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# Framework Analysis of Fatal Accidents and Fatal Accident Reporting System by using Data Mining Technique

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**ABSTRACT**

*Roadway traffic safety is a major concern for transportation governing agencies as well as ordinary citizens. In order to give safe driving suggestions, careful analysis of roadway traffic data is critical to find out variables that are closely related to fatal accidents. In this paper we apply statistics analysis and data mining algorithms.This paper work has designed and enforced a Framework Analysis of Fatal Accidents and Reductions of death rate by mistreatment data processing Technique for India which is able to alter traffic police offices and different road safety stakeholders to induce summarized on-line traffic accident data at numerous levels simply and quickly.*

*System necessities are strictly collected from the federal police commission central traffic accident analysis department and by consulting connected literatures and software package product that area unit employed in different countries. the planning and implementation of the system is finished in accordance to the known practical and non practical necessities.*

*The system has completely different scheme to satisfy its core functionalities. associate degree administration scheme authenticates directors and traffic cops to login to the system and executes their outlined task. The accident registration sub system permits the traffic lawman to enter and submit road traffic accident details employing a easy to use wizard primarily based interface. A report and question scheme allows any interested users of the system to look at some predefined reports and notice specific accident records. Furthermore the system is enforced with Amharic language interface for maximizing its usability associate degreed it can even displays an accident location on Google map.*

***Keywords: Road Traffic Accident, National Road Accident Database System, Car Accident Data System, Web based Road Accident Reporting System; GIS- enabled Road Accident System, Car Crash Data Management System***.

## I.INTRODUCTION

A road traffic accident (motor vehicle collision, automobile accident, automotive accident, or car/road crash) is once a road vehicle collides with another vehicle, pedestrian, animal, or geographical or branch of knowledge obstacle which may lead to injury, property harm, and generally death too .[2]

Road traffic injuries area unit world issues touching all sectors of society. consistent with the planet Health Organization (WHO) quite 3000 folks die on the world's roads a day, tens of countless folks area unit black-and-blue or disabled per annum .[2] A recent international organization Economic and Social Commission report conjointly disclosed that the quantity of road traffic accidents will increase per annum within the world which these accidents kill around a meg folks and injures twenty three million others and eighty fifth of the fatalities occur within the developing countries .[1]

Road accident in Asian country is one in all the worst accident records within the world, as expressed per ten, 000 vehicles . Some places may contribute a lot of to the accident than others. New Flower, takes the lion's share of the danger having higher variety of vehicles and traffic and also the price of those fatalities and injuries incorporates a nice impact on the socio-economic development of the society.[4] Every year, around three hundred folks area unit killed on Addis Ababa's roads and 1500 area unit gently and seriously black-and-blue. the govt. has launched many campaigns, like "Think!" and Road Safety Campaign (RSC), to assist folks become tuned in to road issues of safety and check out to scale back road accident . country's traffic accidents within the last 3 years, for instance, have increased by seventeen per cent and fatalities increased by ten per cent that is within the vary of 129 and a hundred forty five per 10 thousand automobiles. matters is probably going to be even a lot of severe than shown within the statistics owing to the attainable important under-reporting. [5]

## II.RELATED WORK

The existing road accident coverage system merchandise seem normally in 2 forms as Desktop application (using Mainframe or Microcomputer) and Web-based. Recently, each sorts of the appliance classes may be additionally GIS enabled for easy mental image of accident locations and accident analysis. [8]

Web primarily based applications ar a lot of advanced and powerful for accident information access and sharing than desktop applications. internet primarily based applications ar developed on prime of international, national or regional road accident databases and created accessible through the net or Intranets. But, desktop applications ar designed to run on an area information of a standalone laptop. Some internet primarily based applications ar reviewed within the following sections. [4]

Road Safety Management System (RSMS)

