Location Tracker for Tadipaar

Harsha Khandelwal[1], Bhavesh Chaturvedi[2], Prof. Ms. Shahin S Makubhai[3]
[1,2]*Student, MIT School of Engineering, MIT-ADT University*
[3]*Professor, Dept. of Computer Science Engineering, MIT School of Engineering, MIT-ADT University*

Abstract **- Using location-based services, people can easily monitor and locate their locations wherever they are. They can also track the activities of their various devices and objects from their home. Most applications use Google Maps to create and share their location information. They can also retrieve data related to their current location and check traffic conditions in a certain area. One such use case of Location Based Services is our government offices, to track the location of the officials, criminals, and day-to-day workers. This project aims to develop an Android Application that will allow officials to monitor and track the location of Tadipaar. We will be developing an android application that will allow users to track their location and alert the authorities when they enter a restricted area. Another feature that will be added is a geofencing app that will allow users to set up their own fencing. GPS and Cloud Messaging services will be used for tracking and information sharing purposes respectively.**

Index Terms **- Location Based Service, Geo-fencing app, Android Application, GPS, Cloud Messaging Services, Face Recognition, RSA Algorithm.**

I.INTRODUCTION

At this time, the world is in a transition period. As we enter the Digital Era, we still have a lot to see in this field and still have a lot to learn about the potential that AI, IoT, Big Data Analytics, and several other technologies can have. The world right now is far more connected than ever before, and it will be interesting to see how this evolves over time.

Our devices can play all of the songs ever made, control our home appliances from anywhere, collect all the information there is about any given topic, share a message or pictures with any total stranger anywhere in the world, and even track the location of anyone within range.

It has been our goal to implement this idea so that various government organizations can track the locations of their field workers throughout the day and even monitor them in real-time.

We have attempted to build a platform on which these Government Organizations can find out the exact location of their employees in real-time, during working hours, to maintain order and ensure work is carried out honestly.

This app differs from existing systems in that it uses not only GPS but also Cloud Messaging Services, which makes it unique.

A.FACE Recognition

3D liveliness facial recognition Face Detection SDK & API like other biometric authentication mechanisms are vulnerable to spoofing and face biometrics. This can cause an unauthorized person to bypass the authentication mechanism by using a fake biometric, images of persons, masks, or dummies. Several latest mobiles which offer face unlock are prone to such authentication bypass attacks.To resolve this issue to a greater extent, we have used the FACEKI technology solution for Tadipaar's Facial Recognition process, to prevent any kind of spoofing attacks and can also detect the liveliness of the image being captured.

FACEKI Biometrics is a truly seamless and frictionless service, and it's far more secure than traditional methods, as it comes with certified anti-spoofing and liveliness detection that provides an additional layer of security, ensuring the person in front of the camera is who really claims to be.

B.RSA Encryption Algorithm

RSA has become the most used asymmetric algorithm. It provides a method to assure the confidentiality, integrity, authenticity, and non-repudiation of electronic communications and data storage.

We all know that in today's day every bit of the data needs to be encrypted so does our app needs to be. We have tried a lot of encryptions for trial purposes and ended up with RSA as the best and most suitable

encryption algorithm for our program. We use this at the very first step of the interface in the app for the user.

And the firebase gives us double security. As Firebase gives us a provision that data, we store in the database is already stored in an encrypted form using the SHA algorithm, but still, we are using the AES algorithm in the sign-up module.

The AES algorithm Is a symmetric block cipher that has three block ciphers {AES-128, AES-192, and AES-256. Based on the key length used, the number of execution rounds of the algorithm is 10, 12, or 14 respectively.

Thus, we are able to provide 2 layers of encryptions to keep the data collected while the sign-up process and it is well protected in firebase.

The rest of the paper is organized as follows. Section 2 presents the related works. Section 3 discusses the materials and methodology of the Location Tracker application. The results and related discussions are given in Section 4. Finally, Section 5 presents the conclusions and future research direction.

II.RELATED WORKS

The purpose of this review is to show the comparison between our proposed system and other related works which uses various different similar technology stacks for different application conditions. As of now, there is no such existing system for Tadipaar specifically which have been developed. But there are applications like LifeMap App and Land Vehicle Tracking App, which we have considered for comparison purposes in our project.

Considering factors such as Security, Accurate Prediction, Usability, bookmarking certain locations, and Trace bookmark locations, we have conducted a comparison check for our proposed project. In Life Map application for android, they do provide security to user details as well as provide accurate prediction to some good extent but when it comes to usability, bookmarking certain locations and tracing the bookmarked location in real-time, this application has not been able to provide them to the end user.

