Traffic Safety through Smartphone

Abstract:

Around the world, there are more than 1.3 million fatal car collisions each year. The total includes vulnerable road users such as cyclists, pedestrians and motorcyclists. IEEE Member Bilin Aksun-Guvenc believes that these numbers can be significantly reduced, and pedestrian safety increased, with a device that most people carry in their pockets: the smartphone.

This project is aimed at developing a mobile app useful for drivers and pedestrians to help keep safe in traffic using smartphone sensor data of pedestrians to track user motion and broadcast it to the vehicles.

Functionalities:

- **Real-time Traffic Updates**: Integrating with traffic data sources to provide users with real-time updates on traffic conditions, accidents, road closures, and other incidents that may affect their route.
- **Route Optimization**: Offering users the ability to input their destination and receive optimized routes based on current traffic conditions, helping them avoid congested areas and reduce the likelihood of accidents.
- **Speed Limit Notifications**: Using GPS data to alert users when they exceed the speed limit, encouraging safer driving habits and reducing the risk of accidents and traffic violations.
- **Driver Assistance**: Providing alerts for approaching intersections, sharp curves, pedestrian crossings, and other potential hazards to help drivers stay attentive and avoid accidents.
- **Emergency Assistance**: Including a feature that allows users to quickly contact emergency services or roadside assistance in the event of an accident or breakdown.
- **Crowdsourced Data**: Allowing users to report accidents, hazards, or traffic violations they encounter, contributing to a real-time database that benefits other users.
- **Driver Behaviour Analysis**: Utilizing accelerometer and GPS data to analyse driving behaviour, such as harsh braking, rapid acceleration, and sharp turns, and providing feedback to help users improve their driving habits.
- **Integration with Smart Devices:** Integrating with wearable devices or in-car systems to provide hands-free access to features and minimize distractions while driving.
- **Driver Fatigue Detection**: Using algorithms to detect signs of driver fatigue based on factors such as steering patterns, lane deviation, and reaction times, and providing alerts or suggestions for taking breaks.
- **Education and Training**: Offering resources such as articles, videos, and quizzes to educate users about safe driving practices, traffic laws, and emergency procedures.
- **Turn Signal Awareness:** When in a traffic, the nearest vehicles position should be taken which indicates driver to which side it will go left or right.
- **Pedestrian awareness:** Pedestrians will be indicated when vehicles are approaching at the zebra line through vibration alerts.