RSMS may be a merchandise from India's transportation IT systems supplier, IBS software package. it's Associate in Nursing accident management system that redefines the method road crash information is managed. RSMS permits the police to record a bunch of data concerning road crashes (in the shape of circumstances associated with humans and vehicle(s) concerned and road at the time of the crash).[2] The software package is GIS enabled, permitting users to pinpoint the precise geographic location of the crash by directly plotting on a map or victimisation GPS handsets to get coordinates. This integrated data is then offered during a format of option to multiple stakeholders, (traffic police, road engineering departments, motorcars departments, insurance firms, healthcare, and non- government agencies concerned in road safety) which may facilitate them scientifically arrange and implement acceptable intervention measures to scale back road accidents/enhance road safety.[9]

RSMS has 3 versions : one. RSMS enterprise: internet primarily based , country level application two. RSMS Lite: internet primarily based, province level application three. RSMS desktop: single, native installation.[10]

As a web-based system, RSMS facilitates straightforward information entry from multiple locations guaranteeing prepared handiness of live information for all approv+ed users whenever needed.[6] Since information drives higher cognitive process, delay in actions, irresponsibility and inconsistent reaching to cut back road accidents attributable to cumbersome paper-based coverage processes, inconsistent and inaccurate coverage, lack of handiness of knowledge and an important backlog would all be a issue of the past. the merchandise may be utilized by customers of each developing countries and people with mature road networks .[12]

RSMS has six major sections: Accident Recording Engine, GIS Engine, Safety Analysis Engine, customary Reports, Dynamic customary and abstraction question Builder and Administration and Tools sections.[5]

TRACKView

TRACView is a web primarily based application that was developed to assist enforcement agencies and insurance firms in United States of America and Canada manage and access traffic accident reports during a a lot of economical manner.

TRACView Benefits include:

- Flexible searching tools to help you find the report quickly and easily.
- Allow multi-jurisdictional data sharing and searching.
- A comprehensive system to facilitate web accessible availability of accident reports for insurance companies, officers and citizens.
- Remove the police department from the billing and request fulfillment process.
- Reports are available from work or home, 24 hours a day via the Internet.
- Reports are converted to PDF format making them easy to view, save, print and email.
- Reports are accessible usually within 24 hours of being scanned.
- Reports cannot be modified, maintaining report integrity.

Road Crash and Victim Information System (RCVIS)

The objective of the RCVIS is to produce governments and development stakeholders in Kingdom of Cambodia with correct, continuous and comprehensive data on road crashes and victims for the needs of raised understanding of the present road safety scenario, designing applicable responses and policy, and evaluating impact of current and future initiatives.[11]

Traffic law enforcement officials on the most Cambodian national roads ar currently equipped with GPS devices to accurately identifies road crashes location.[5] By accurately locating road traffic accidents, precise digital maps are often made and facilitate to spot black spots, a key part for understanding the character of accidents, prioritizing actions to cut back accidents and measurement progress.[7]

Accident coverage System (ARS)

ARS, GIS primarily based net application that provides details of all the road accidents in Pune [one of the biggest town found in India] region. it's a software system application developed for Traffic local department to enter all details of associate accident and precise location of the accident. Innovative use of map technology makes it doable to look at all accidents on map of Pune. It will generate varied reports and helpful statistics supported accidents knowledge. This helps Traffic Police to spot accident prone areas and analyze causes behind accidents. Necessary action are often then taken to stop future accidents [10]

An ARS key feature includes:

- Simple form to enter all important details of an accident such as details of people involved, vehicles involved, cause of accident, road and weather conditions.
- Detail map of Pune region with facility to Zoom In, Zoom Out and Quick Zoom. Exact accident spot can be located on the map
- Police jurisdiction boundaries are shown on the map
- Search feature to quickly find out relevant accidentUser can specify accident parameters, form query and see results on the maps to get the insight
- At a click of button, twenty different types of reports (accident statistics) can be generated based on accident data
- All reports and results on map can be easily printed for offline use

## III. METHODOLOGY

1 Data Collection

For the purpose of requirement elicitation for the new system, primary data from the federal police commission and other potential organizations such as insurance companies for their accident data recording and reporting requirements, has been collected and analyzed.