Taking the case of the Land Vehicle tracking android application, along with providing security and accurate prediction of the location, it is a go-to app in terms of usability as well. But while considering the bookmarking of a certain location and tracing bookmarked location factors, this app is not able to perform these well.

III.METHODOLOGY

The application is coordinated into 2 profiles, the Client-Server and the Admin Server. Presently taking the case of the Law Enforcement Team like the Police department, the Tadipaar will be the Client-Side users, and the Higher authorities following and checking them will utilize the Admin Side. At the point when a criminal is out on probation, his officials can screen his movements and ensure he doesn't leave the range he is allowed to move in. The server side requires an Android-based Smartphone beginning from Android 7.0 and with GPS and GPRS empowered. The admin side has similar prerequisites for sending and getting Cloud Messages. The proposed framework in these associations causes the Tadipaar to download the specific application without fail. Individuals disregarding them will download the application and make a record on the Admin Side. Presently, the Admin Side clients, i.e., the Police officials can demand the real-time location from the Client-side users i.e., the Tadipaar to screen their movements at any time of the day and can even take their attendance using the "Verification" button instead of settling on the pen paper strategy which has a ton of escape clauses. When the client-side user acknowledges the solicitation and empowers their area, the Latitude, and Longitude area, design is accumulated by the application and is changed over into a Human meaningful location which can be observed by the Admin. The administrator can even set a Geo-Fence for the Tadipaar, beyond which the person is not supposed to go. This element is to keep control over the Tadipaar and go through the entire process of probation bother-free. Area of cell phones is as scope and longitude which is changed over into full location by this application including Street Name, Area, City, State, and Country.

Geofence

1 Authorities will enter the radius of the Geo fence to be created in kilometers.
2 They will select the location from which the radius is to be considered, depending on the latitude and longitude of the selected location will be saved.

3 Authorities can then raise a location request to the detainee on the date of presentee.
4 Detainee will then upload a picture that will be tagged by latitude and longitude in its meta data.
5 This meta data will be used to check whether the detainee is in the Geo fence created for him while adding the detainee profile.
6 Subsequent notification will be sent to the authorities about his current status.

