Nusantara Journal of Multidisciplinary Science
Vol. 1, No. 3, Oktober 2023
Hal 354-363
E-ISSN : **3024-8752**
P-ISSN : **3024-8744**
Site : https://jurnal.intekom.id/index.php/njms

Design of Body Temperature Control Equipment IoT Based Human

Safna Safitri[1], Achmad Fauzi[2], Milli Alfhi Syari[3]
[1,2,3] Fakultas Teknik Informatika, STMIK Kaputama, Binjai, Indonesia

Article Info

Article history:

Received August 12, 2023
Revised September 10, 2023
Accepted Oktober 2, 2023

Kata Kunci:

Body temperature control device,
Internet of Things (IoT),
Temperature sensors,

Keywords:

Body temperature control device,
Internet of Things (IoT),
Temperature sensor,

ABSTRAK

Penelitian ini bertujuan untuk merancang dan mengembangkan alat pengontrol suhu tubuh manusia berbasis Internet of Things (IoT). Alat ini dirancang dengan tujuan untuk memonitor dan mengatur suhu tubuh manusia secara akurat dan efisien. Implementasi teknologi IoT memungkinkan alat ini terhubung ke jaringan internet, memfasilitasi pemantauan jarak jauh dan pengaturan suhu secara real-time.Dalam perancangan alat ini, sensor suhu yang sensitif digunakan untuk mengukur suhu tubuh manusia. Data suhu yang diambil akan dikirim melalui koneksi internet ke platform yang dapat diakses oleh pengguna melalui perangkat pintar seperti smartphone atau komputer. Pengguna dapat memonitor suhu tubuh mereka sendiri atau suhu tubuh individu lain melalui antarmuka aplikasi yang mudah digunakan. Hasil pengujian menunjukkan bahwa alat pengontrol suhu tubuh manusia ini mampu mengukur suhu secara akurat dan dapat mentransmisikan data melalui jaringan internet dengan baik. Keunggulan alat ini terletak pada kemampuannya untuk memberikan informasi suhu tubuh secara real-time, yang dapat berguna dalam pengawasan kesehatan dan deteksi dini gejala infeksi atau penyakit. Dengan menggabungkan teknologi sensor, IoT, dan konektivitas jaringan, penelitian ini menghasilkan alat yang berpotensi memberikan kontribusi dalam pemantauan kesehatan masyarakat secara lebih canggih dan efektif, serta dapat diterapkan dalam berbagai konteks, termasuk kesehatan perorangan, perawatan medis, dan pengawasan kesehatan umum.

ABSTRACT

This study aims to design and develop a body temperature control device based on the Internet of Things (IoT). The device is designed with the purpose of accurately and efficiently monitoring and regulating human body temperature. The implementation of IoT technology allows this device to be connected to the internet, facilitating remote monitoring and real-time temperature adjustments. In the design of this device, sensitive temperature sensors are utilized to measure human body temperature. The collected temperature data is transmitted through the internet connection to a platform accessible to users via smart devices such as smartphones or computers. Users can monitor their own body temperature or that of other individuals through a user-friendly application interface. Test results demonstrate that this human body temperature control device is capable of accurately measuring temperature and transmitting data through the internet network effectively. The device's strength lies in its ability to provide real-time body temperature information, which can be useful in health monitoring and early detection of infection or illness symptoms. By combining sensor technology, IoT, and network connectivity, this research produces a device that has the potential to contribute to more advanced and effective public health monitoring, applicable in various contexts

E-ISSN : 3024-8752
P-ISSN : 3024-8744

including individual health management, medical care, and general health supervision.

Corresponding Author:

Safna Safitri
Fakultas Teknik Informatika, STMIK Kaputama
Binjai, Indonesia
Email: safnasafitry01@gmail.com

1. INTRODUCTION

Current developments in knowledge and technology encourage humans to continue to think more creatively, not only exploring new discoveries, but also maximizing the performance of existing technology and continuing to innovate to make human work easier in everyday life. Therefore, we must be able to compete and master technology. With advances in technology in the field of electrical engineering, currently the world of electrical engineering utilizes microcontroller-based systems. With that, the author would like to introduce that in the world of electricity it is not only about power generation, the world of electricity can also function in the world of health for humans, where in this final project the author will design an IoT-based non-contact body temperature detection device.

In 2020 the Covid-19 virus pandemic attacked almost the entire world, including Indonesia. Cases of spread continue to soar in Indonesia to this day. Moving on from the case of the Covid-19 virus, the government implemented several policies for the entire community by prohibiting people from leaving the house to break the chain of spread of the Covid-19 virus. There are many ways to anticipate the spread of the Covid-19 virus, one of which is by checking your body temperature regularly. There are several places where body temperature must be checked, such as airports, malls, banks, etc. and implementing health protocols by wearing a mask, washing hands and checking body temperature. During the Covid-19 pandemic, body temperature measurements are needed to determine a person's body temperature as a measure to anticipate Covid-19 symptoms. Using a Thermometer Gun is the newest way to monitor a person's body temperature.