Traffic accident reporting systems designed and implemented in other countries have been also consulted for incorporating key and useful design and implementation features with the current system.

2 Significance of the paper

- The paper's result could be applicable in different areas benefiting different target groups. The main beneficiaries could be the following.
- Traffic police officers are the main users of the system in registering traffic accidents, submitting or communicating it, initiating report generation and using the reports to take appropriate actions.
- Citizens, NGOs and media can get access to accident statistics and take necessary action with the help of local government.
- Insurance Companies who's insured was involved in an accident can also use the system to get current and up-to-date information about their client and take measure.
- Indian Road Authority for identifying those roads which might have caused repeated traffic accidents and improve these road standards.
- Fire fighting and rescue department to provide prompt rescue services.
- Ministry of Transport and Communication to identify and monitor which of those licensed drivers and registered vehicles by the ministry are causing repeated accident.

## IV.ALGORITHMS

**K- Means Algoritham**

Input:{D,k} // D→Data set consists of n data object,k→Number of clusters

Output: K clusters

Method:1.Choose the k objects at random from D, as initial cluster centers.

2. repeat

3. Assign each data object to the cluster to which its distance is closest

4.Update the cluster means, i.e, calculate the mean value of the objects for each cluster.

5.Until to data object changes its cluster membership or any other convergence criteria is met.

**Association rule mining** :

Support (S p )

Confidence (C f )

Lift (L t )

Leverage (L v )

Conviction (C v )

Sp=P(A∩B)N,Sp=P(A∩B)N,

where N is the total number of accident records.

Cf=P(A∩B)P(A),

Lt=P(A∩B)P(A)×P(B),

Lv=P(A∩B)−P(A)×P(B),

Cv=P(A)×P(B)P(A∩B¯),

## V.MATHEMATICS

**Distance finding Method:**

Data set D ij , i = 1,2,…,m, j = 1,2,….,n of m data objects with values of n attributes.

Euclidean distance :by d xy = ∑ (X j − Y j ) ^2

into k clusters, c 1 , c 2 ,….,c k , where c i indicates the ith cluster, then n i = |c i |.

Let D i = ∑d xy , (where x, y ∈ c i ) is the sum of pair-wise distances for all points in cluster i and W k is the collective within cluster sum of squares around the cluster means.

Wk=∑i=1k(12ni)Di,Wk=∑i=1k(12ni)Di,

Gap n (k) difference between expected and observed values of log(W k )

Gapn(K)=E∗n{log(Wk)}−log(Wk),Gapn(K)=En∗{log(Wk)}−log(Wk),

## VI.ARCHITECTURE OF THE SYSTEM

At a high level, the architecture of an application defines how different parts of the system are organized and logically separated yet ensuring that they work together. The architecture used for the system is three tiers Client-Server architecture: client tier, middle/web tier and the data tier as illustrated in Figure 1. Such architecture is one of the most commonly used type of architecture for web-based applications as it provides greater application scalability, high flexibility, high efficiency, lower maintenance, and better reusability of component

