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Advanced Neural Network Applications in Smart Cities Air Quality Monitoring and Energy Optimization

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Abstract:

As urban areas face increasing environmental challenges, the integration of advanced neural networks in smart city infrastructures offers promising solutions for air quality monitoring and energy optimization. This study explores the application of deep learning models, particularly Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs), to enhance air quality prediction and energy consumption management. Real-time data from IoT sensors monitoring pollutants, weather conditions, and energy usage are processed through neural networks to provide accurate air quality forecasts and predict energy demands. The optimization of energy distribution based on these predictions supports the reduction of consumption peaks, enhances energy efficiency, and promotes the use of renewable energy sources. The proposed system improves urban environmental health and sustainability by enabling smarter energy management and cleaner air.

Keywords:

Neural networks, smart cities, air quality monitoring, energy optimization, deep learning, IoT.

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