DETECTING ACCIDENT SEVERIETY VEHICLE TO VEHICLE COMMUNICATION

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ABSTRACT_ project is a pioneering initiative aimed at revolutionizing the automotive industry by leveraging advanced communication technologies. As vehicles become increasingly connected, the need for efficient and secure communication between them becomes imperative. This project focuses on developing a robust Vehicle-to-Vehicle (V2V) communication system that enables real-time exchange of critical information among vehicles on the road. The system employs state-of-the-art wireless communication protocols to facilitate seamless interaction, allowing vehicles to share information about their speed, location, and status. By harnessing V2V communication, the project aims to enhance road safety, reduce traffic congestion, and pave the way for future intelligent transportation systems. The integration of V2V communication holds the potential to transform the driving experience, laying the groundwork for a safer, more efficient, and interconnected vehicular ecosystem. This project signifies a crucial step towards the realization of smart and connected transportation networks, contributing to the evolution of next-generation automotive systems.

1.INTRODUCTION

future of vehicles The "Vehicle-to-Vehicle Communication" project stands out as a ground-breaking initiative that is poised to rethink the dynamics of road safety, traffic efficiency, and the overall driving experience in the rapidly changing landscape of modern transportation. As vehicles become all the more mechanically progressed and interconnected, the requirement for consistent correspondence between them turns out to be progressively apparent. By creating a sophisticated Vehicle-to-Vehicle (V2V) communication system, this project hopes to fill this void and make significant progress toward the development of intelligent and interconnected transportation networks. The project's central objective is the development of an infrastructure that enables vehicles to instantly exchange vital information like speed, location, and operational status. This system gives vehicles the ability to autonomously exchange data by utilizing cutting-edge wireless communication protocols. This contributes to a collective intelligence that improves road safety and reduces traffic congestion. The introduction of V2V communication has the potential to transform the transportation ecosystem as a whole as well as individual drivers. The integration of V2V communication promises to transform the way automobiles interact with one another on the road at a time when we are on the cusp of a new era in automotive technology. Our determination to advance the vision of intelligent transportation systems, paving the way for travel that is safer, more effective, and interconnected, is exemplified by this project.

2.LITERATURE SURVEY

2.1 EFFECT OF VEHICLE-TO-VEHICLE COMMUNICATION LATENCY ON A COLLISION AVOIDANCE ALGORITHM FOR HEAVY ROAD VEHICLES

ABSTRACT: Active safety is of utmost importance in heavy road vehicles due to the relatively higher number of fatalities encountered in their accidents. Vehicle-to-Vehicle (V2V) technology, which is seen as a future of connected vehicles, can potentially complement onboard sensing to reduce the time taken for detection, and to plan the path with the information available from road side units (RSU). This project investigates the effect of Iatency in (V2V) communication on a collision avoidance algorithm developed for heavy road vehicles. Experiments performed on a Hardware-in-Loop setup were used to evaluate the effect of Iatency for various scenarios. It was found that Iatency had a counterbalancing effect on vehicle spacing and relative longitudinal speed that led to insignificant changes in the final spacing. Further, a sensitivity analysis done at different host vehicle longitudinal speeds demonstrated the need of a variable time headway.

2.2 CAN GATEWAY FOR FAST VEHICLE TO VEHICLE (V2V) COMMUNICATION

ABSTRACT: Intelligent transport systems (ITS) use information and communication technologies to improve vehicle safety on roadways and effective traffic flow management. A vehicle communicates with other vehicles and/or infrastructures with wired/wireless communication technologies. In-vehicle networks are composed of numerous electronic control units (ECUs) according to the type of service in various domains (e.g. powertrain domain, body domain, and chassis domain). Vehicle to vehicle (V2V) messages related to vehicle safety should meet low-latency requirements. In addition, the information contained in V2V messages is associated with specific ECUs. For the interworking between the V2V communications and in-vehicle networks, we should consider a new method that responses necessary ECUs for specific V2V message. In this paper, we propose an effective controller area network (CAN) gateway method. This method uses CAN gateway searching for a network table based on the CAN frame for V2V message. Because of simple structure and method, the proposed method can be a good solution that controls the ECUs with ease. And it also can make V2V messages at high speed.

