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Implementation of Body Temperature Checking System with Automatic Door Lock Web and Arduino Assistance

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ABSTRACT

The main objective of this research is to investigate the implementation of the IOT prototype that contributes to the movement to prevent COVID-19 transmission to support COVID-19 free programs among higher education institutions in Bogor with the implementation of the existing system. Several efforts were made, one of which was checking the body temperature when entering the room. for normal temperature will be allowed to enter and if fever is not allowed to enter. Body temperature measurement can also be done with conventional infrared thermometers that have been circulating in the community, but this infrared thermometer requires guards for its operation who will be at risk of contracting COVID-19. Then a body temperature measurement tool was built using the Arduino Mega2560 microcontroller and web assistance to minimize the spread of COVID-19 when entering the room. There are several methods including Analysis, Design, Implementation, Testing. This tool is designed to use the MLX90614-DCI sensor as a temperature sensor which will be displayed on the LCD if the temperature is normal then the relay will cut off electricity on the electromagnetic door so that the door lock will open and vice versa. The temperature that is read will be stored in the database and will appear on the web to monitor the temperature read by the body temperature measuring device. This tool has been tested for comparison with conventional infrared thermometers with a difference of 0.3oC so that it is feasible to use.

1. Introduction

As of May 17, 2021, the Covid-19 pandemic has recorded more than 1.739 million cases and 48 thousand deaths. Spread over 34 provinces and 510 cities throughout Indonesia. Today, cases of corona virus infection throughout Indonesia experienced a spike. Launching data from the Ministry of Health (kemkes.go.id) and the National Disaster Management Agency [1]. Cases of the spread of the corona virus in Indonesia continue to show an increase. Steps to prevent transmission of the corona virus, one of which is checking body temperature. Body temperature checks are often found in various places, including offices, stations, airports, cafes, malls, schools or campuses as well as applying hand washing and checking body temperature [2]. Bogor Regency is included in 1 of 5 districts / cities that have the largest increase in the number of cases and the widest distribution of cases in the Bodebek area (Bogor, Depok, Bekasi)[3]. One of the signs of the corona virus is a high fever. Humans are said to have a fever when their body temperature has passed the average normal body temperature of 37.5 degrees [4].

The purpose of this system is to change the manual door lock system to automatic and can make it easier for users to monitor [5]. MLX90614-DCI is a thermal sensor that can measure temperature from a distance of more than 10cm without making direct contact with the object to be measured[6]. Of course, it will be very useful for people who can monitor their own health, to minimize the spread of this virus. With the design of this system, the public can monitor their health and self-isolate if symptoms are felt or produced according to those published by the Ministry of Health of the Republic of Indonesia [7]. Monitoring body

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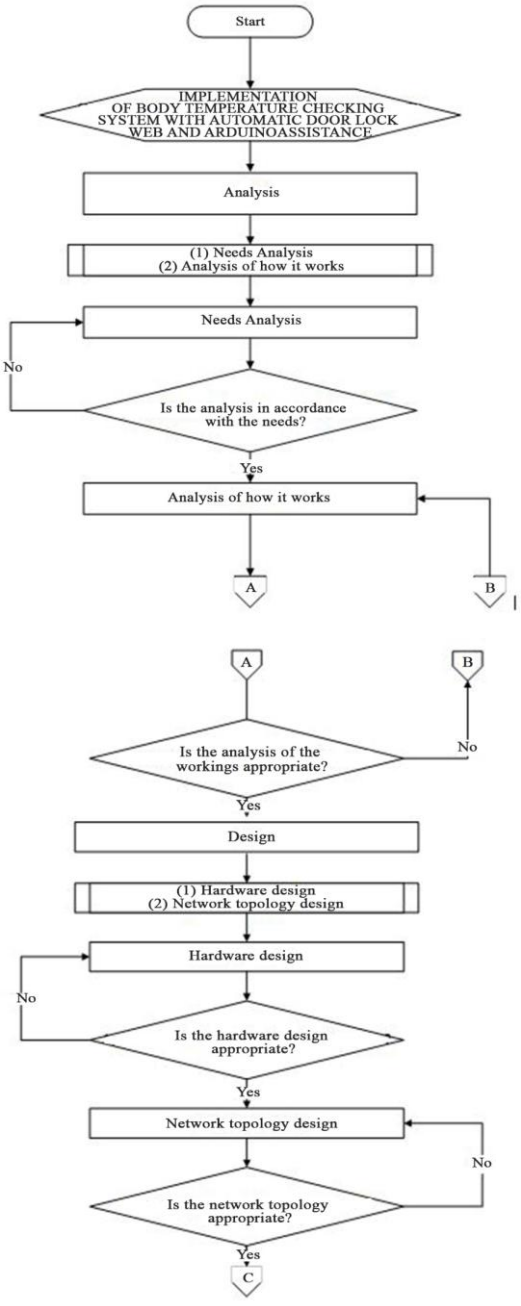
temperature is important to minimize the spread of COVID-19 in the Net Centric Computing lab environment. Automatic checks are good to implement without having to involve people to monitor body temperature upon entry. The purpose of this research is to build a body temperature measuring device with an automatic door.

