

ABSTRACT

Lungs are one of organs in human body that are susceptible to disease because they come in direct contact with the air that is inhaled through the nose. There are several ways to check lung health condition, usually using a *CT-scan* and sputum test. With the high cost cause many people don't know the system, then they will be lazy to check their lung health condition. In this final project, the author design a prototype for detecting early lung health condition using Analytic Hierarchy Process method based on Internet of Things (IoT).

The prototype is made to detect early lung health indication consists of two sub-parts, are tools and *mobile* application that are integrated with each other. The used sensors are the TCS3200 color sensor, the DS18B20 temperature sensor, and the piezoelectric sensor. This research focuses on efficiency of Analytic Hierarchy Process method for final decision system for early lung health indication. Someone will be checked through a device that is integrated into *mobile* application and connected to internet. The Firebase platform is used as a database to store and send sensor data from the device to the Android application which will then send notifications to the user.

From the results of system testing, it known that the tool is functioning and well integrated. The results of data from the DS18B20 temperature sensor compared to a digital thermometer have an error percentage of 0.759%. The results of the TCS3200 color sensor data compared to the eyedropper tool have an error percentage of 4.1%. The results of the piezoelectric sensor data, with the Vc measuring tool compared to the biopac have an error percentage of 0.095% then the respiration rate of the tool compared to manual measuring has an error percentage of 3.46%. The *mobile* application can connect to the *Firebase* database and reads the database data properly. In testing the *mobile* application, users can find an early indication of their lung health.

Keywords : *Lungs, Internet of Things, Analytic Hierarchy Process, Prototype, Temperature Sensor, Color Sensor, Piezoelectric Sensor, Mobile Application, Firebase, Delay.*