2.3 VEHICLE TO VEHICLE COMMUNICATIONS AT SUBURBAN ENVIRONMENT USING IEEE 802.11AF COMPLIANT DEVICES

ABSTRACT: Vehicle-to-vehicle (V2V) communications where vehicles exchange data such as traffic information had been developed to support the goals of the intelligent transportation system in providing smarter traffic management to lessen road congestions and vehicular accidents. Traditionally, V2V communications operate at ITS band of 5.9 GHz (5.85 - 5.925 GHz) which is more susceptible to attenuation and limited to shorter-range communications. Owing to its better propagation characteristics and wider coverage, V2V communications in the television white space (TVWS) spectrum has been exploited and already been demonstrated. In this paper, V2V communications over TVWS at suburban environment using the IEEE 802.11af-compliant devices were evaluated and characterized in terms of received signal strength and throughput as a function of the separation distance between the two vehicles. The experiments were conducted at a hilly University of San Carlos Taliban Campus located in Cebu City, Philippines which mimic the suburban environment due to buildings, terrains and vegetation present. By utilizing 20 dBm or 100 mW of transmit power with 64-QAM payload modulation and 2/3 coding rate, a maximum of 4.87 Mbps throughput has been measured at -51 dBm of received power. The said data were obtained when the effective speed of the vehicles and the distance between them are 8.68 m/s and 37 m, respectively. Throughput was affected by the packet loss rate and in this study, the packet loss rate of less than 10% was obtained at received signal strength between -88 to -33 dBm in every MCS. In addition, received signal strength and throughput were affected by the non-line of sight communication and multipath propagation influenced by locations, terrains, buildings and other infrastructures present in the area. The results suggested the feasibility of utilizing TVWS in vehicular wireless communications supporting the goals of the intelligent transportation system

3.PROPOSED SYSTEM

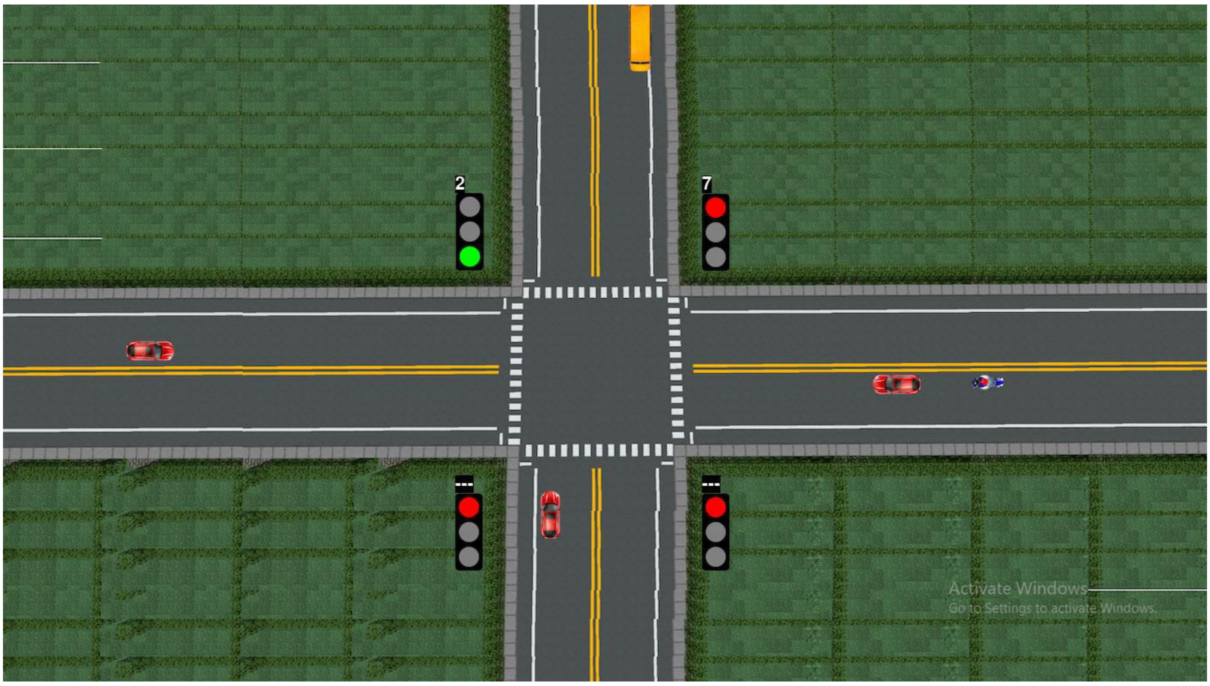
Vehicle-to-Vehicle Decentralised Communication System The suggested approach entails putting in place a decentralised architecture for vehicle-to-vehicle (V2V) communication. Vehicles connect with one another directly through cellular-based or dedicated short-range communication (DSRC) technologies, as opposed to depending on a centralised authority. With this method, vehicles can work together in real-time to create a dynamic, self-organizing network that shares vital data like position, speed, and road conditions.