2. Method

The research method is a step to achieve research objectives through problem boundaries. In this study using a flow chart. The following is a flow chart for building a body temperature measuring device.



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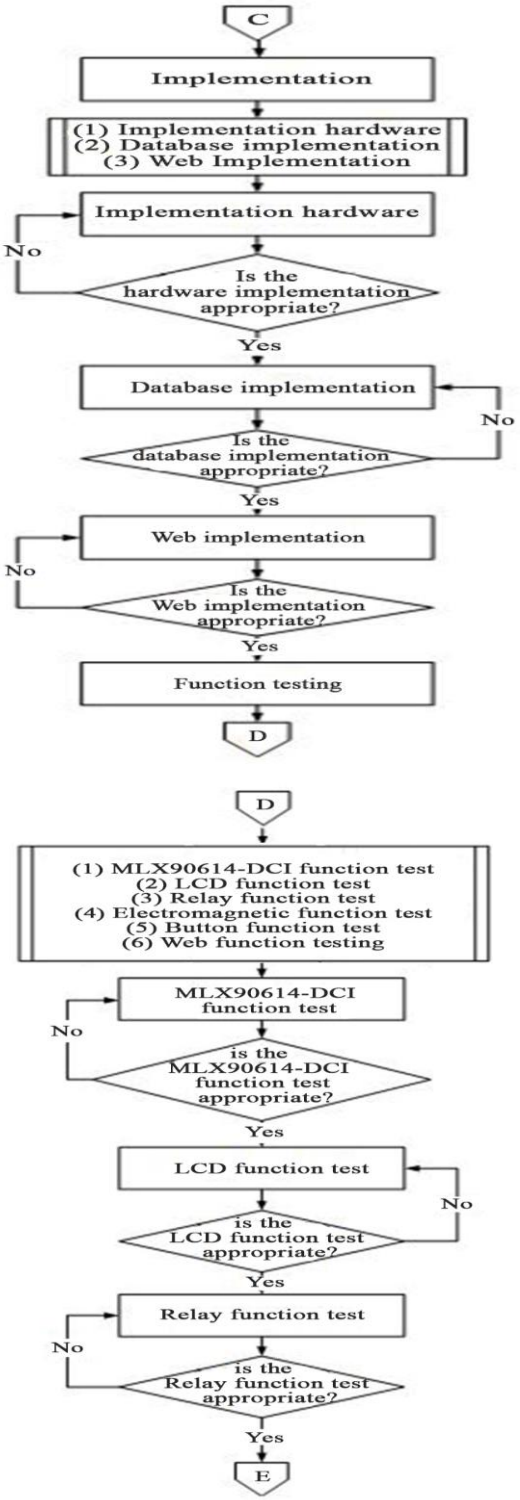

