INTELLIGENT SENSOR DESIGN FOR ACCURATE DETECTION OF FOREST FIRE USING ARTIFICIAL NEURAL NETWORKS

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ABSTRACT

Forest fires are a disaster that has hit Indonesia in recent years and there has been no real solution from both the community and the government to prevent these forest fires. In this final project, research on intelligent sensor design is carried out to make an accurate detection tool for forest fire smoke. This tool is equipped with a series of gas sensors, namely the MQ-7 sensor, the TGS2600 sensor, and the MQ-2 sensor. The purpose of this gas sensor array is to detect the voltage characteristics of the three smokes tested, namely forest fire smoke, cigarette smoke, and motor vehicle exhaust. To support the gas sensor array above, the Arduino Mega2560 R3 CH340 microcontroller is used as the main component. After being able to detect the voltage characteristics of the three smokes above, the process continues to the artificial neural network system so that it can distinguish between forest fire smoke or not. The artificial neural network used is three input layers with ten hidden layers and the artificial neural network here uses the Backpropagation method. In this study, based on testing, the accuracy, precision, sensitivity and specificity of this forest fire detection tool were 92%, 96%, 88%, and 96%.

Keywords*: Forest Fire, Artificial Neural Network, MQ-2, MQ-7, Figaro TGS2600*