information Technology has led to the formation of new ways of finding missing people. Today, engineers and researchers are

putting their efforts to automate the tasks of various manual processes. Some of the applications are presented below to find and save details of missing people.

[1] Missing People Find, is the application used to search for missing people. It has the features of registering missing people and database for found people is maintained. But there is no feature of matching the faces of missing person. There no form validation applied to check the correctness of information entered by the user. [2] Missing Person Registration application works the same as Missing People Find, form validation is applied and used effectively but it only saves the details of missing persons and there is no provision of face recognition feature or similar technology. [3] Find Stolen or Missing People stores the details of missing person and displays the content, but it does not properly upload the images and there is no face recognition found in the application. [4] Missed person is also a similar type of application which saves the details of missing person in low quality images and face recognition system is also not present in it. These related works showed that these applications are not sufficient to find the missing person and work in the field of real time applications. So, there are some steps taken to work in the field of missing persons and decreasing the crime rate but these applications are not sufficient to fulfil the current scenario of the nation.

Therefore, there is a need for automation which automates the task of recognizing the missing person. The server provides a system for saving the images and corresponding details of the missing person. By doing this, we can grab the details of all the missing person at that instant. Many applications are providing the service of saving details to the database, but they are not effective to give proper details and takes more time to give the results. Servers like AWS, Alibaba, etc. can be used to store the details of the missing person.

5. PROPOSED STATEMENT

The world is growing rapidly and so the level of safety needs to be reorganized. Some applications are made to increase the level of safety, but fails at some point or the other. To tackle the problems in the existing applications, we have developed a simplified android platform-based Application named as Missing Person. The applications provide the features of adding missing person cases and uploading the image of found person to match it with the images saved in database. In case, the person is unable to identify himself due to the situations faced by the person, this application gives all the details of that person if the details are registered on the database (server). The application responds from the server in seconds which saves the time of people and making the user interface effective to use. The application works on any android version ranging from Android 2.1 to Android 10, which is the latest version of Android available in most of the devices. Also, it can be as a web application just typing the URL of the website. The web application feature is available to the Django framework of Python.

The proposed system includes the following features. Adding details to the database. Details are name, age, address, contact number, Description, image of the missing person, etc. Details can be fetched using admin panel by an authorized person. After saving the details, image the found person can be uploaded to get the details of the missing person. Notification of updated (added) details.

5.1 Presentation Layer

It provides the frontend view to show the actual behavior of the application. Mobile phone will work as a client to send the requests to the server. Then server in response, perform the required computation and give back the results. User will interact with the presentation layer to use the application. It uses Python Django framework to send and receive the requests.

5.2 Business Layer

This layer acts as an intermediate between presentation layer and server. It receives requests from client and sends it to the server (database). In return server responds to it and forwards the response to the client. We used amazon web services to provide a server for our application. Amazon EC2 is used to work as compute power and stores our data in database.

5.2 Database Layer

In Django, the default database used is SQLite. It is beneficial for a smaller number of records. However, the type of database used can be changed according to the requirement. SQLite is faster and efficient to work properly. Django interacts with the database and modifies it according to the situations. It also gives the advantage of easy upload and retrieve images. Here are some advantages of the proposed system. Easy uploading of images, Simple GUI, Easy information retrieval, For both desktop and mobiles. Disadvantages of the proposed system. Internet connectivity is compulsion. Works with android devices.
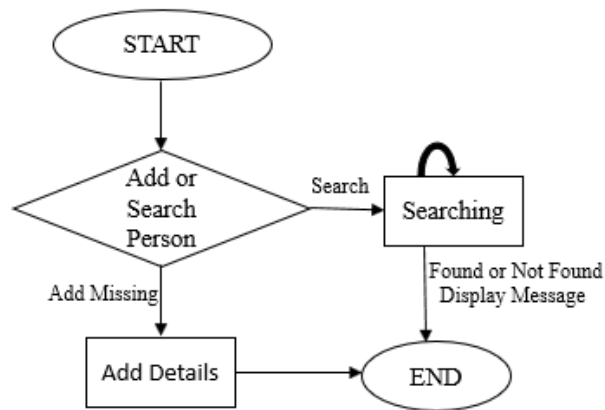
Fig - 1. Work Flowchart