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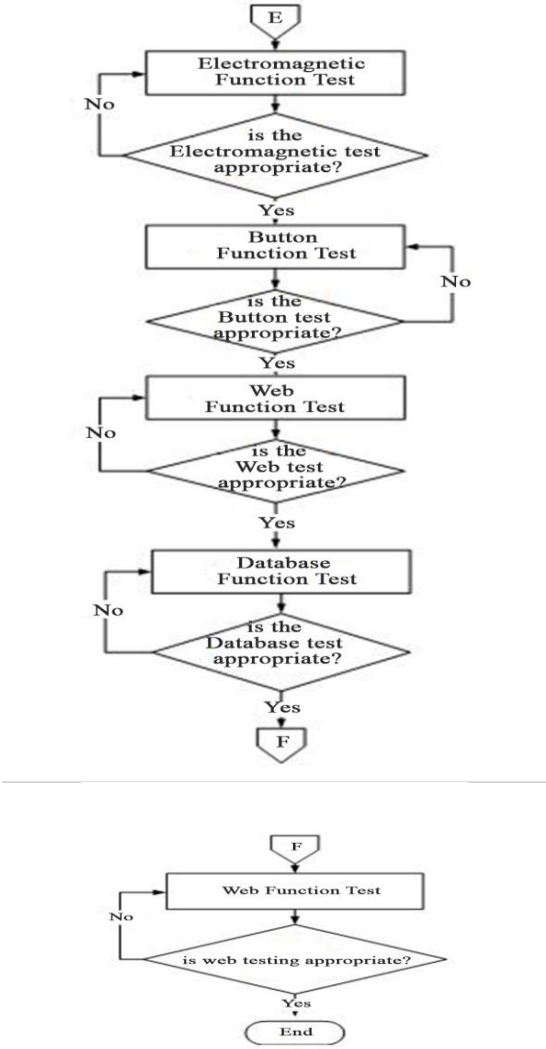

Fig 1. Research Method

3. Result and Analysis

3.1 Analysis of how it works

In the process of how it works, it will explain how the system works in this study. Explained about the analysis of how this system works.

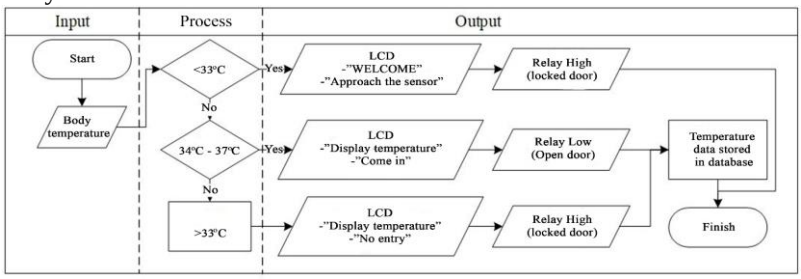

Fig 2. Analysis of how it works

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3.2 Overall Block Diagram Design

The MLX90614-DCI sensor is an input that is processed by Arduino Mega 2560 which will produce the following outputs: LCD displays information, relay cuts off electromagnetic electricity, Ethernetshield sends data to the server. The sequence is as follows:

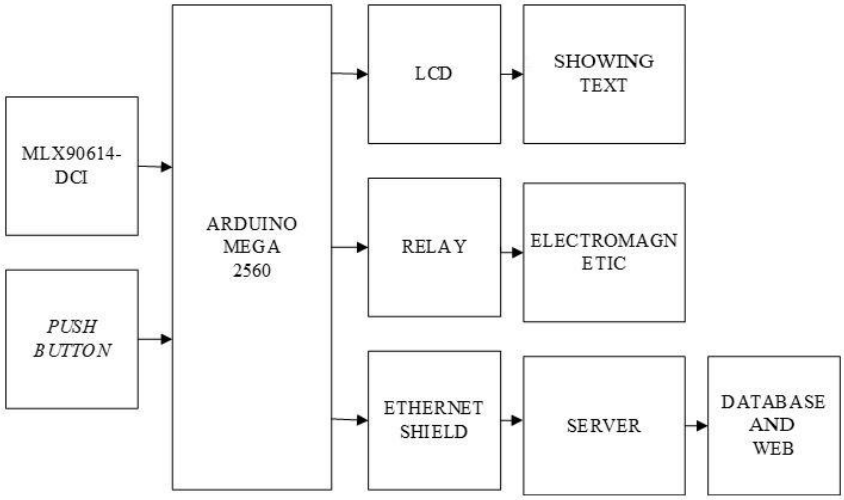

Fig 3. Overall Block Diagram Design

3.3 Implementation

At this stage, everything that has been prepared and designed previously will be fully implemented.