The community is taking steps to prevent the spread and transmission of the Covid-19 virus, including in daily activities by complying with health protocols that have been implemented by the government, such as maintaining distance and living clean, for example wearing masks, washing hands. Measuring human body temperature is one of the main factors as an action to detect early symptoms of the Covid-19 virus in terms of measuring body temperature. Generally, people use manual thermometers and allow officers to always be on standby to check body temperatures one by one. Using this tool is less efficient and takes a lot of time so that its use is not appropriate. This tool also poses a risk to patients and staff because there is direct contact between patients and staff who are worried about being exposed to

symptoms of the Covid-19 virus. Having conducted research on body temperature detection devices, in this research a design was made for an Arduino-based body temperature measuring device which has a reminder alarm if the body temperature is above 37.30 and is connected to a computer device via Bluetooth. This body temperature measuring tool uses a DS18B20 sensor to measure temperature in Celsius (0C. The test results of the body temperature measuring tool are compared with a thermo gun and have a deviation range of 1.16% - 2.02%. If something abnormal is found, the measuring tool will automatically make a sound alarm which means information to be alert and as an early warning.

Currently technology has developed greatly, one of which is that many tools have been created to check body temperature. One of the most widely used is IoT technology. The internet of things or often called IoT is an idea where all objects in the real world can communicate with each other as part of one integrated system using the internet network as a link.

2. METHOD

2.1 Method of collecting data

Research plan or design in the narrow sense is interpreted as a process of collecting and analyzing research data. In a broad sense, research design includes the process of planning and implementing research. The preparation steps in the design of an IoT-based human body temperature control device are as follows:

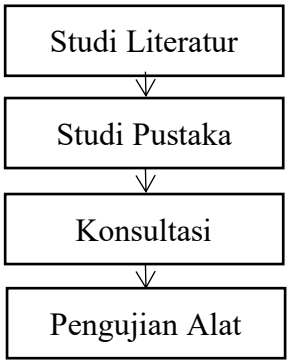

Figure 1. Metode Pengumpulan Data

2.2 Block Diagram

The block diagram of the system being designed is as shown in Figure 2.

