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SPEED BREAKER MANAGEMENT SYSTEM

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Abstract: With increasing road accidents due to improper and non-standard speed breakers, it is the need of the hour to address this issue appropriately, and due to this although speed breakers are built for safety, they are posing to be more of a danger. This is mainly due to building illegal speed breakers and not maintaining existing ones. The existing solutions are largely dependent on the user or the surrounding, both of which do not provide immediate accuracy and dependability. This paper presents self-improving system with minimal user involvement and aims to cover almost all the drawbacks of the current solutions. It suggests speed breaker detection by measuring the difference in the height between the road level and the vehicle. In this approach, GPS coordinates are stored in an online database system that is available to the public through a portal. When the vehicle is at a predefined distance away from the speed breaker, the user is notified resulting in improved accuracy with every usage.

Keywords: Speed Breaker, Detection, Mapping, Proximity, Alerting System.

I. INTRODUCTION

Road surface monitoring is essential for municipal corporations for quick detection and maintenance of Speed Breakers, detecting the other abnormalities of the road such as speed breaker etc and making them accessible to travellers will provide a better driving experience. If such information of all roads is put on a central server which could be accessed by anyone freely, the drivers can choose the best possible road from source to destination. Road surfaces can be classified into different categories such as smooth roads, potholes, bumps, contraction joints, man holes, expansion joints etc. The surfaces where one has to slow down his speed are known as speed breakers. Soto detect speed breakers and putting them on to the server can provide the driver prior information about the roads so they could be able thoroughly figure out what time would be taken to complete the journey. Road traffic accidents have been increasing dramatically worldwide, which have become the leading cause of death by injury and the tenth-leading cause of all deaths. The Global status report on road safety 2013 indicates that worldwide the total number of road traffic deaths remains unacceptably high at 1.24 million per year. Ignoring speed breakers on highway roads is one of the major causes for occurring road accidents. According to the Road Accident Report 2020. While 4726 lives were lost in crashes due to humps, 6672 people died in accidents caused due to speed breakers. Development of this application is highly economically feasible. The organization needed not spend much m one for the development of the system already available. The only thing is to be done is making an environment for the development with an effective supervision. I f we are doing so; we can attain the maximum usability of the corresponding resource. Even after development, the organization will not be in a condition to invest more in the organization.

II. PROBLEM STATEMENT

Develop a system, such that it will be aware about upcoming speed breakers using an android based navigation application to the vehicle driver so that the driver can reduce the speed of the vehicle before arriving at the speed breaker hence accident/injury can be avoided.

III. PROPOSED SYSTEM

Our proposed system is comprised of three inter-dependent modules; Autonomous Data Collection of Speed Breaker (Transport Office), Dynamic Detection of Speed Breaker (Android Application), Warning Generation and Notification as shown in Figure 1. Moreover, here we assume that each vehicle is provided with a android application and enabled with such functionality that helps to communicate with a cloud server through Internet and to execute small. To collect the information about speed breaker location, some volunteer Government officers are configured with speed breaker

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data collection module. In general it is seen that just before passing a speed breaker drivers slow down the speed of their vehicles and as soon as they pass the speed breaker, they increase the speed. In cloud server all volunteer speed Breakers pattern are analysed and probable location for speed breaker are identified where vehicles satisfy the breaker speed threshold. To perform this operation, cloud server conducts analysis of variance (ANOVA) on the provided speed behavioural pattern and breaker speed threshold is set by system administrator. As similar characteristic may be shown by the vehicles in other cases, this procedure is highly suspected to create false positive problems. Data collection through several iterative runs on different times of a day can made this procedure trustworthy.

