Driver Assistance System In Stop Signal Intersection Scenarios With Live Gps Voice

ABU ARAVIND [1] , DENZEL JOBI [1] , DERIN TOM [1] , Ms. DIVYA S B [2]
[1] Department of Computer Science, Mangalam College of Engineering, Ettumanoor, Kerala
[2] Associate Professor, Department of Computer Science, Mangalam College of Engineering, Ettumanoor, Kerala

***Abstract*— The problem we address is that of failure of maps not giving adequate information about the destination that we choose. The purpose is to provide a brief description about the real time location and suggest information about the famous locations with GPS voice. The GPS module provided in the car will provide a description about the place to the drivers. This feature allows the passengers to explore and get a better knowledge about the places they visit. The driver assistance system with information provision to warn drivers that they are approaching a stop-sign intersection. The stop signals can be identified using the camera module provided in front of the car. When the system detects a stop signal, it will send an information to the driver that they are approaching an intersection.**

Keywords— Maps, Destination, Real-Time Location, GPS, Voice Module, Driver Assistance System, Stop-Sign Intersection, Camera Module.

I. INTRODUCTION

It is evident that there are multiple reasons for accidents occurring at intersections with stop signs. According to Figure 1, the intersection environment can be split into five sections: the approach, deceleration, entering the intersection area, preparing for a turn and executing said turn. During the first stage of this process, drivers should focus on locating and recognizing various elements such as lane arrangement, road markings and of course – the stop sign. Notably though, distraction or negligence are often main culprits in these types of incidents.In addition, trees and other things can make stop signs hard to see or they might be worn out due to age. This is especially true in bad weather or dark conditions.During the slow-down procedure, drivers must do two jobs. Firstly they need to judge the distance fromthe crossroads and decide when to press on the brake and let go of the accelerator; secondly they have to halt their vehicle fully at the line near it. Researching drivers' attitudes towards obeying stop signs, Pietrucha et al realized that fewer vehicles on side streets often lead people not noticing how dangerous disregarding a stop sign could be. As drivers enter intersections, their main task is coming close while searching for conflicts with other users (cyclists, pedestrians) in zebra crossings.Van Houten and Rettingfound that many drivers are unable to recognize potential risks at intersections and don't take the necessary precautions. While there is still a risk of collisions without stopping, it is more likely to happen if the sign isn't followed. The driver has two tasks during the preparation for a turn - stopping in an appropriate place, and observing oncoming traffic. Then during execution, they evaluate whether it's safe to carry out the maneuver without accidents. A line-of-sight blocked by something could create huge problems here.Failure to wait for sufficient gaps in cross-traffic corresponds to a substantial increase in crash risk. Elderly drivers often estimate incorrectly the safe time margins they should allow themselves.

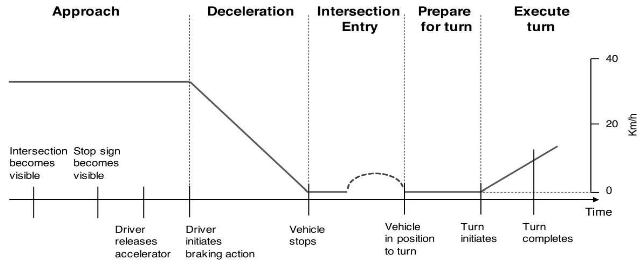

Fig 1. Rule following driver behaviour at intersections.

II. RELATED WORK

A. *Intelligent driving system for safer Automobiles (Hideo Inoue et.al ,2017)[1]*

The goal of this research is to create an Autonomous Intelligent Driving System to reduce accidents and increase safety for elderly drivers. The system uses a Risk-predictive driving intelligence model and Shared control between humans and machines. The system includes a risk-prediction mechanism to prevent accidents in difficult driving conditions, and it can recover deteriorated recognition, decision-making, and operational abilities for experienced drivers. The system aims to intervene with braking or steering actions if needed, decreasing driving workload. Shared control is used to optimize assistance levels during braking and steering maneuvers while minimizing interference with human driving behavior. The Driving Simulator and the test vehicle are used to verify the system's effectiveness.