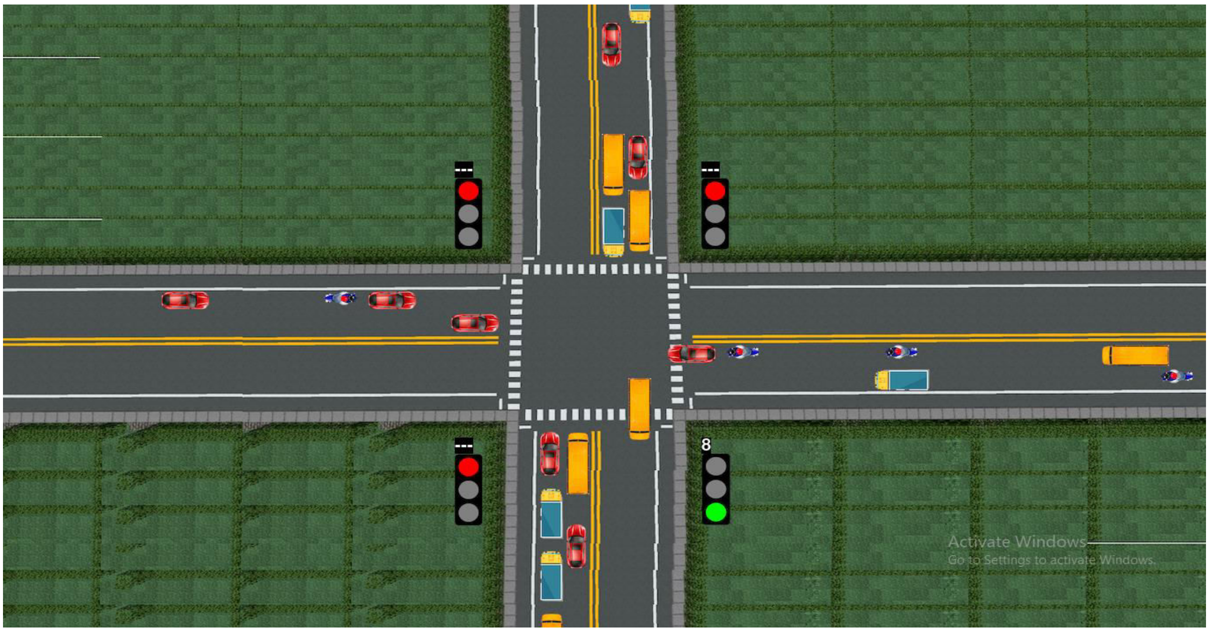
3.1 IMPLEMENTATION

1) We have trained machine learning model by using weather and traffic congestion data so ML can predict or suggest new route to driver based on traffic congestion and weather condition
2) By using another accident dataset we have trained machine learning algorithm to predict accident severity and to train model we have used 'US Accident Severity dataset'
