Masters Desertion Showcase
Year 2023

Department: Computer & Information Systems Engineering

Programme: Master of Science

Specialization: Data Sciences

1	**Title of the Thesis** Deep Learning Models for Carbon Monoxide Prediction in Urban Traffic
2	**Abstract** One of the major causes of air quality degradation is vehicular emissions in urban agglomeration. It has severe health effects and even results in fatality. The research aims to propose an ANN-based ensemble machine-learning model for predicting Carbon monoxide (CO) resulting from road traffic vehicles. The proposed model is implemented on real-time traffic and pollutant emitted from vehicles simultaneously. The observations were collected at major arterials on the roadside in Karachi, Pakistan. The results of the proposed model were also compared with different machine-learning techniques. The model has also been validated and shown acceptable efficiency. It was also concluded that the emission of CO is highly dependent upon the prevailing composition of traffic.
3	**Impact on Sustainability of Urban Regions or SDG-11 "Sustainable Cities and Communities"** The solution can be helpful for government bodies to protect the well-being of generations from the harmful concentrations that are injurious to their health and develop an eco-friendly environment to make communities and cities more sustainable. It will also have a greater impact on policy-making public transportation systems for an urban community.
3a	*SGD Target: 11.6 has been attained through this study.* Machine learning techniques were widely utilized and proved to be worthy of resolving current challenges faced by humanity. It describes the data's patterns and learns them in order which is usually hidden. It also develops a forecasting model that can produce high accuracy. Different researchers have worked on air quality assessment and improvement through machine learning techniques and suggested several frameworks to control the variables that are affecting the environment. This study proposes an ANN-based ensemble machine-learning model for predicting Carbon monoxide (CO) emitted from the prevailing traffic mix. The proposed model is useful to control those variables that are responsible for producing CO concentrations in the environment and causing air quality degradation. These variables can be controlled, and strategies can be developed for elevating Air Quality Index (AQI). The suggested model gives results with high accuracy and is also easy to be implemented.
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