B. *Analysis of motor vehicle crashes at stop signs in four U.S cities(R.A Retting et.al,2003)[2]*

The study investigated police-documented motor vehicle crashes that occur yearly at stop signs, with around one-third of these resulting in injury, to understand the accidents and discover potential solutions. The researchers thoroughly investigated police accounts of collisions at two-way stop sign intersections from 1996 - 2000 in four US cities and found that 70% of all crashes occurred due to a violation of stopping rules, with angle impacts being the most common. In approximately two-thirds of collisions resulting from stop sign violations, the drivers reported having initially come to a halt, but the cause of the accident was typically attributed to being unable to spot oncoming traffic. Counteractive measures suggested include transforming traffic regulations and intersection construction, enhancing visibility, and augmenting the conspicuity of stop signs.

C. Cooperative collision avoidance at Intersections : Algorithms and Experiments(M.R Hafner et.al,2013)[3]

This paper examines how two vehicles can employ V2V communication technology to prevent collisions when they meet at an intersection. The algorithms are both computationally efficient and decentralized, plus have been designed using control theoretic methods to guarantee safety unless overrides are necessary. Model uncertainty and communication delays have been taken into consideration for the model and state estimation algorithm. A test track has been used to experimentally validate our method in a collision avoidance scenario involving two instrumented vehicles.

D. A vehicular networking perspective on estimating vehicle collision probability at intersections.(S.Joerer et.al,2014) [4]

This paragraph discusses the challenge of evaluating the effectiveness of Intelligent Transportation Systems (ITSs) in terms of safety. The focus is on offering a metric that estimates the likelihood of collisions at intersections, which can be used to evaluate intervehicle communication (IVC) concepts. Networking metrics such as delays and packet loss rates are not sufficient to judge safety-enhancing protocols and applications. A new evaluation system is presented that computes the probability of a collision based on a receiving vehicle's beacon message. A modified road traffic simulator is used to examine how safety messages between cars at an intersection can affect the situation. Basic beaconing is found to be ineffective in rural settings, leading to the development of advanced beaconing methods. The criticality metric provides a comprehensive examination of the condition.

E. Effects of an in-vehicle collision avoidance warning system on short- and long-term driving performance.(A.Ben-Yaccov et.al,2002) [5]

Our research looked into the consequences of having an imperfect In-vehicle Collision Avoidance Warning System (IVCAWS). We found that these lead drivers to overestimate their headway, making them drive at unsafe distances. However, this study also revealed that having IVCAWS can help people become better at gauging their headway, which they do after a brief exposure.This has potential applications in driver education and training programs.

III. METHODOLOGY

The methodology for implementing the use of live GPS voice information about live places and automatic identification of stop signals and breaking would involve a detailed and comprehensive approach. The following are the key steps that would be involved in implementing this technology:

A. Research and development:

The first step would involve extensive research to identify the most effective and accurate methods for providing live GPS voice information and automatic identification of stop signals and breaking. This could involve conducting a literature review of existing studies and technologies, as well as developing prototypes for testing.

B. Testing and validation

Once the prototypes have been developed, they would need to be tested and validated to ensure their accuracy and reliability. This could involve conducting tests on closed tracks or designated testing areas, as well as collecting feedback from drivers and experts.

C. Integration with existing systems

The next step would be to integrate the technology with existing GPS and navigation systems, as well as with the infrastructure used to identify stop signals and breaking. This would require collaboration with government agencies and private companies to ensure that the technology is compatible with existing systems and can be seamlessly integrated.

D. Implementation and training

Once the technology has been developed and integrated, it would need to be implemented and drivers would need to be trained on how to use it. This could involve providing training materials and holding informational sessions to educate drivers on how to use the technology and how it can improve road safety.

E. Evaluation and continuous improvement

After implementation, the technology would need to be evaluated and continuously improved based on feedback from users and ongoing testing. This could involve collecting data on its usage and effectiveness, and using this information to make improvements and modifications to the technology over time.