6. SOFTWARE / HARDWARE RELATED TO PROPOSED SYSTEM

6.1 Software Requirement

- Visual Studio Code
- Android Studio
- AVD for testing
- SDK for API 8 (min) or API 29 (max)
- JDK, Java 7+
- EC2 instance from amazon web services
- Python 3.6 or above
- Django 2+
- Dlib 19+, Face recognition, etc. as required
- 64 bit-Operating System
- Window 7 or above.
- HTML
- Gradle 2+

6.2 Hardware Requirement

- Processor of 1.7GHz Processor Pentium 4 or above
- RAM: 1GB, 100GB of hard disk
- Android Mobile with camera

7. LANGUAGES AND SOFTWARES TO IMPLEMEMT

7.1 Python

Python is a high-level programming, extensively used for Machine Learning, face recognition, Artificial Intelligence, Data Science, etc. new emerging technologies. As python is easy to use with syntax and semantics, it chosen for these technologies. We used python language to implement the application using Django framework. Python Django provides a web and mobile application interface to send and receive requests from server. It has its own admin panel which is in built if we install Django. The admin panel stores all data in the database and give the facility to create, update, delete and modify the data. Due to the simplicity of Python, it is chosen for making mobile applications. For making any application in python, there is need of virtual environment to separate our modules and files from other python files and directories. Python has its own package management and library of modules with rich sources of information including NumPy, re, pandas, matplotlib, OpenCV, json, random, socket, tkinter, turtle, urllib, xml, etc.

7.2 Java

Java is a widely used language as it performs all the task needed to make any software application, mobile application, server connection, android application, distributed systems. As Java is a general-purpose language, it widely used in every field of Information Technology. Java uses JVM (Java Virtual Machine) to develop, compile and run the code correctly. Java known for its features like robustness, exception handling, simplicity, Object Oriented, Secure, High Performance, flexibility, Multithreaded, Platform Independent, etc. These features make JAVA, one of the most popular language. Java behave as a backbone to other frameworks to work properly. We are using JAVA with Android Studio to develop our Android Application. JAVA works great to develop a good and interactive application.

7.3 Android Studio

Android Studio is the desktop application used to develop android applications and for editing existing android projects. Android Studio is a replacement of Eclipse Android Development Tools (ADT) used as the primary IDE for developing native Android applications. The latest version of Android Studio is 3.5, which makes the development android application even easier and interactive. The software consists of Gradle, AVD, Java and XML files, etc. Gradle is used for building and preparing the application for debugging and editing purpose. It is an open source software application for build automation system used for building android applications using the concept of Apache Ant and Apache Maven. Android Virtual Device (AVD) is used to run our android application without installing in android phones. It provides a virtual android device to run the applications. Different AVDs are available according to different android versions. Java files are used to write the functionality of the application and XML files are used to improve the appearance of the application.

8. WORKING AND EXPERIMENTAL RESULTS

The application name is "Missing Person". First of all, install the application. Then Android OS will check the compatibility of application with the current version while installing the application. Now, when we turn on the application, the first page appears on the screen is to a button "Get Started". On clicking the button, a new activity opens. On this page, there are two options, either search a person by uploading the image and matching the face, or adding the details of new missing person. If we choose to add a missing person, details like name, age, address, contact number, image of the person, description, etc. were to be answered. After filling the details, the details are added to the database and we have a new missing person saved in our admin panel. And if we want to search a missing person by an image, just upload the image of the person and click on search button. On clicking on search button, our algorithm of face matching gets started. First it collects the number of saved images, then loop through each image and compares the uploaded image with the images saved in the database. If any of the image face matches, it breaks the loop and shows the message "The image is matched by name ....". It tells that the match is found and we can get the details of the missing person by referencing that image name in the database stored in the admin panel. But if the image is not matched with the database images, then a message "this is not matched" appears on the screen.

