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Automated Highway System

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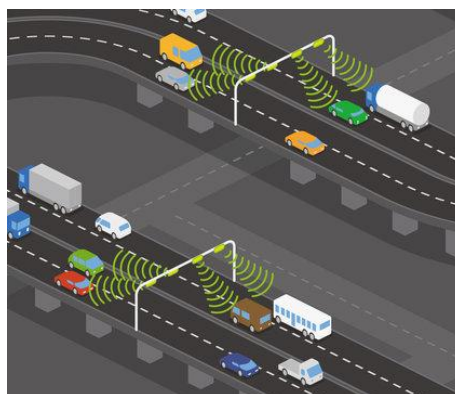
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ABSTRACT: The use of Automated Highway Systems (AHS) technology has been proposed as a mitigating application to vehicle collisions in rural areas. The application of AHS in the urban environment is being tested and evaluated to reduce traffic congestion with secondary consideration to safety. The purpose of this study was to address the feasibility, applicability and institutional issues of deploying AHS components in Mumbai Pune express way. It is a intelligent system that uses computers, sensors, artificial intelligence and communication technologies to provide safe travel to the driver. It provide safety against collision and reduce travel time and congestion between the vehicles.

KEYWORDS: Computer Aided Control System Design, Vehicle Platooning, Autonomous Vehicles, Automotive Control Transmission, Lane Changing Mechanism, Transportation, intelligent vehicles,

I. INTRODUCTION

An automated highway system (AHS) or Smart Road is a proposed intelligent transportation system technology designed to provide for driverless cars on specific rights-of-way. Every major city suffers from the problems that are related to increasing mobility demands. Cities have to deal with pollution, congestion and safety problems caused by increasing traffic. Traditional transport systems are not sufficient anymore to cope with these increasing problems. Automated highway system will contribute to innovative solutions that will allow increased mobility in a well controlled manner, using technologies with low pollution, high safety levels and a much increased efficiency, using either a separate infrastructure or existing roads. Recent research in automated highways has clearly indicated that automated vehicle control technology offers major improvements in the safety and efficiency of existing highways.



II. METHODOLOGY

There were four major steps for completing this project. They were Data Collection and Assimilation, Data Processing and Analysis, AHS Countermeasure Assessment, and Benefit-Cost Evaluations.

Data Collection and Assimilation

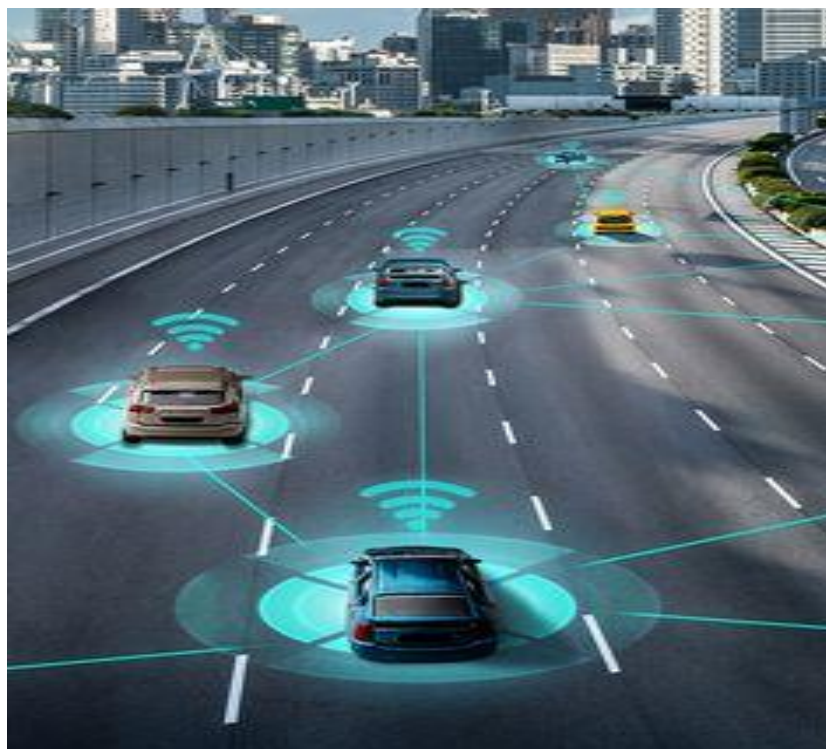
To start with the project past data had to be collected and assimilated with the boundaries. The data collected includes the accident data, metrological data, fatality data, existing Infrastructure data.

