Research paper on Online Missing Vehicle Tracking System

Diksha Gupta[1], Shradha Gupta[2], Karnish Sharma[3], Ishika Batra[4]

[1]Diksha Gupta

Computer Science Department, Chandigarh University, Punjab

[2]Shradha Gupta

Computer Science Department, Chandigarh University, Punjab

[3]Karnish Sharma

Computer Science Department, Chandigarh University, Punjab

[4]Ishika Batra

Computer Science Department, Chandigarh University, Punjab

Abstract— **Missing Vehicle Tracking system is application software that helps in tracking the lost vehicle in online mode using few details of the vehicle such as registration number. As we know that cases of car or any vehicle theft are increasing day by day so this system will help the general public as well as public constables to find stolen vehicles. It is less time-consuming as it sends back the message to police constables whenever a vehicle will be pointed. It aims at reducing the trips and work for finding the missing vehicles for both police department and owner of such vehicles by reducing significantly the paperwork through simple centralized SMS sending services. It is not necessary to install GPS to track a vehicle using this system, just a Registration and VIN would be helpful. There are 3 modules named "public module", "admin module" & "police module", one main view and one database to store all the registered data. Hardware used in this project are Desktop, C.P.U, and storage media. Software used in this project are Windows 10 O.S, python using Spyder code for front end, Datastax Python Driver 3.24 for Apache Cassandra database for backend and any browser program.**

Keywords—— **Missing Vehicle Tracking System, Admin Module, Public Module, Complaint Registration, Police Module**

I.   INTRODUCTION

There is an increase in theft of vehicles now a days which result in great disturbance to the owners as they have to make frequent trips to the police station which is very time consuming and also is not very pocket friendly. Also, for police department to entertain such cases is very difficult and also requires more manpower as for completing the formalities and papers before handling the vehicle to legitimate owner they require an experienced police officer to eliminate mistakes in such procedures.

[1]Online missing vehicle tracking system aims at reducing the trips and work for finding the missing vehicles for both police department and owner of such vehicles by reducing significantly the paperwork through simple centralized SMS sending services. There are two scenarios for the missing vehicles:

*1)*If the police department finds any abundant vehicle and take that to the police station, through the centralized database system of this software it can be possible to find out the complaints registered for such vehicle, or through collaborating with RTO the owner of vehicle can be informed about his/her vehicle and with any government issued proof he/she can collect the vehicle from there.

2) The last location of the missing vehicle can be informed to the police department once the registration plate of number is identified by the camera available on check posts or signals and from there on the police patrolling vehicles can take over and bring the vehicle to police station and the same procedure can be followed as mentioned in point 1.

II.   FEASIBILITY STUDY

As mentioned above the existing system of finding the stolen or lost vehicles is very cumbersome for both police department and owners of vehicle which results in the insignificant office trips and for getting the work done people usually bribe the officers or the workers working inside the police station which leads to increase corruption. Also keeping tracks of so many lost vehicles is very difficult on papers, and in case if the vehicle has crossed the city/ state boundary it becomes very difficult to track the vehicles due to the decentralized system.

Now a day's bike stolen cases are increasing day by day. Finding out stolen bikes had become tough task for police why because culprits may leave stolen bikes where ever they

want. Police department will send a constable with chassis number and license number to RTO office where RTO officials will accept letter from police and send information after one or two days and then police will inform to the bike owner this entire process takes more than a month or more. This application is developed to solve this problem.

Thus there is a need of a centralized and digital system for keeping tracks of lost and found vehicles and to make sure the vehicle is being handled to legitimate user.

III.FRONT END AND BACK END USED

For this project, the front-end used is python and back-end database used is Cassandra database.

A. Python:

Python is a high level, interpreted and general-purpose dynamic programming language that focuses on code readability. It has fewer steps when compared to Java and C. It was founded in 1991 by developer Guido Van Rossum. It is used in many organizations as it supports multiple programming paradigms. It also performs automatic memory management.

Advantages:

   1)   Presence of third-party modules
   2)   Extensive support libraries (NumPy for numerical calculations, Pandas for data analytics etc.)
   3)   Open source and community development.
   4)   Easy to learn.
   5)   User-friendly data structures
   6)   High-level language.
   7)   Dynamically typed language (No need to mention data type based on value assigned, it takes data type).
   8)   Object-oriented language.
   9)   Portable and Interactive.
   10)   Portable across Operating systems

B. The backend used in this project i.e. Cassandra database has following advantages:

   1)   Fault Tolerant**:** Data is automatically replicated to multiple nodes for fault-tolerance. Replication across multiple data centres are supported. Failed nodes can be replaced with no downtime.
   2)   Performant**:**Cassandra consistently outperf orms popular NoSQL alternatives in benchmarks and real applications, primarily because of fundamental architectural choices.
   3)   Decentralized**:** There are no single points of failure. There are no network bottlenecks. Every node in the cluster is identical.
   4)   Scalable**:** Some of the largest production deployments include Apple's, with over 75,000 nodes storing over 10 PB of data, Netflix (2,500 nodes, 420 TB, over 1 trillion requests per day),