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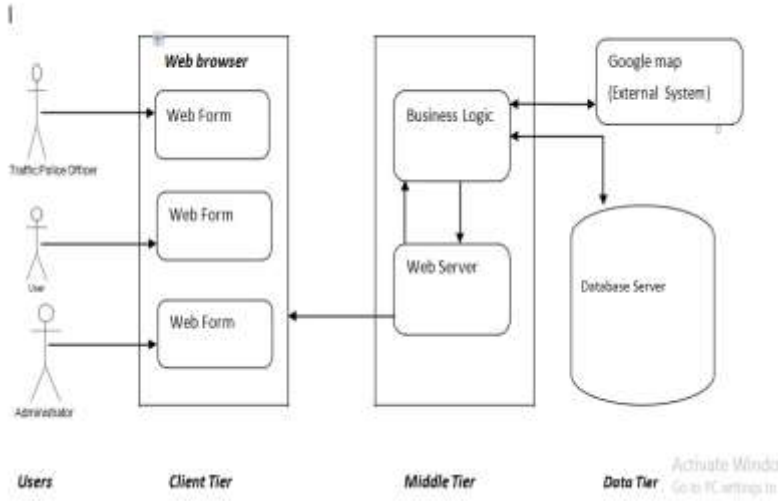


**Figure 1: System Architecture**

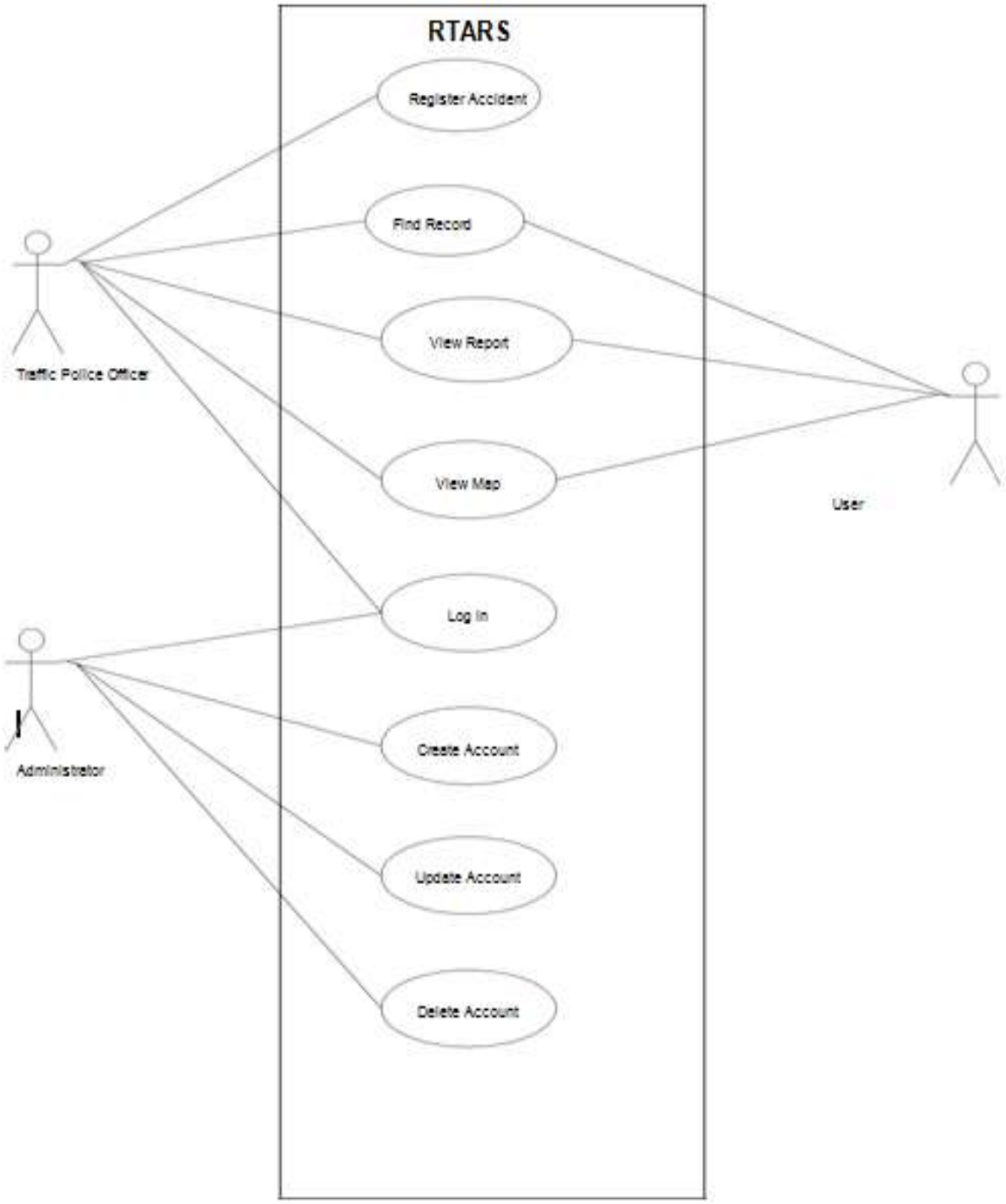


Figure 2: Use Case diagram

Deployment Diagram

A deployment diagram of a system shows the hardware/software mapping (which components would be part in which hardware node and so on).The subsystems (components) of RTARS identified in the preceding section are mapped onto the client and server nodes as shown in figure 6.3 deployment diagram.