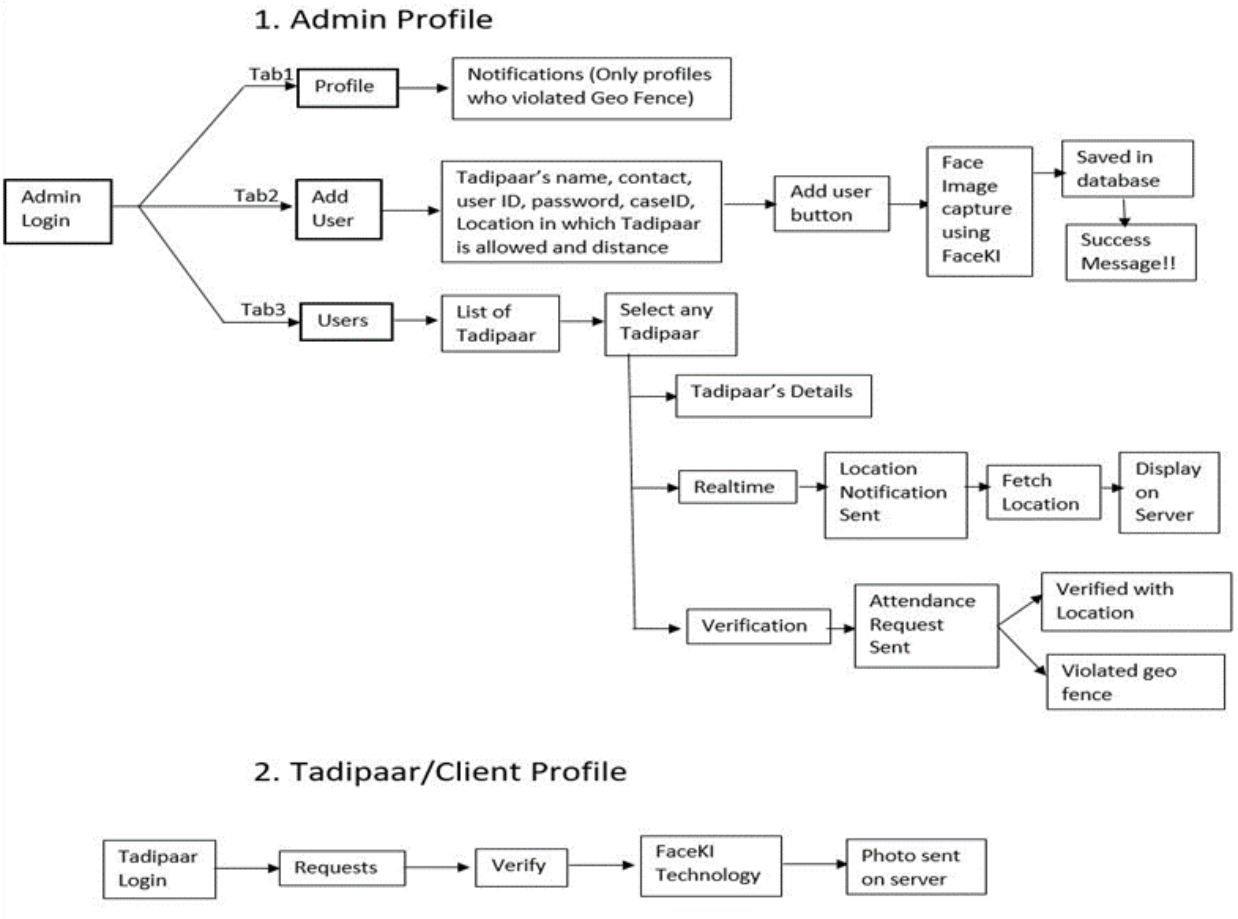

Fig. 2: Flowchart of the Application design

IV.WORKING

Android Studio is used to develop the entire application using java for functionality and control and XML for design purposes. Once the Admin or the Higher Authorities LOGIN using their credentials, they have three windows in their application:

i) Profile
ii) Add User
iii) Users

The Profile section provides admin details along with the notifications list of the Tadipaar who violated the Geo-fence, in the remaining section of the window.

In the Add User window, the admin will create Tadipaar's account with his details such as Tadipaar's Name, contact number, Unique user ID, Password, Unique Case ID, Exact Location using the Google Map, and the radius from that location in which the Tadipaar is supposed to reside in and then go to the "ADD USER" button to open the camera so as to click the Tadipaar's picture to save in the Database. The Camera here uses FaceKI Technology, which helps detect the liveliness of the image as well as for an Anti-Spoofing Check. And the location system uses the Geo-Fence application which works on Google Map SDK. Once the image is saved on the server end, a "SUCCESS" message will be displayed.

In the user's window, a list of all the Tadipaar profiles will be there. The user can click on any of the profiles, to see the particular Tadipaar's details and also can

request the Tadipaar's verification for regular attendance purposes as well as can also demand Tadipaar's real-time location. As soon as the user clicks on the "VERIFICATION" button, a notification to verify his details using Firebase Cloud Messaging Service will be sent to Tadipaar's account and simultaneously, an incomplete record will get created in the "History" section of that particular Tadipaar's profile, with its request status set to "Pending". Once the verification is completed by the Tadipaar, based on the location and image, i.e., if the image and the location match with the ones in the database, then the request status will be marked as "VERIFIED", else it will be marked as "Violated Geo Fence". And this record will be shown on Tadipaar's profile History section as well as in the case of "Violated Geo Fence" it will also be shown in the Notifications of the Profile Window of Admin.

The application on the Tadipaar begins with Tadipaar's Login information which was entered while creating the Tadipaar account from the admin's end. The Tadipaar application is a single window application with minimal access to it. Once the user is logged IN, he will be able to see the verification requests under the requests section on the window. As soon as the Tadipaar clicks on the "VERIFY" button, the front camera will open, along with FaceKI technology working under it to detect the liveliness and for anti-spoofing purposes. When the user captures the image and sends it to verify, the image along with the Tadipaar's location will be sent to the Server end.