Chinese search engine Easou (270 nodes, 300 TB, over 800 million requests per day), and eBay (over 100 nodes, 250 TB).
   5)   Durable: Cassandra is suitable for applications that can't afford to lose data, even when an entire data centre goes down.
   6)   You're in control**:** Choose between synchronous or asynchronous replication for each update. Highly available asynchronous operations are optimized with features like Hinted Handoff and Read Repair.
   7)   Elastic**:** Read and write throughput both increase linearly as new machines are added, with no downtime or interruption to applications.
   8)   Professionally Supported: Cassandra support contracts and services are available from third parties.

Thus overall this project is easily accessible, flexible and secure for the storing of important and confidential information of people.

IV.METHODOLOGY AND ARCHITECTURE

Our project consists of Home page, Database and 3 different modules named as Admin module, Public module and Police module. Details about them as follows:
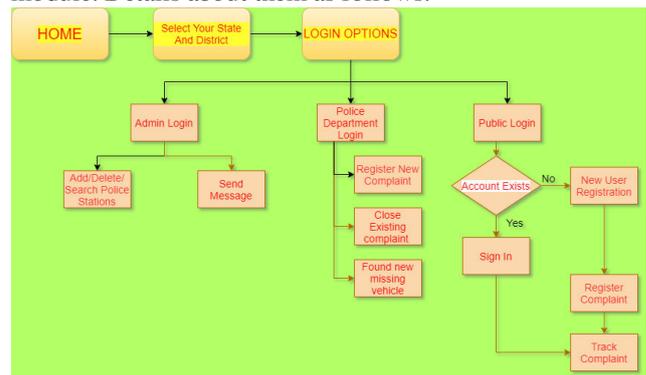

Fig.1. Architecture of proposed system

   A.   Home Page

Page where users have to select their State and District and then have to move further to Login options directed into 3 sections i.e. Admin Login, Police Department Login & public Login
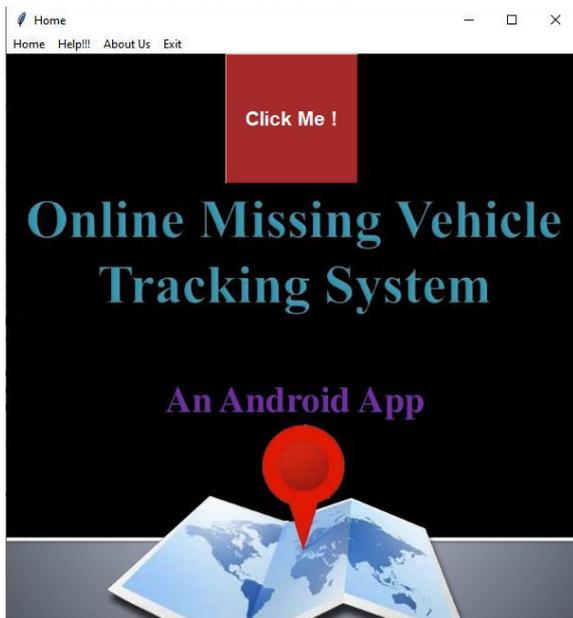
Fig 2. Home Page

B.   Database

The full database will be only accessible to admin and for all others including police officials would only be able to access only the required information such as complaint numbers, if the complaint is open or closed and after entering the vehicle number if vehicle is in lost database or in found database etc.

All the information with all dates and all locations would be stored in database.

No case of modification in the database without proper permissions would be entertained.

C.   Modules

1)   Admin module

Admin would be the person which can access whole system and would be able to fix any bugs encountered and also would be able to add different police stations under this project.

Functions featured in Admin module are:

To add new police station into the system.

To remove any existing police station from the system.

To search the required police station.

To send the common message to all the police stations.

Fig 3. Add Police Station in Database

2)   Public module

This module is for general public who want to either lodge a complaint for their lost vehicle or for tracking the progress of their complaints.

Functions featured in Public module are:

To Register a Complaint

To track a complaint
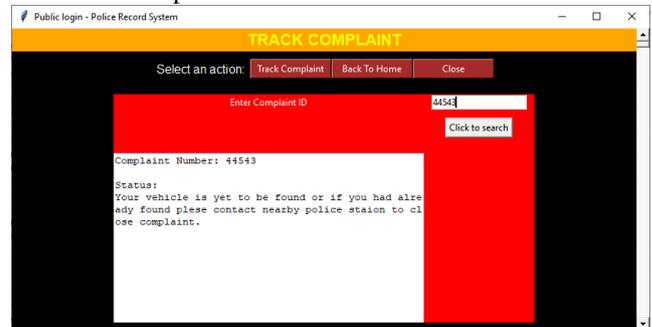
Fig 4. Track Complaint Status by user

3)   Police module

This module is for the police stations in which the person responsible for registering the complaints for lost vehicles would be able to register the complaint on behalf of owner, also would be able to keep up the records of the complaints lodged under his/her police station and how many vehicles are returned to their owners with which proof etc.

