

IBM – NAALAYA THIRAN
SIGNS WITH SMART CONNECTIVITY FOR BETTER ROAD SAFETY

LITERATURE SURVEY

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1. IoT Based Regional Speed Restriction Using Smart Sign Boards

Author: P.Madhumathy, H.K.Nithish Kumar, Pankhuri & D.S.Suspreeth Narayan

https://link.springer.com/chapter/10.1007/978-3-030-65661-4_10

Major cause for fatal accidents on the road is over speeding. Accident risk increases with an increase in speed. The judging ability of upcoming events also gets declined while moving at higher pace, which causes judgment mistakes and leads to a crash. Around 30% of road accidents are due to over speeding. There have been various ways to avoid accidents due to over speeding, but none of them can automatically control the speed and customize the regional speed limit together. An IoT-based smart solution is discussed to overcome this, limiting the vehicle's top speed to a particular region even though people are unwilling to use control stations, smart signboards, and speed control unit in the vehicle.

2. Smart transportation system using IoT

Authors: P.S.Saarika, K.Sandhya & T.Sudha

<https://ieeexplore.ieee.org/abstract/document/8358540>

Nowadays the concept of smart cities became more popular. The evolution of internet of things (IoT) helps the idea of smart city more achievable. A major branch of smart city is smart transportation. Problems such as traffic congestion, road safety, accident detection, automatic fare collection and limited car parking facilities can be resolved by IoT. In this paper, an IoT based smart parking system along with an intelligent signboard is proposed. The smart parking system composed of intelligent sensors deployed on site and are used to monitor and inform the availability of parking spaces. A mobile or internet application can be provided to check the availability of parking slot. The sign board with embedded RF module and connected sensors working with solar energy as well as in battery will show the place, distance to that place, weather condition, temperature and different routes to those places.

3. Smart city for VANETs using warning messages, traffic statistics and intelligent traffic lights

Authors: Carolina Tripp Barba, Miguel Angel Mateos, Pablo Reganas Soto, Ahmed Mohamad Mezher & Monica Aguilar Igartua

<https://ieeexplore.ieee.org/abstract/document/6232229>

Road safety has become a main issue for governments and car manufacturers in the last twenty years. The development of new vehicular technologies has favoured companies, researchers and institutions to focus their efforts on improving road safety. During the last decades, the evolution of wireless technologies has allowed researchers to design communication systems where vehicles participate in the communication networks. Thus, new types of networks, such as Vehicular Ad Hoc Networks (VANETs), have been created to facilitate communication between vehicles themselves and between vehicles and infrastructure. New concepts where vehicular networks play an important role have appeared the last years, such as smart cities and living labs [1]. Smart cities include intelligent traffic management in which data from the TIC (Traffic Information Centre) infrastructures could be reachable at any point. To test the possibilities of these future cities, living labs (cities in which new designed systems can be tested in real conditions) have been created all over Europe. In this work, the development of a warning system composed of Intelligent Traffic Lights (ITLs) that provides information to drivers about traffic density and weather conditions in the streets of a city is proposed and evaluated through simulations.

4. Highway 4.0: Digitalization of highways for vulnerable road safety development with intelligent IoT sensors and machine learning

Authors: Rajesh Singh, Rohit Sharma, Shaik Vaseem Akram, Anita Gehlot, Dharam Buddhi, Praveen Kumar Malik, Rajeev Arya

<https://www.sciencedirect.com/science/article/abs/pii/S0925753521002514>

According to United Nations (UN) 2030 agenda, the transportation system needs to be enhanced for the establishment of access to safe, affordable, accessible, and sustainable transport systems along with enhanced road safety. The highway road transport system is one of the transport systems that enables to transits goods and humans from one location to another location.

The agenda of UN 2030 for the transport system will be accomplished with the assistance of digital technologies like the internet of things (IoT) and artificial intelligence (AI). The implementation of these digital technologies on highways empowers to provide reliable, smarter, intelligent, and renewable energy sources experience to the users travelling along the highways. This study discusses the significance of the digitalization of highways that supporting and realizing a sustainable environment on the highways. The significance of implementing smart display boards and renewable sources with real-time applications is also addressed in this study. Embedding the deep learning techniques in the vision node at the traffic junction and the highway lighting controller is able to deliver an intelligent system that provides sustained experience and management of the highways. Smart reflectors, adoption of renewable energy, developing vehicle-to-vehicle communication in vehicles, and smart lamppost are the few recommendations for the implementation of digitalizing highways.

5. Internet of Things Based Solutions for Road Safety and Traffic Management in Intelligent Transportation Systems

Authors: Arnav Thakur, Reza Malekian & Dijana Capeska Bogatinoska

https://link.springer.com/chapter/10.1007/978-3-319-67597-8_5

Road safety, traffic congestion and efficiency of the transport sector are major global concerns. Improving this is the primary objective of intelligent transport systems (ITS). Having Internet of things (IoT) based solutions for ITS would enable motorists to obtain prior contextual guidance to reduce congestion and avoid potential hazards. IoT based solutions enabling collection of data from client nodes in a wireless sensor network in the transport environment implementing ITS goals is studied. Road safety techniques studied include distance sensing, improper driving detection and accident prevention, weather related events and negligent driving detection and accident avoidance. Vehicle to vehicle communication and vehicle to infrastructure based channels are studied. Wireless communication technologies suitable for the channels are studied. Additional benefits and services that can be added to a system with the IoT approach are also studied. The effectiveness of such a system is studied with the use of validation framework. Multiple case studies of current and future IoT based ITS along with the challenges in the application is discussed.