**DEPARTMENT OF ELECTRONICS AND COMMUNICATION**

**ENGINEERING**

**IBM – LITERATURE SURVEY**

**PROJECT TITLE**

**SIGNS WITH SMART CONNECTIVITY FOR BETTER ROAD SAFETY**

**[1]Highway 4.0: Digitalization of highways for vulnerable road safety development with intelligent IoT sensors and machine learning**

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

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.

# [2]Traffic Sign Recognition using Deeplearning for Autonomous Driverless Vehicles

# A Suriya Prakash D Vigneshwaran

To ensure Traffic Safety, the development of smart cars requires the detection and recognition of traffic signs. The algorithm is the extended work on the classical LeNet-5 CNN model. The proposed technique makes use of Gabor based kernel followed by a normal convolutional kernel after the pooling layer. The optimizer technique used here is the Adams method. Hue, Saturation Value color space features have a speed of detection is faster and low suffering from illumination. The proposed technique for traffic sign recognition is evaluated using the German Traffic Sign Recognition Benchmark. The proposed technique gives an accuracy of nearly 99%.

**Drawbacks:**

Errors in algorithms may leads to false detection of signs.

# [3]Improved Traffic Sign Detection and Recognition Algorithm for Intelligent Vehicles

Jingwei Cao, Chuanxue Song, Silun Peng, Feng Xiao, and Shixin Song

Traffic sign detection and recognition are crucial in the development of intelligent vehicles. An improved traffic sign detection and recognition algorithm for intelligent vehicles is proposed to address problems such as how easily affected traditional traffic sign detection is by the environment, and poor real-time performance of deep learning-based methodologies for traffic sign recognition. Firstly, the HSV color space is used for spatial threshold segmentation, and traffic signs are effectively detected based on the shape features. Secondly, the model is considerably improved on the basis of the classical LeNet-5 convolutional neural network model by using Gabor kernel as the initial convolutional kernel, adding the batch normalization processing after the pooling layer and selecting Adam method as the optimizer algorithm. Finally, the traffic sign classification and recognition experiments are conducted based on the German Traffic Sign Recognition Benchmark.

**Drawbacks:**

The viewpoint of traffic sign recognition accuracy but algorithm more time-consuming

# [4]Smart roads: A state of the art of highways innovations in the Smart Age

Andrea Pompigna, Raffaele Mauro

The years we are experiencing are often identified as those of the Age of Smart Technologies. Smart is now a very popular term, with the meaning of clever, intelligent, sharp, quick on the uptake. Its extensive meaning can be grasped if we consider it as an acronym for Self-Monitoring Analysis and Reporting Technology to indicate the essential features of the innovative technologies that characterize today's society in its daily life. Thus, the advent of the Smart Age, which is therefore the era of smart technologies, has heavily characterized and modified many aspects of today's society compared to the past. In this panorama, some arising questions regard transport infrastructure systems and, first of all, road transport.

**Drawbacks:**

Advanced innovations may use with great concern, otherwise leads to the exploitation of clean and renewable energy sources. Loss of privacy and security of data due to a large amount to store.