As the details of the person are confidential, so we made it accessible to only those people who are authorized. People can search the images but the details can be seen in the presence of authorized person through the admin panel. It only notifies to people whether a match is found. As seen from below screenshots of the application. On searching an image, the person image

matched because it was saved in the database and face matching algorithm works properly. Figure 2.1 shows the process of uploading an image of the person. When clicking on Search Person button, the process of facial recognition starts recognizing the images stored in the database. If there is a match, then the corresponding message is displayed as seen in figure 2.2. If there is no match, then match not found is displayed on the screen. Then we can check the details of the person through admin panel. Admin panel will be accessible by IP address "http://52.12.145.106/admin/"
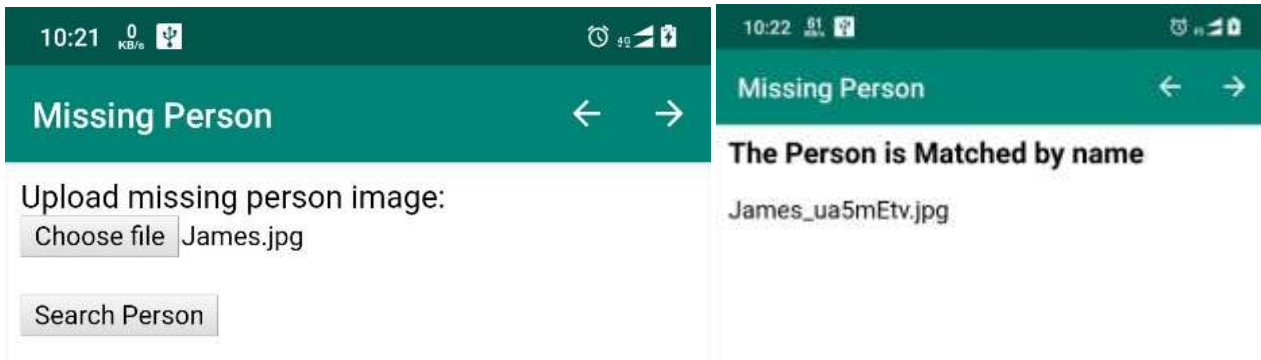
Fig -2.1: Uploading image for searching **Fig -2.2**: Result after searching

9. FUTURE SCOPE

The upcoming work on which we are targeting is to calculate the working tendency of the application, so if any problem occurs, we can resolve it as soon as possible and show that our proposed system is better than pervious applications. Also, we were planning to append following features to the application. Automatic alert for recognizing missing person. Automatic notification system is also under working for improving the working of the application.

10. CONCLUSION

In previous applications, if some of them availing the feature of saving details then the feature of facial recognition found missing and vice versa. Efforts are made on implementing face recognition possible with much better accuracy and so this method is very helpful in recognizing missing person. The application uploads, retrieves, deletes and updates the data of the missing person. A searching option is given to match the faces and identify the details of the missing person. This application is for common people for uploading and searching the details, for police, it gives the features to check the details of the missing person and admin panel for modifying and storing the details in the database. The server of the application is also handled by the Admin itself.

11. ACKNOWLEDGEMENT

11. REFERENCES

[1]   Missing People App

[2]   Missing Person Registration Application

[3] Initiatives from UP Police for finding missing person. https://uppolice.gov.in/article/en/missing-person

[4] Missed Person Application

[5] Data on missing children –

 http://www.findthekids.org/pdf/datamissing.pdf

 https://www.india.gov.in/list-missing-persons-0

 https://en.wikipedia.org/wiki/Category:Missing_person_cases_in_India

 https://www.thebetterindia.com/53899/jyotsna-dhavale-chandrapur-lost-21-years-ago-missing-person-police/

[6] Find Missing Person using AI – Gagan Manku.

[7] Python Django Documentation.

[8] Edith Fairman Cooper (2003), *Missing and Exploited Children: Overview and Policy Concerns; CRS report for Congress*, Nova Publishers, p. 4, ISBN 1-59033-815-4

[9] API for face recognition Python. https://pypi.org/project/face-recognition/

[10] Missing Person Stories: https://www.thehindu.com/society/indias-missing-children-what-the-whatsapp-rumours-dont-tell-you/article24641527.ece

[11] Sedlack, *Andrea J. (2002). "National Estimates of Missing Children: An Overview". NISMART Series Bulletin: 7, 10. Retrieved* November 9, *2015.*Spector, A. Z. 1989. Achieving application requirements. In Distributed Systems, S. Mullender