3) To adjust traffic signal time we have utilized PYGAME simulator which will monitor number of vehicles arrived at the signal and based on number of vehicles it will adjust signal time and based on number of vehicles it will give priority to only that route which has more vehicles.
4) Road narrowing and widening is not possible via software.

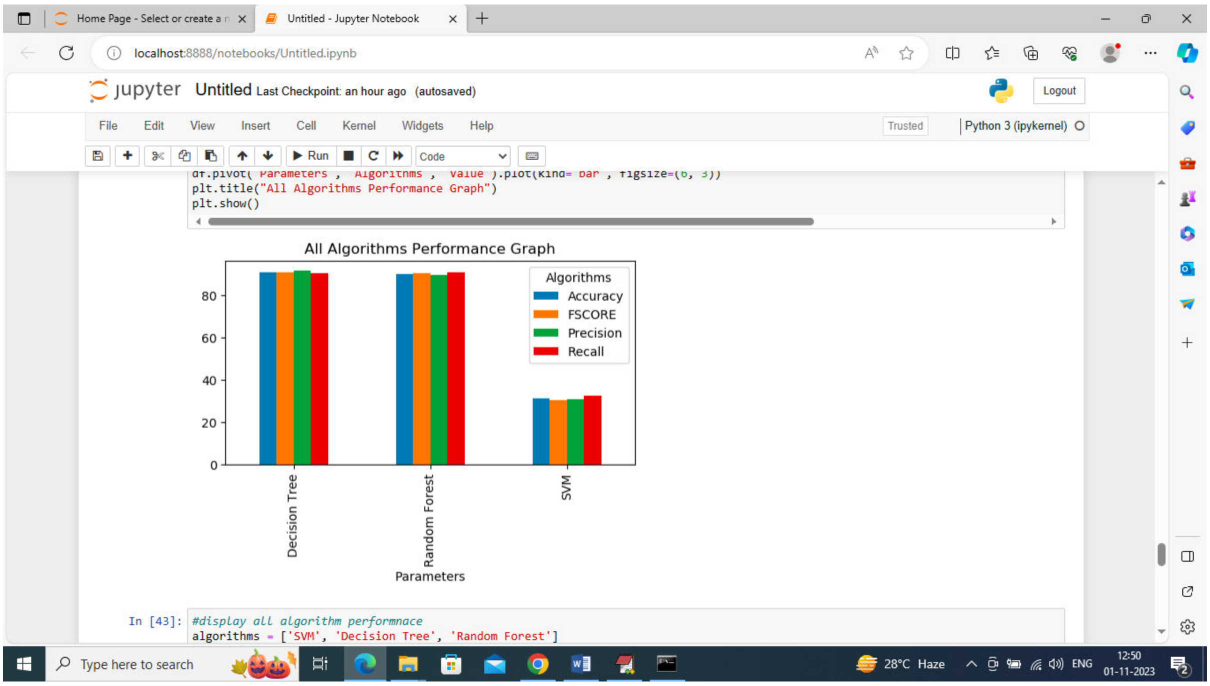
4.RESULTS AND DISCUSSION

In below screen we are showing simulation output of traffic signal and this simulation you can run by double click on 'runSimulation.py' file



