

***Implementation of K-Means Algorithm for Clustering Air Pollutant
Concentration Data from IoT Based Monitoring Based on Air Pollution
Standard Index (Ispu)***

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ABSTRACT

Air pollution is an environmental issue that directly affects human health. This study aims to cluster air pollution levels at eight monitoring points in Jember Regency using Internet of Things (IoT) technology and the K-Means Clustering method. The monitoring system was built using an ESP8266 microcontroller and sensors such as MQ-2, MQ-131, MQ-135, DSM501A, and ADS1115 to measure PM10, PM2.5, CO, HC, and O3. Additional data on NO2 and SO2 were obtained from the local Environmental Agency. The collected data were normalized and analyzed using the K-Means algorithm. Evaluation using the Silhouette Score indicated that two clusters were optimal. The clustering results were visualized through a simple web interface. This study demonstrates that integrating IoT with K-Means Clustering can effectively detect air pollution patterns, even with a basic system. Further development can be pursued by expanding location coverage, enriching data parameters, and optimizing the system interface to better support environmental policy-making.

Keywords: *Air pollution, Internet of Things, K-Means, Clustering, Silhouette Score.*