The client program (the web browser) will communicate with those JAVA applications (subsystems) residing on the web-server through an HTTP connection. And those subsystem components on the web server communicate with the data base system through an JAVA connection.

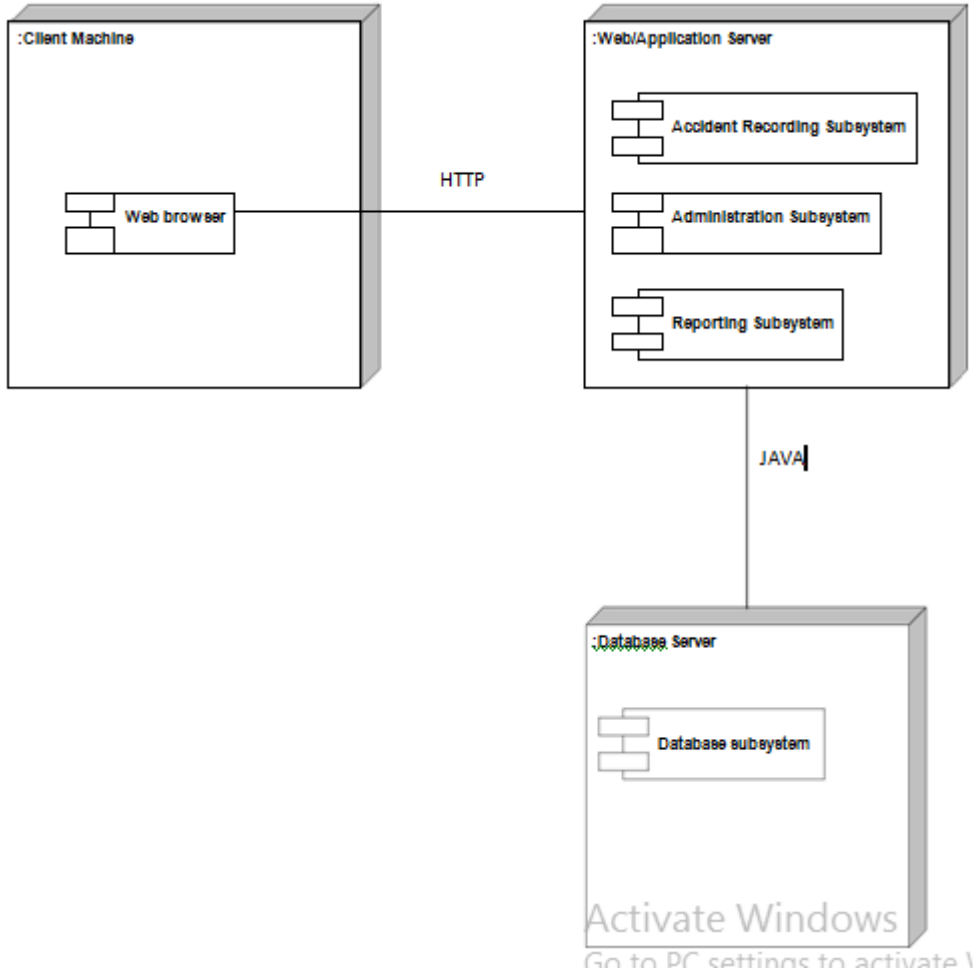


Figure. 3 Deployment Diagrams of RTARS

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## VII. PERSISTENT DATA MANAGEMENT