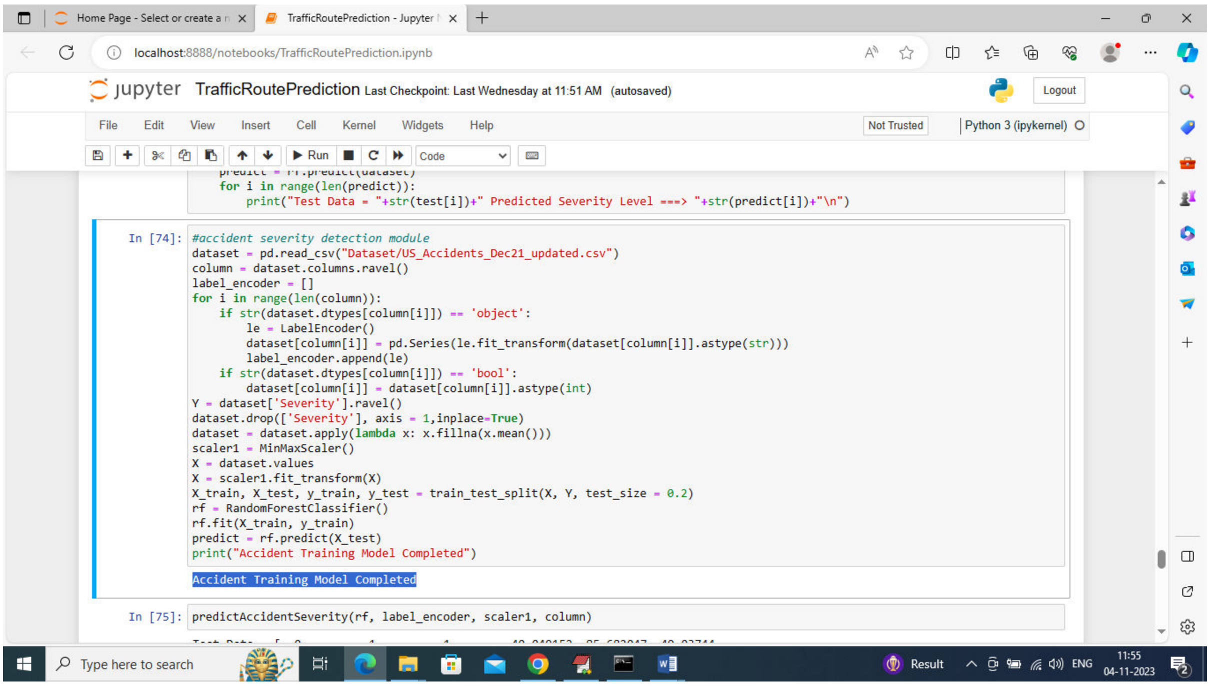


In above screen you can see PYGAME traffic signal simulation output and at each lane traffic density is calculated and then adjust green and red signal. This simulation run in INFINITE loop and for run it will adjust signal based on number of vehicles arrived and to stop simulation you can press 'windows' key from keyboard and then close application.