F. Partnership and collaboration

An effective way to implement the live GPS voice information and automatic identification of stop signals and breaking technology would be through partnerships with car manufacturers, governments, and tech companies. Such partnerships would help ensure that the technology is incorporated into new cars and that it is supported by government infrastructure.

G.Privacy and Security

The privacy and security of drivers' data would also need to be taken into consideration. This could involve implementing measures such as encryption and ensuring that drivers' data is not shared with third parties without their consent.

H. Public awareness and adoption

Finally, public awareness campaigns and incentives could be put in place to encourage drivers to adopt the technology. This could involve marketing campaigns and offering incentives such as discounts on insurance premiums for drivers who use the technology.

Overall, the successful implementation of the live GPS voice information and automatic identification of stop signals and breaking technology would require a multidisciplinary approach that involves collaboration between government agencies, private companies, and researchers. With the right approach and implementation, this technology has the potential to significantly improve road safety and reduce the number of accidents caused by missed stop signals and sudden braking.

IV. SYSTEM ARCHITECTURE

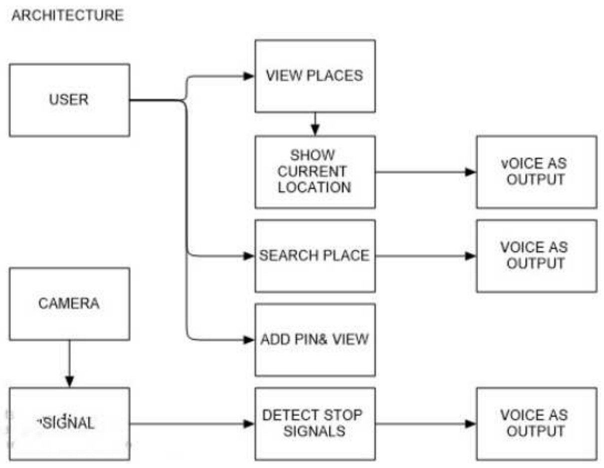

Fig 2. System Architecture

The Architecture involves hardware and software components. The hardware includes sensors and GPS devices, while the software includes algorithms and speech synthesis software. The system would be designed to identify stop signals and sudden braking, provide real-time location information, and integrate with existing GPS and navigation systems. The following are the key modules that would be involved in implementing this technology:

A. Admin/User

Admin/User refers to person (Driver, Passenger , etc.)

B. Software Devices

It consists of two parts which are Front-end decentralized applications and APIs. That is, the user can interact with this application through various APIs.

C. Camera

The camera helps the system to detect stop signal and also to capture the images that is to be uploaded in the software.

D. *User Registration*

In this stage, every individual in the respected industry should have a Personal account in this application. For that, he/she should provide Name, Mobile number, Address, Password and his/her unique ID. After this stage the user should login using his Password, Mobile number and ID. The system checks whether his password and mobile number matches with ID he owns.

E. View Places

The application allows users to search the details about a place and the photographs related to those places. The user will also be able to select route to his/her destination.

F. Current location

This provides the current location of the user to the system, so that the system can provide information about the location to the user.

G. Detect stop signal

The stop signal can be detected from the images provided by the camera module, so that an information can be provided to the user to stop the car.

H. *Add pin & view*

During driving, the user may not be able to check the details of the place .So the pin & view feature allows the user to pin a place, such that he can listen to it whenever possible.

FUTURE SCOPE

Although the results of this paper are better, the accuracy of the GPS needs to be further improved in the future. A challenging road is still ahead for a real-world application due to the challenges of technologies.Furthermore different algorithms can be used in future to increase the accuracy of the system.

CONCLUSION

It can be concluded that using Artificial Intelligence Stop signals can be detected and thus can reduce accidents. With real-time information and alerts, drivers can make more informed decisions, reducing the likelihood of accidents caused by missed stop signs or sudden braking. This technology can also assist in identifying high-risk areas and improving intersection design to reduce the number of collisions. The use of live GPS voice information about live places and automatic identification of stop signals and breaking can significantly improve road safety.

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