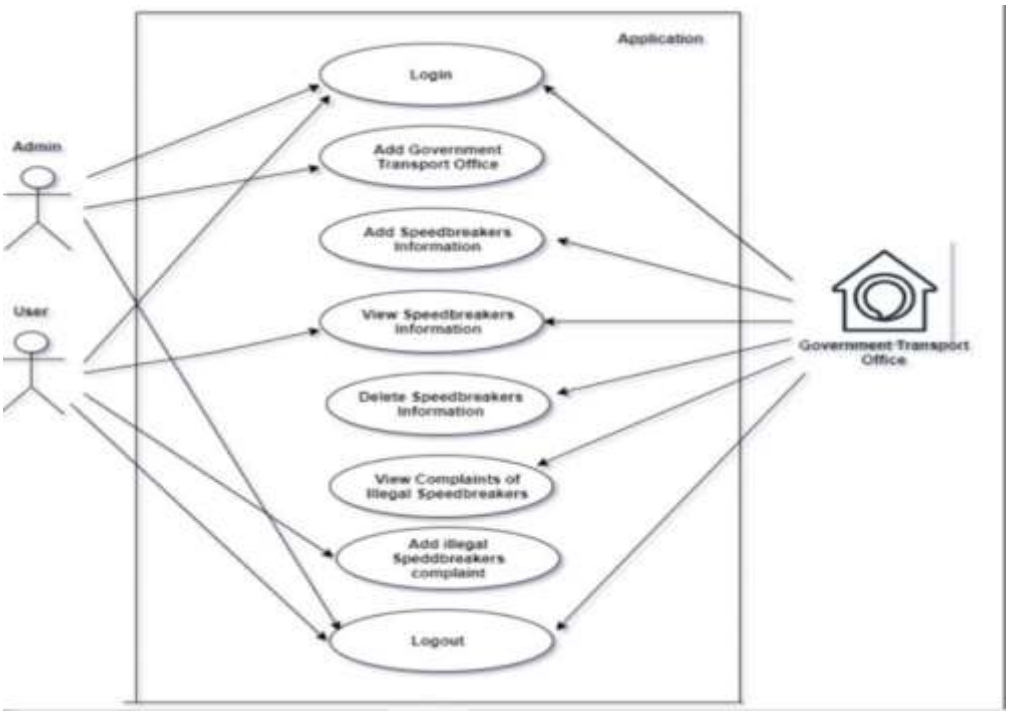

Fig1. Simple Structure of System

IV. OBJECTIVES AND GOALS

Objectives - The main objective of a market research feasibility study is to understand the market and determine whether enough demand exists to make the venture successful. This involves secondary research and analyzing the market. This also creates your pool or population that you will use for your demand modelling and estimates. Road accidents are the most important issue not only for Indian Government but also for the common people. Mostly, it is found that road accident happening are more frequent at certain specific locations i.e. Speed Breakers.

Goals -

- Google map integration system.
- Tourism Departments.
- Show speed breaker spot on map.
- Send voice notification on nearby speed breaker spot.

V. RELATED WORK

Risk Management - In appropriate dataset - To overcome this risk we are trying to use well organized and complete dataset. Security - To overcome and improving security we use multilevel security like access permissions of user.

Purpose of Risk Management- A risk is an event or condition that, if it occurs, could have a positive or negative effect on projects objectives. Risk Management is the process of identifying, as sensing, responding to, monitoring, and reporting risks. This Risk Management Plan defines how risks associated with the SSBS project will be identified, analyzed, and managed. It outlines how risk management activities will be performed, recorded, and monitored throughout the lifecycle of the project and provides templates and practices for recording and prioritizing risks. The Risk Management Plan is created by the project manager in the Planning Phase of the CDC Unified Process and is

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monitored and updated throughout the project. The intended audience of this document is the project team, project sponsor and management.

Risk Identification Risk identification - will involve the project team, appropriate stakeholders, and will include an evaluation of environmental factors, organizational culture and the project management plan including the project scope. Careful attention will be given to the project deliverables, assumptions, constraints, WBS, cost/effort estimates, resource plan, and other key project documents. A Risk Management Log will be generated and updated as needed and will be stored electronically in the project library located at local host. For risks identification, review of scope document, requirements specifications and schedule is done. Answers to questionnaire revealed some risks. Each risk is categorized as per the categories mentioned in project. Please refer table 6.1 for all the risks. You can refer following risk identification questionnaire.

Qualitative Risk Analysis and Quantitative Risk Analysis- Qualitative Risk Analysis tell The probability and impact of occurrence for each identified risk will be assessed by the project manager, with input from the project team using the following approach and Quantitative Risk Analysis tells Analysis of risk events that have been prioritized using the qualitative risk analysis process and their affect on project activities will be estimated, a numerical rating applied to each risk based on this analysis, and then documented in this section of the risk management plan.

VI. TASK NETWORK

Task Network is a form to represent (visualize) dependency between actions to show how they are arranged into the correct/planned order. Example of a task network is a project activity diagram or WBS where particular tasks are linked up to each other to show their impact within project plan. By using task networks you can make your working plans more comprehensible and easy-to-grasp: it is a way to schematize (map out) your future efforts and represent them in a vivid format that provides opportunities for optimization. Task networks can be composed on every project that is complicated enough to have more than one line of activities at the same time (it has some tasks running in parallel). Task networks provide you with an opportunity to review how the tasks can be put into parallel to decrease duration of the task schedule (schedule compression), and also give you a base for constructing risk and resource break-down structures where you can associate each activity or work package from a network with these matters to overview your future needs in supply or threat mitigation.