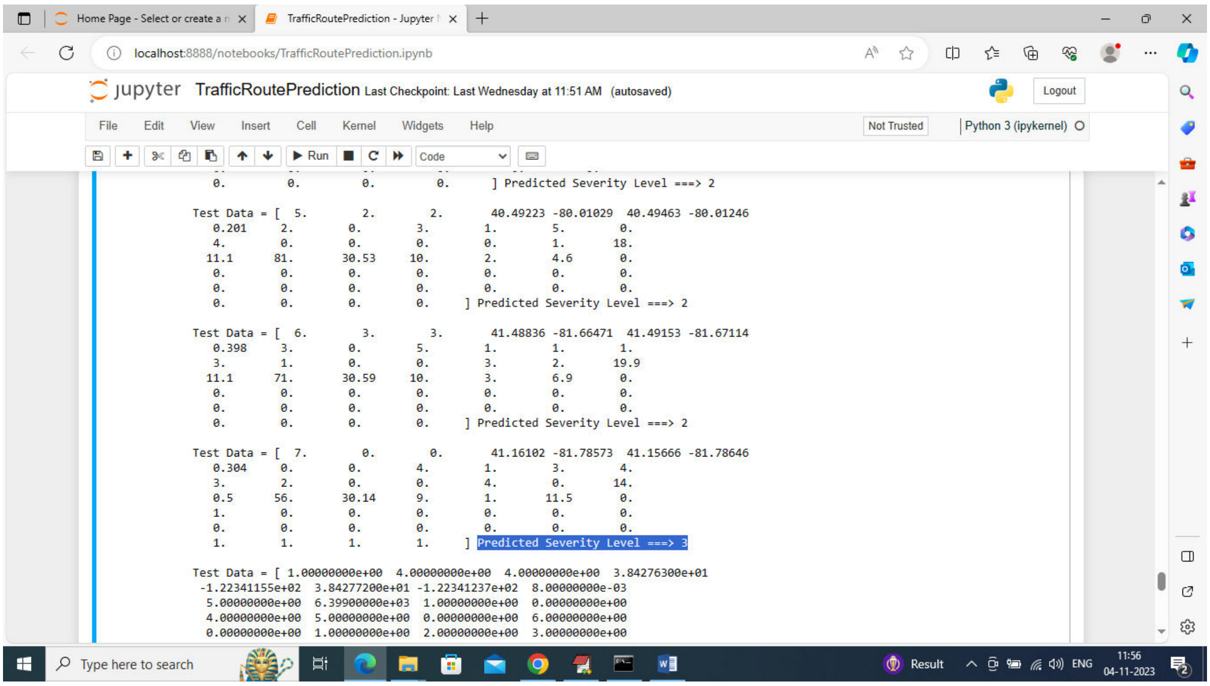


In above graph x-axis represents algorithm names and y-axis represents accuracy

and other metrics in different colour bars and in all algorithms Random Forest and Decision Tree work best



In above screen we are reading accident dataset and then training Random Forest model and in blue colour text can see model training completed and when we apply this model on test data then will get below severity prediction output



In above screen in square bracket we can see accident Test Data and after =➔ symbol we can

5.CONCLUSION

In conclusion, the "Vehicle-to-Vehicle Communication" project is an important step toward making modern transportation systems more intelligent and effective. This project aims to rethink the dynamics of road safety, traffic management, and overall driving experience by establishing a robust framework for vehicle communication. A commitment to addressing the limitations of existing centralized traffic management systems is exemplified by the pursuit of a decentralized Vehicle-to-Vehicle (V2V) communication system.

There are numerous advantages to the planned V2V communication system. Vehicles can work together in real time to respond quickly to changing road conditions, which improves road safety. The foundation for a transportation ecosystem that is both dynamic and adaptable is the sharing of essential information, such as traffic updates and collaborative traffic management.

Additionally, resilience and scalability are guaranteed by the proposed system's decentralized structure. A self-organizing network that can withstand disruptions and scale seamlessly with the increasing number of connected vehicles is facilitated by vehicles' autonomous communication capabilities. In order to guarantee the communication infrastructure's dependability and long-term viability, this resilience is an essential quality.

The "Vehicle-to-Vehicle Communication" project is at the forefront of innovation as we move toward an era of intelligent transportation systems. It not only indicates that driving will be safer and more effective, but it also paves the way for the development of connected transportation networks. This project plots a course for the future by encouraging vehicle cooperation.

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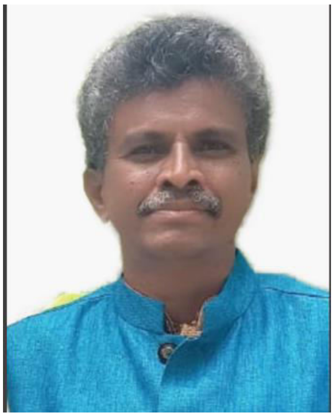
AUTHOR PROFILES



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