

A Machine Learning Approach for Intelligent Transportation System Management on Urban Roads

Authors : Ashish Dhamaniya, Vineet Jain, Rajesh Chouhan

Abstract : Traffic management is one of the gigantic issue in most of the urban roads in al-most all metropolitan cities in India. Speed is one of the critical traffic parameters for effective Intelligent Transportation System (ITS) implementation as it decides the arrival rate of vehicles on an intersection which are majorly the point of con-gestions. The study aimed to leverage Machine Learning (ML) models to produce precise predictions of speed on urban roadway links. The research objective was to assess how categorized traffic volume and road width, serving as variables, in-fluence speed prediction. Four tree-based regression models namely: Decision Tree (DT), Random Forest (RF), Extra Tree (ET), and Extreme Gradient Boost (XGB)are employed for this purpose. The models' performances were validated using test data, and the results demonstrate that Random Forest surpasses other machine learning techniques and a conventional utility theory-based model in speed prediction. The study is useful for managing the urban roadway network performance under mixed traffic conditions and effective implementation of ITS.

Keywords : stream speed, urban roads, machine learning, traffic flow

Conference Title : ICCEE 2024 : International Conference on Civil and Environmental Engineering

Conference Location : Singapore, Singapore

Conference Dates : March 25-26, 2024