Persistent data management deals with how the persistent data are stored and managed and it outlives a single execution of the system. Information related to accidents, vehicles, injured people, drivers, and other related information are persistent data and hence stored on a database management system. This allows all the programs that operate on the RTARS data to do consistently. Moreover, storing data in a database enables the system to perform complex queries on large data sets.

In order to store data persistently in a database those class objects identified in the class diagram of RTARS are mapped into tables and the attributes into fields to the respective tables. The tables of the system with their respective fields and the relationships that exist between the tables are illustrated in Figure 3.

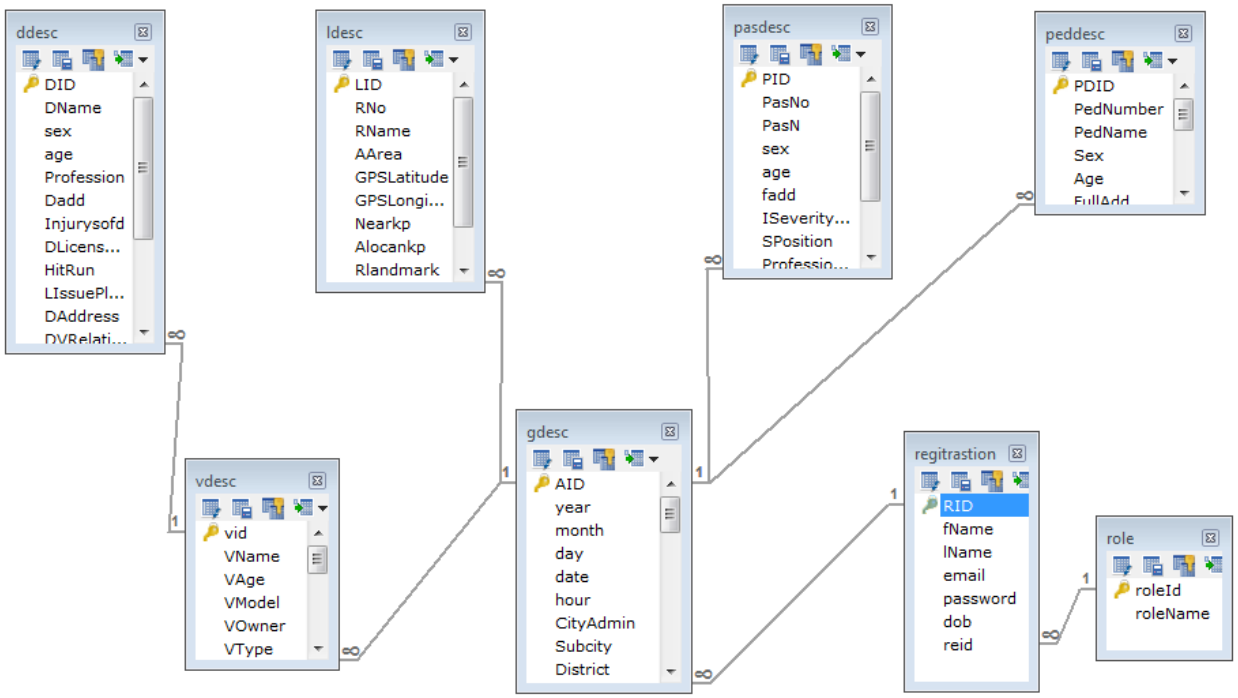


Figure. 4 The Database tables and their relationships of the RTARS

## VIII.USER INTERFACE DESIGN

The user interface designed for the system starts with a main interface window (homepage) that contains a button link to the main tasks of the system namely View Reports, Search Accident Record and Log In.