VII. METHODOLOGIES

The Waterfall Model was the first Process Model to be introduced. It is also referred to as a linear-sequential life cycle model. It is very simple to understand and use. In a waterfall model, each phase must be completed before the next phase can begin and there is no overlapping in the phases. The Waterfall model is the earliest SDLC approach that was used for software development. The waterfall Model illustrates the software development process in a linear sequential flow. This means that any phase in the development process begins only if the previous phase is complete. In this waterfall model, the phases do not overlap. Waterfall approach was the first SDLC Model to be used widely in Software Engineering to ensure success of the project. In "The Waterfall" approaches, the whole process of software development is divided into separate phases. In this Waterfall model, typically, the outcome of one phase acts as the input for the next phase sequentially. The following illustration is a representation of the different phases of the Waterfall Model. The sequential phases in Waterfall model are

- Requirement Gathering and analysis all possible requirements of the system to be developed are captured in this phase and documented in a requirement specification document.

- System Design The requirement specifications from first phase are studied in this phase and the system design is prepared. This system design helps in specifying hardware and system requirements and helps in defining the overall system architecture.
- Implementation With inputs from the system design, the system is first developed in small programs called units, which are integrated in the next phase. Each unit is developed and tested for its functionality, which is referred to as Unit Testing.
- Integration and Testing All the units developed in the implementation phase are integrated into a system after testing of each unit. Post integration the entire system is tested for any faults and failures.
- Deployment of system once the functional and non-functional testing is done; the product is deployed in the customer environment or released into the market.

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- Maintenance There is some issues which come up in the client environment. To fix those issues, patches are released. Also to enhance the product some better versions are released. Maintenance is done to deliver these changes in the customer environment. All these phases are cascaded to each other in which progress is seen as flowing steadily downwards (like a waterfall) through the phases. The next phase is started only after the defined set of goals are achieved for previous phase and it is signed off, so the name "Waterfall Model". In this model, phases do not overlap.

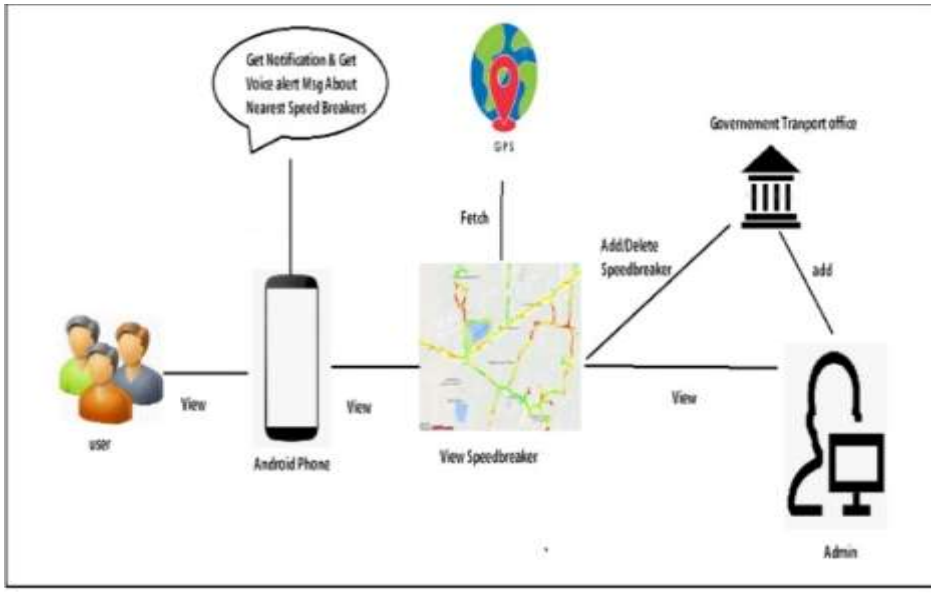

Fig 2. System Architecture

VIII. CONCLUSION

In India most speed breakers not constructed following norms, which led to accidents or cause heavy damage to vehicle. As per national crime records bureau statistics, 9900 accidents have taken place due to poor road infrastructure in 2019.We developed a system, such that it will be aware about upcoming speed breakers using an android based navigation application to the vehicle driver so that the driver can reduce the speed of the vehicle before arriving at the speed breaker hence accident/injury can be avoided. In literature survey we found that, Prior works done by the researchers show the detections of speed breakers using accelerometer/GPS based approaches. These accelerometer based detections will not be able to alert the driver on new road hump. It detects only after the vehicle passes through the hump based on thresholding and other time and frequency domain processing techniques applied on to accelerometer data obtained.

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