Data Processing and Analysis

Data which is been collected from previously published data from the highway department. AHS mainly focuses on reducing travel time, reducing accidents and on time performance. Based on data further study is required for the specific locations and must be analysed for the project the data which is collected is analysed to determine the challenges and deficiencies in the highway.

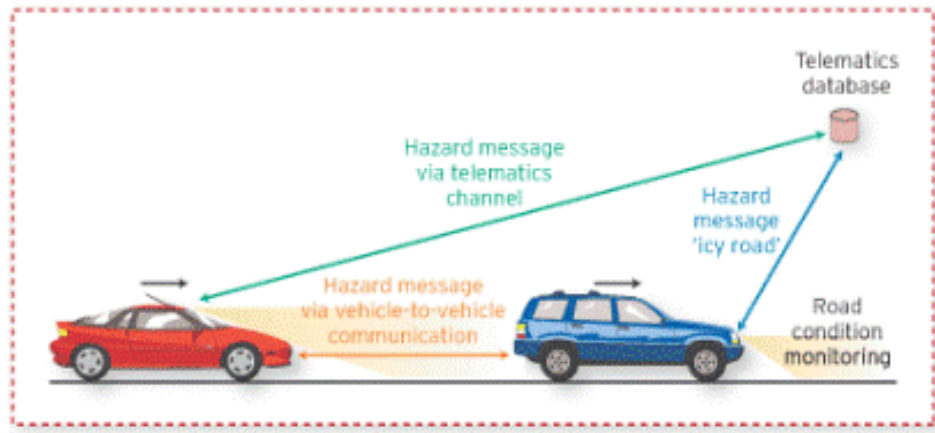
Benefit cost analysis

Benefit cost analysis is necessary for the determining the necessity of the project which is to be done. In transportation engineering, benefit-cost analysis involves analyzing the advantages, benefits and cost reductions associated with a proposed transportation system enhancement as they apply to the system providers and users. This analysis assumed transportation providers would only be responsible for the purchase and installation.



III. OBJECTIVE

The major Goal of the project is to enhance the transportation facility in rural as well as urban areas by significantly reducing the accidents and fatality. The AHS will show a reduction in the occurrence rate per highway kilometre of fatalities, severe injuries, and property damage for AHS vehicles under automated control of at least one half the current rate for highway traffic. The AHS will enhance the nation's ability to effectively and predictably move people and freight using the highway system. The human desire, and need for mobility is at the heart of all transportation systems, including the vehicle highway system. The AHS will provide shorter and more predictable trip times resulting from increased throughput and the ability to maintain free flowing speeds at high levels of throughput. Studies will be carried out to show that an automated transport system is not only feasible, but will also contribute to a sustainable solution for the city's mobility problems, now and in the future.



IV. SCOPE

The reliable intelligent driver assistance systems and safety warning systems are still a long way to go. However, like computing power, sensing capabilities, and wireless connectivity for vehicles rapidly increase, the concept of assisted driving and proactive safety warning is speeding towards reality. As technology improves, a vehicle will become just a computer with tires. As now new vehicles are already giving assisted driver system as it will proceed further the automated highway is not far away. As it does not require building any new roads so the cost required is also much lesser and more affordable. Driving on roads will be just like surfing the Web there will be traffic congestion but no injuries or fatalities. Advanced driver assistant systems and new sensing technologies can be highly beneficial, along with a large body of work on automated vehicles. These findings suggest that the research into autonomous vehicles within the ITS field is a short-term reality and a promising research area and these results constitute the starting point for future development.