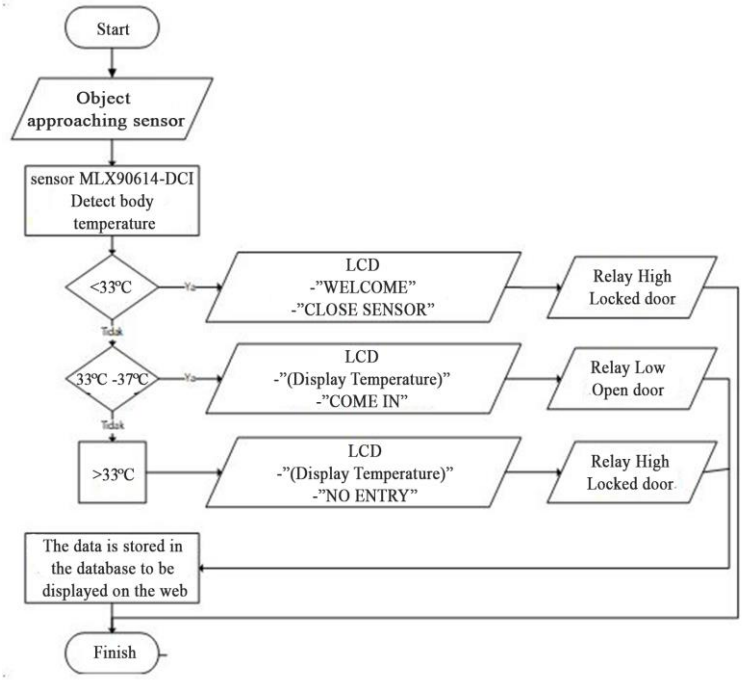

Fig 4. Flowchart System

3.4 Testing

a. Relay function test

Testing the relay function as the output of the microcontroller which functions to disconnect and connect electricity which is connected to electromagnetically locked or closed doors. Relay test results as follows.

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Table 1
Relay test results in 2 different conditions

No	Condition	Aim	Description
1	Relay HIGH	Power supply connected	Success
2	Relay LOW	Power cut off	Success

b. Electromagnetic Door Function Test

Testing the electromagnetic door function in the form of a door opening and closing function based on the flow of electricity from the relay. Testing this test runs the results of the microcontroller process to the relay and then electromagnetic. Electromagnetic test results are as follows.

Table 2
Electromagnetic door test results in 2 different conditions.

No	Condition	Aim	Description
1	Electricity	Strong magnetic properties, the door is locked	Success
2	No electricity	No magnetic properties, the door is not locked	Success

c. MLX90614-DCI sensor comparison testing conventional infrared thermometer

At this stage, it is carried out to compare the MLX90614-DCI sensor with a conventional infrared thermometer to find out what the comparison value is between the 2 temperature gauges.

Table 3
Testing the comparison of the conventional infrared teemometer MLX90614-DCI sensor

No	**Sensor MLX90614-DCI (^{O}C)**	**infrared thermometer Conventional (^{O}C)**	**Difference (^{O}C)**
1	36.1	36.6	0.5
2	36.3	36.5	0.2
3	34.3	34.6	0.3
4	35.6	35.8	0.2
5	38.3	38.7	0.4
6	38.0	38.4	0.4
7	37.5	37.8	0.3
8	33.6	33.8	0.2
9	33.5	33.9	0.4
10	37.1	37.3	0.2
Rata-Rata	**36.0**	**36.3**	**0.3**

From the results of the data obtained, the average difference of 0.3 OC between the MLX90614-DCI sensors and can be considered feasible to be used to replace conventional infrared thermometers so that it can be applied to the needs of the Net Centric Computing lab.

4. Conclusion

Based on the research that has been carried out, the following conclusions can be drawn: The manufacture and design of a Prototype of Body Temperature Measuring Device Using the MLX90614-DCI Sensor, Arduino Mega 2560, push button, Electromagnetic door, LCD, in testing this tool is implemented in Indoor. After doing a comparison between the MLX90614-DCI sensor and a conventional infrared thermometer, a difference of 0.3 OC is obtained and the data obtained from the measurement of body temperature are stored in the database and can be displayed on the web that has been created as needed.

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