Kombinasi dampak emisi polutan dan kebisingan pesawat dengan menggunakan model artificial neural network untuk menentukan tingkat resiko kesehatan = Combined effects of aircraft pollutant and noise emissions by using artificial neural network model to determine healthy risk level

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Abstrak

[ABSTRAK

Emisi polusi dan kebisingan pesawat merupakan bagian penting dari sumber polusi di sekitar bandara, yang secara langsung atau tidak langsung akan mempengaruhi resiko bahaya bagi kesehatan manusia dan ekosistem.

Efek suara pesawat dan emisi pada populasi di sekitar bandara berkaitan dengan gangguan yang terkadang sangat berbahaya. Untuk mengatasi masalah ini, penelitian ini mengusulkan model yang mengintegrasikan emisi pesawat dari kebisingan dan polutan dengan menggabungkan efek dari kedua emisi tersebut dengan menggunakan Artificial Neural Network (ANN) untuk menentukan indeks resiko kesehatan di sekitar bandara.

Pengukuran emisi pesawat baik kebisingan maupun polutan di Bandara Internasional Soekarno Hatta - Cengkareng Indonesia digunakan untuk memvalidasi model yang dikembangkan sebagai data masukan.

Hasil yang telah diperoleh dalam penelitian ini adalah arsitektur model ANN yang terbaik yang terdiri dari 4 (empat) variabel input (CO, NOx, SOx, Noise level), 10 (sepuluh) untuk proses layer tersembunyi (hidden layer) dan satu variabel output (indeks risiko kesehatan) atau dapat ditulis model 4-10-1. Berdasarkan kriteria validasi ANN, kinerja validasi terbaik dicapai pada epochs 15 dari 21 epochs dengan Mean Squared Error (MSE) yang bernilai 0,035062. Korelasi antara target dan output divalidasi dengan R = 0,98823, yang berarti bahwa ada hubungan erat antara target dan output. Jaringan nilai output kesalahan mendekati nol, yang

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ABSTRAK

Aircraft noise and pollutant emissions are an important part of the sources of pollution around airport that directly or indirectly will affect harmful to human health and ecosystems. The effects of aircraft noise and pollutant emissions on the populations around airport deal with annoying and sometimes dangerous. In order to address this issue, this research proposes an integrating model of aircraft noise and pollutant emissions by combining effects of both noise and pollutant emissions using Artificial Neural Network (ANN) to determine the healthy risk level around the airport.

Measurement of aircraft noise and pollutant emissions at Soekarno Hatta International Airport – Cengkareng Indonesia is used to validate the developed model as input data. The results obtained in this research are the

best ANN architecture model is 4 (four) variable input (CO, NOx, SOx, Noise Level), 10 for variable process (hidden layer) and one for output variable (healthy risk level) that can be written as 4-10-1 model. Based on ANN validation criteria, the best validation performance is achieved at epoch 15 from 21 epochs with the Mean Squared Error (MSE) of 0.035062. The correlation between targets and outputs are validated with R = 0.98823, which means that there is a close relationship between targets and outputs. The value of network output errors approaches to zero, ranging from -0.6 to 0.6.

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