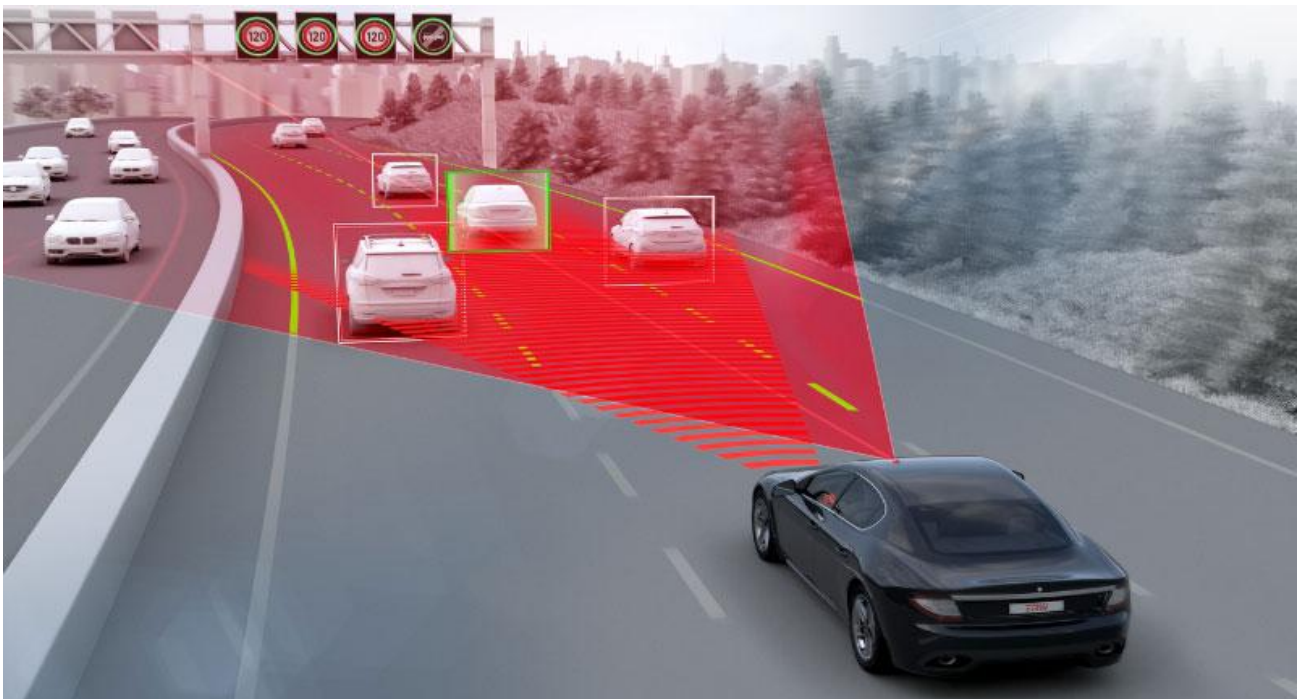
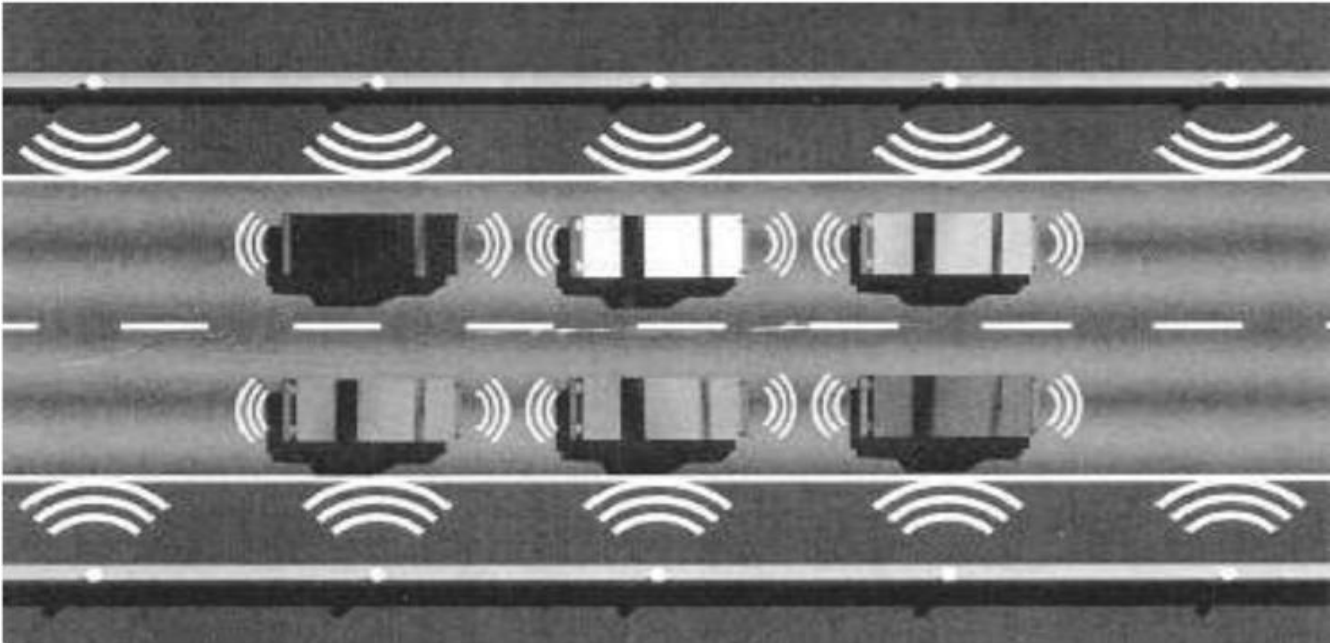
V. GOALS