Activating the "View Reports" link button opens a window which allows users to choose and see different varieties of accident reports and the accident location map. The "Search Accident Record" button link allows users to open a search page (window) that accepts search parameters from users, searches the records and displays the result. The "Log In" button allows an authorized user to log in as an administrator or as a traffic

police officer to the system. For an administrator a window that allows him/her to create, rename or delete an account will be opened. For the traffic police officer a window that allows him/her to register accident records will be displayed. The user interface of the system depicted in figure shows the interfaces organization hierarchically.

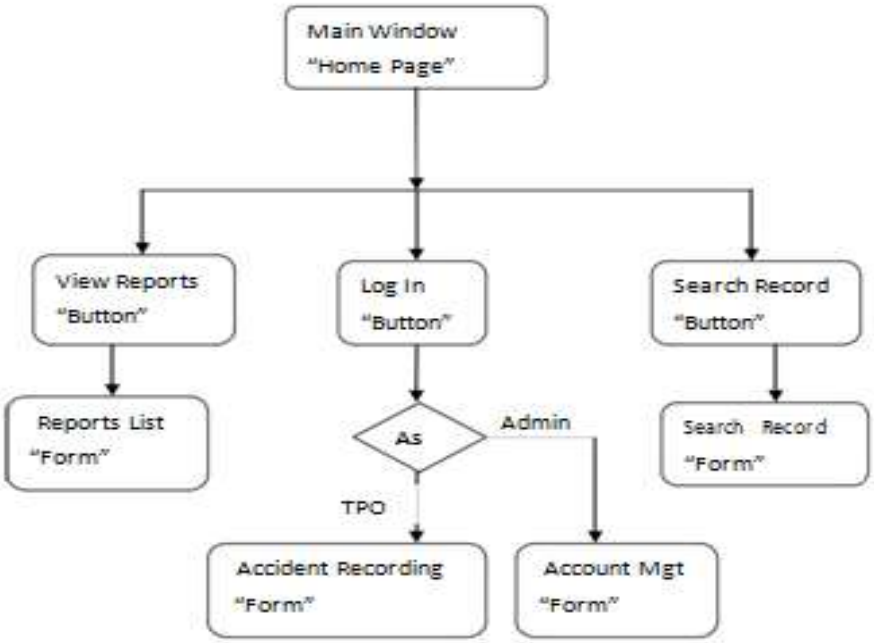


Figure 5: User Interface

## IX.CONCLUSION

Alleviating the harmful road traffic accident desires a nationwide or perhaps world level movement and call over numerous sides of road safety. For the various stakeholders to pass the proper call and take action, organized and timely data ought to be accessible to all or any of them. In India, the present road accident knowledge assortment, process and news task continues to be done essentially employing a manual system, nonetheless Asian nation is one in all the countries with the worst accident records within the world, particularly as expressed per ten, 000 vehicles .

In this paper, we have a tendency to developed an online based mostly road traffic accident news system for Asian nation that conjointly has GIS modify feature. this sort of road traffic accident knowledge assortment, analysis and news systems area unit ordinarily employed in different countries to help all those road safety stakeholders deciding} process. Hence, traffic police offices, road engineers, insurance corporations, mass media, applied mathematics authorities, the final public etc. will simply get and share timely data from such systems.

Such a system might conjointly generate a number of the most pre-defined reports needed by the various parties mechanically in a very tabular and graphical manner. Accident records that occur at any corner of the country will simply be searched by totally different parameters. additionally, accident locations is visualized on-line on Google map.

By this data we have a tendency to area unit reducing rate of accidents on Indian roadways.

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