

ABSTRAK

Tomia, Ratih. 2025. Perancangan Monitoring Berbasis *Internet of Things* dan Implementasi Algoritma *Naive Bayes* Dalam Klasifikasi dan Prediksi Kualitas Udara di Kota Tanjungpinang. Skripsi. Tanjungpinang: Program Studi Teknik Elektro. Fakultas Teknik Dan Teknologi Kemaritiman. Universitas Maritim Raja Ali Haji. Pembimbing I : Ir. Sapta Nugraha, S.T., M.Eng., Pembimbing II : Rusfa, S.T., M.T

Penelitian ini merancang sistem pemantauan kualitas udara berbasis teknologi *Internet of Things* (IoT) untuk mengukur polutan seperti karbon monoksida (CO), partikel debu halus PM_{2,5} dan PM₁₀, hidrokarbon (HC), nitrogen dioksida (NO₂), serta sulfur dioksida (SO₂). Seluruh data hasil pengukuran dikirim secara langsung ke platform *ThingSpeak* dan dapat dipantau secara *real-time*. Data dikonversi menjadi nilai Indeks Standar Pencemar Udara (ISPU) dan dinormalisasi sebelum dianalisis menggunakan algoritma *Naive Bayes*. Pengujian dilakukan selama 15 hari dengan evaluasi model menggunakan metode *5-fold Cross-Validation*, yang menghasilkan akurasi rata-rata sebesar 93,61%. Pada data uji, model mencapai akurasi 97,22% dengan nilai *precision*, *recall*, dan *F1-score* sebesar 98,06%. Tingkat kesalahan model berdasarkan nilai MAPE tercatat sebesar 13,13%. Hasil tersebut menunjukkan bahwa sistem IoT yang dikembangkan mampu memantau kualitas udara secara cepat berdasarkan parameter polutan yang diamati.

Kata kunci: Kualitas Udara, *Internet of Things* (IoT), *Gaussian Naive Bayes*, Sensor, *ThingSpeak*, ISPU.

ABSTRACT

Tomia, Ratih. 2025. *Design of an Internet of Things-Based Monitoring System and Implementation of the Naive Bayes Algorithm for Air Quality Classification and Prediction in Tanjungpinang City*. Thesis. Tanjungpinang: Study Program of Electrical Engineering. Faculty of Engineering and Maritime Technology. University of Maritim Raja Ali Haji. Supervisor I : Ir. Sapta Nugraha, S.T., M.Eng., Supervisor II : Rusfa, S.T., M.T

This study designed an air quality monitoring system based on Internet of Things (IoT) technology to measure pollutants such as carbon monoxide (CO), fine particulate matter (PM_{2.5} and PM₁₀), hydrocarbons (HC), nitrogen dioxide (NO₂), and sulfur dioxide (SO₂). All measurement data were transmitted directly to the ThingSpeak platform and could be monitored in real-time. The data were converted into Air Pollution Standard Index (ISPU) values and normalized before being analyzed using the Naive Bayes algorithm. Testing was conducted over a period of 15 days, with model evaluation using the 5-fold cross-validation method, resulting in an average accuracy of 93.61%. On the test dataset, the model achieved an accuracy of 97.22%, with precision, recall, and F1-score values of 98.06%. The model's error rate based on the Mean Absolute Percentage Error (MAPE) was recorded at 13.13%. These results indicate that the developed IoT-based system is capable of monitoring air quality quickly based on the observed pollutant parameters.

Keywords: *Air Quality, Internet of Things (IoT), Gaussian Naive Bayes, Sensors, ThingSpeak, ISPU.*