Utilization of Neural Network for Local Processing on the Internet of Things (IoT)

by Boy Yako Siahaan

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Abstract

This research is intended to produce a smart sensor system using a Neural Network which is implemented through the design of an Occupation monitoring tool and application (presence). Sensor equipment uses Arduino UNO, EST8266 Wifi, DHT22 and LDR. The readings of these sensors are then sent remotely via the internet and read by the application. Based on the research training conducted, a prediction model will be born where this model will translate the sensor data received and then generate data on the presence in an environment where the sensor is placed. IoT sensor tools and applications that are placed in several locations are very useful in carrying out daily human activities such as monitoring security in the home environment, schools, offices and warehouses for storing goods.

Keywords: nternet of Things (IoT); Neural Network (NN); sensors; security; human environment

Introduction

Environmental monitoring is a mechanism for measuring environmental changes that is carried out repeatedly so that we can study patterns, structures and functions related to the environment. Once we know the environment well, then we can control the environment in a better way. One of them is by monitoring changes in the surrounding environment such as monitoring humidity, temperature using sensors (Martin, A. H., et.al, 2019).

In measuring this environmental change, humans can use various sensor devices that have increasingly diverse functions, such as in the transportation environment, dozens of sensors are needed for transportation equipment to work, ranging from simple sensors to sensors based on Micro Electromechanical System (MEMS). In modern homes, various sensors are found, such as thermostat and infrared sensors to detect motion and gas sensors to detect gas leaks in the air. The mobile phones that we hold today also have various kinds of sensors such as touch sensors, image sensors, inertial sensors, magnetic sensors and environmental sensors such as temperature, pressure and humidity.

The sensors we use today are becoming more and more diverse and have functions that we never imagined. Combining a microchip device with multiple sensors makes the sensor better and smarter than ever. The term Smart Sensor is applied to sensors built like this. Smart sensors will provide much more information by processing measurement data obtained with various data processing methods. The currently available microchips are smaller and require less power, reducing the complexity of sensor design. There are even some microchips that are equipped with data transmission facilities with Wifi and Bluetooth, where continuously measured data can be sent to a storage area (server or cloud computing) with internet media. Usually the sensors that can send data remotely are called the Internet of Things (IoT).

When the sensor measurement data is obtained, a series of data evaluation processes must be carried out. The process of evaluating sensor data is defined as a scientific method for measuring, analyzing and interpreting data as a form of response to the observed situation

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