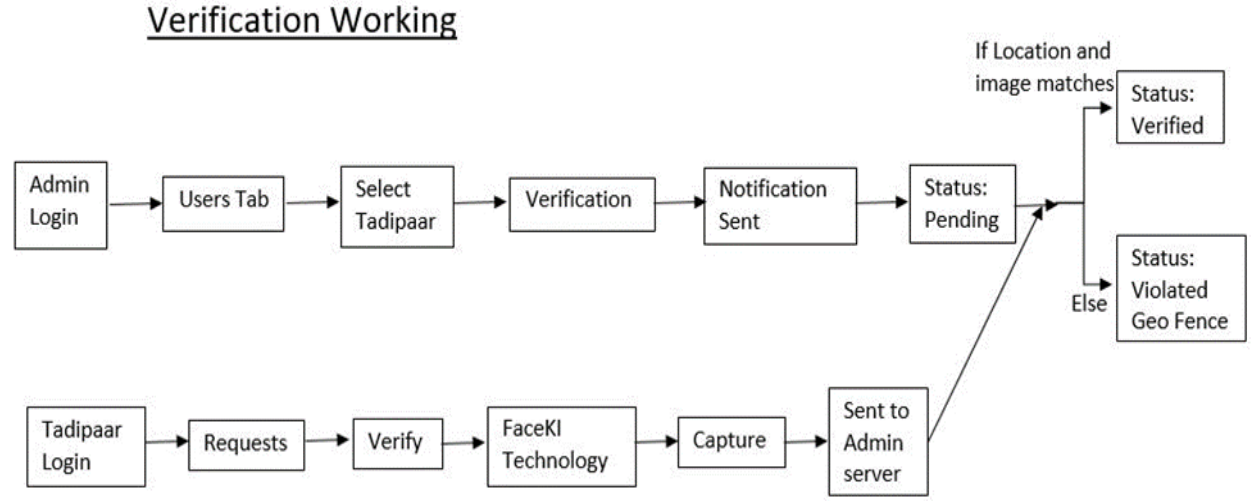

Fig. 3: Working flow of Verification Process

V.RESULTS AND DISCUSSIONS

The proposed android application is able to detect the Tadipaar with utmost accuracy using the FACEKI technology. It can also retrieve the real-time location of the tadipaar within short time span with google maps.

It allows the admin or the higher authorities to easily conduct the everyday attendance with just one click. For the verification purposes, the FACEKI technology solution has been implemented to perform the facial detection and recognition along with providing anti-spoofing and liveness detection features.

VI.CONCLUSIONS

The paper in detail explains the development of a Location Tracker Application for Tadipaar on an Android mobile device. The application allows the police department to monitor and track the location of Tadipaar and can even do the daily attendance task with just one click. Using the Cloud Messaging Services, the Authorities and the Tadipaar will be able to send and receive request notifications on the server. To proceed with the verification process, the FACEKI technology solution works the best, as it provides specific features like anti-spoofing and image liveness detection. For security purposes, we have successfully implemented the RSA algorithm on top of already provided Firebase security. Hence, a double-layered secure application. The application can be used in many departments where the Authorities want control

over their employees and want to detect their movements during working hours.

REFERENCE

[1] https://faceki.com/india-identity-verification/

[2] https://developers.google.com/maps/documentation/android-sdk/overview

[3] https://www.heavy.ai/technical-glossary/location-based-services

[4] https://gistbok.ucgis.org/bok-topics/location-based-services#:~:text=Location%2DBased%20Services%20(LBS),and%20service%20and%20content%20provider

[5] L. Zhao and X. Yu, "Design and development of anti-theft tracking APP based on geofence," 2021 IEEE Asia-Pacific Conference on Image Processing, Electronics and Computers (IPEC), 2021, pp. 738-741, doi: 10.1109/IPEC51340.2021.9421332.

[6] R. B. Hadiprakoso, H. Setiawan and Girinoto, "Face Anti-Spoofing Using CNN Classifier & Face liveness Detection," 2020 3rd International Conference on Information and Communications Technology (ICOIACT), 2020, pp. 143-147, doi: 10.1109/ICOIACT50329.2020.9331977.

[7] A. Salihbašić and T. Orehovački, "Development of Android Application for Gender, Age and Face Recognition Using OpenCV," 2019 42nd International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO), 2019, pp. 1635-1640, doi: 10.23919/MIPRO.2019.8756700.

[8] L. A. Elrefaei, A. Alharthi, H. Alamoudi, S. Almutairi and F. Al-rammah, "Real-time face detection and tracking on mobile phones for criminal detection," 2017 2nd International Conference on Anti-Cyber Crimes (ICACC), 2017, pp. 75-80, doi: 10.1109/Anti-Cybercrime.2017.7905267.

[9] M. M. Swastikasari, E. Sediyono and A. S. Ardjo, "Design of E-KOST: An Android-based mobile application using location-based service (Study case: SWCU'S students)," 2017 International Conference on Innovative and Creative Information Technology (ICITech), 2017, pp. 1-9, doi: 10.1109/INNOCIT.2017.8319135.

[10] K. Patel, H. Han and A. K. Jain, "Secure Face Unlock: Spoof Detection on Smartphones," in IEEE Transactions on Information Forensics and Security, vol. 11, no. 10, pp. 2268-2283, Oct. 2016, doi: 10.1109/TIFS.2016.2578288.

[11] A. Gupta and V. Harit, "Child Safety & Tracking Management System by Using GPS, Geo-Fencing & Android Application: An Analysis," 2016 Second International Conference on Computational Intelligence & Communication Technology (CICT), 2016, pp. 683-686, doi: 10.1109/CICT.2016.141.

[12] M. Alzantot and M. Youssef, "UPTIME: Ubiquitous pedestrian tracking using mobile phones," 2012 IEEE Wireless Communications and Networking Conference (WCNC), 2012, pp. 3204-3209, doi: 10.1109/WCNC.2012.6214359.