Functions featured in Police module are:

To file the F.I.R. regarding missing vehicle.

To close the F.I.R.

To update the status regarding the filed complaint.

To send the SMS.

Fig 5. Registering complaint by Police station

V. OBJECTIVE OF PROJECT

A.   To construct a vehicle tracking system controlled by a centralized server. To design and implement cost effective vehicle tracking system yet an efficient one.

B.   To design a user friendly and a safe system to control all the complaints of lost and found vehicles especially aimed to aid all people.

C. The main aim for developing this project is to interconnect information between public, police department linking with RTO for finding out the information of the stolen bike with a single automated SMS and provide quality and fast services to public.

D. The same application can also be used by public before purchasing a secondhand bike by just sending license and chassis number details about the bike can be known along with owner information. So, using this application can reduce vehicle thefts and reduce workload for police and public, case can be solved in a short time.

Fig 6. Statistics of lost and found vehicles[3],[6]

VI. COMPARISON WITH OTHER MODELS

A. If GPS system is not available in a vehicle, still our software can track its location using registered number plate.[4]

B. Main advantage of tracking the vehicle using number plate is that it can be easily captured by CCTVs or at check post, whereas it is difficult to capture chassis number through these mediums.

C. It will return message to the police corporate who will file the complaint regarding missing vehicle on our software. Therefore, it will be easier for them to take action accordingly.

D. In previously made software, they are relating the filed data with insurance data, but there can be many vehicles with no insurance, but all vehicles are registered in R.T.O. for sure, so we are relating the filed data with R.T.O. data.

VII. FUTURE SCOPE

This project has a lot of potential as it is centralized and thus vehicle can be tracked anywhere in the country. Moreover the project can be integrated with RTO records for better identification of lost vehicles. All the new progress can be shared using emails or SMS thus reducing number of office trips and cases of bribery. [5]One does not need the GPS trackerand the identification can be done easily using a valid government issued proof as well as the vehicle registration details. For future updates, the password and user information can be stored more securely and the implementation of OCR can be done in the cameras installed at check posts or at traffic signals.

VIII.CONCLUSION

A. This project is basically to help public as well as police officials to track the missing vehicles in less time and more effectively.

B. This project skill has some shortcomings that can be overcome such as the passwords are stored in direct way without any encryption techniques which makes it less secure.

C. After the successful implementation of project it is very user friendly and requires less number of people in in charge to get the work done as it is a centralized version.

D. Online missing vehicle tracking system is the software which will reduce the time to find the missing vehicle as our software can track the vehicle by using few registered details of vehicle and vehicle owner. Main advantage of this system is that it doesn't need G.P.S. system to be compulsorily installed in the vehicle, our system can track it by using registered number only. There are 3 modules named as "public module", "admin module", "police department module", 1 home page and 1 database to store all the data regarding vehicle and their owners.
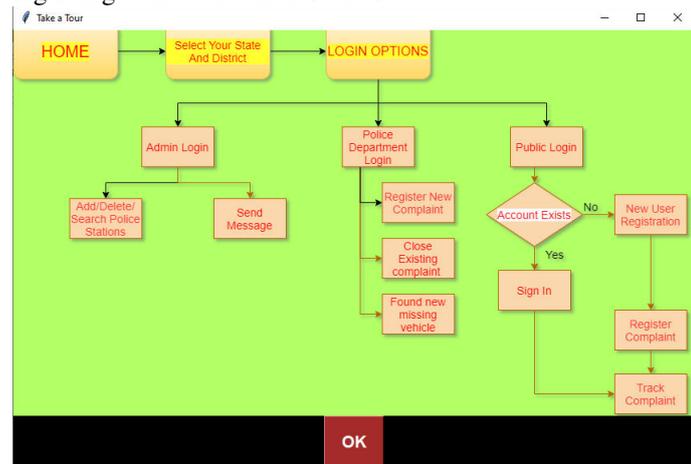

Fig 7. Page including the permissions allowed to different users

REFERENCES

[1] Online Traffic Congestion Management System- Mr Thavaseelan, G.V VinishaVincy Sandra Edwin. [Online]. Available https://link.springer.com/article/10.1007/s10586-018-2152-9

[2] Smart traffic signal monitoring system Veeramanickam, Arun, Kumar Narayan, Anandan, ShaikParvez. [Online]. Available www.researchgate.net/publication/299477431_Internet_of_Things_for_Intelligent_Traffic_Monitoring_System_A_Case_Study_in_Denpasar.

[3] Survey Information and graphical representation of lost vehicles.

[4] Vehicle traffic system using IOT.

[5] "Instant Theft Alert and Tracking System in Car.",2010, Preeti P. Tanna, Shubha IJACTA Volume1- No. 21-0975-8887

[6] Reported rate of theft in India in 2019.