1. Improve safety by significantly reducing:
 - i) Fatalities.
 - ii) Personal Injury.
 - iii) Pain and Suffering.
 - iv) Anxiety and Stress of Driving.
2. Save money and optimize investment by:
 - i) Maximizing efficiency of the existing infrastructure investment.
 - ii) Integrating other ITS services and architecture to achieve smooth traffic flow.
 - iii) Using available and near-term applied technology to avoid costs of conventional highway build-out.
 - iv) Developing affordable equipment, vehicles, infrastructure, operations, maintenance, and user fees.
 - v) Closing the gap on predicted infrastructure needs.
 - vi) Reducing fuel consumption and costs, maintenance, wear-and-tear, labour costs, insurance costs, and property damage.
3. Improve accessibility and mobility by:
 - i) Improving public transportation service, increasing customer access, and expanding service levels, resulting in increased revenue, reduced costs, and reduced accidents.
 - ii) Achieving a smooth traffic flow, reducing delays, travel times, travel time variability, and driver stress.
 - iii) Making driving more accessible to less able drivers.
4. Improve environmental efficiencies by:
 - i) Reducing emissions per vehicle-mile travelled.
 - ii) Providing a solid base for reliable, lower-cost transit.
 - iii) Providing an efficient base for electric-powered vehicles and alternative fuel vehicles.



VI. CONCLUSION

- The researchers on the AHS program felt that this is a truly exciting program that may have a very substantial impact on how the nation travels in the twenty first century.
- Automated Highway System is an example of a large scale, multi-agent complex dynamical system .
- Transportation systems are an indispensable part of human activities. Estimation shows that an average of 40% of the population spends at least one hour on the road each day. People have become much more dependent on transportation systems in recent years; transportation systems themselves face not only several opportunities but several challenges as well.
- The competitiveness of a country, its economic strength and productivity heavily depend on the performance of its transportation systems .
- It is important to demonstrate that AHS brings major transportation benefits in terms of
- safety, efficiency, affordability and usability, and environment in order to achieve its
- development goals.
- The AHS is a complex large-scale control system, whose design required advances in sensor, actuator, and communication technologies and in techniques of control system synthesis and analysis. It is a measure of the advanced state of the art that these techniques have reached a stage that they could be successfully used in the AHS project.





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