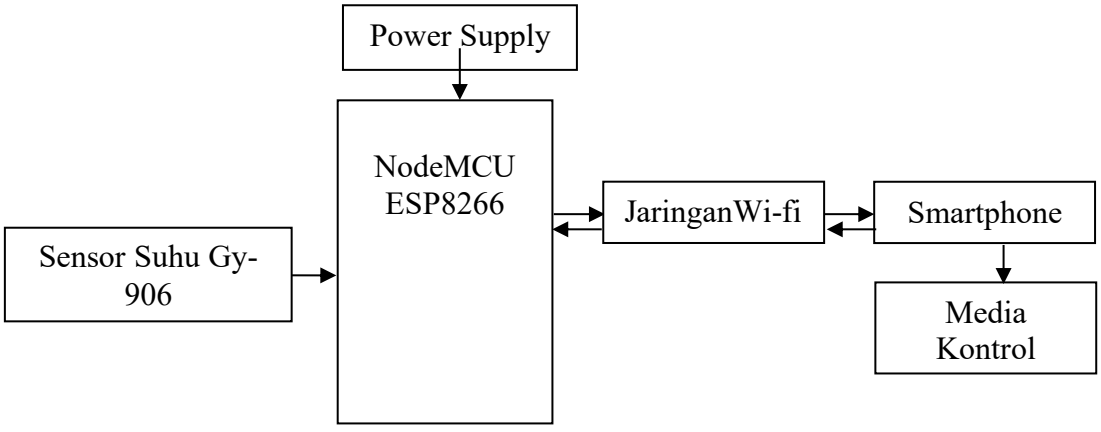

Figure 2. System Block Diagram

2.3 Flowchart System

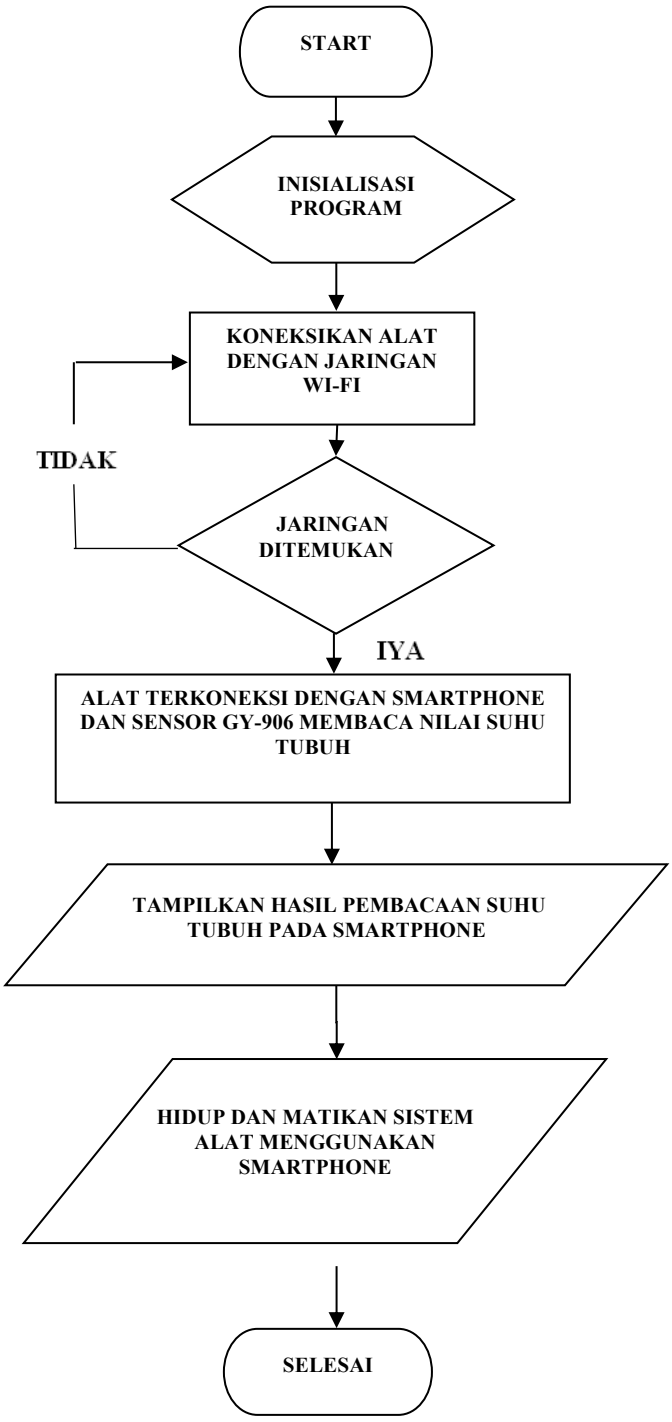

Figure 3. System Flowchart

2.4 IoT Flowchart on Blynk Server

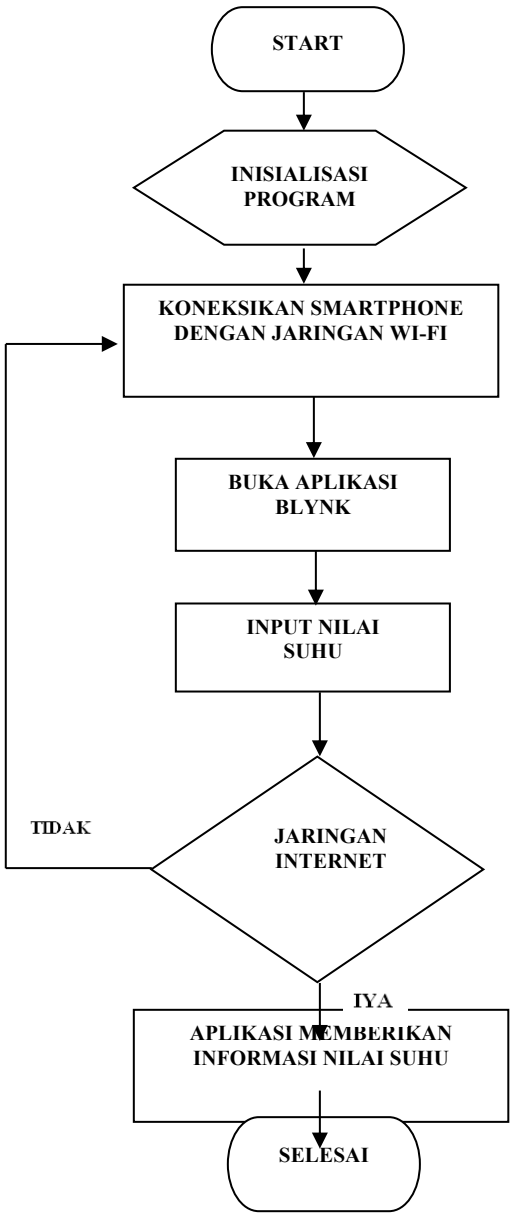

Figure 4. IoT Flowchart on the Blynk Server

3. RESULTS AND DISCUSSION

To find out whether the NodeMCU ESP8266 Microcontroller circuit is working properly on the device, a test is carried out by giving a command program to the Microcontroller by inputting data from the computer into the Microcontroller. It can be seen in Figure 4.

E-ISSN : 3024-8752
P-ISSN : 3024-8744

Figure 5. NodeMCU ESP8266 Programming

When installing, first connect the computer to the downloader via a USB cable to the microcontroller circuit.

3.1 Pengujian Software

To find out whether the NodeMCU ESP 8266 circuit is working properly on the device, a test is carried out by giving a command program to the microcontroller by inputting data from the computer into the microcontroller.

When installing, first connect the computer to the downloader via a USB cable to the microcontroller circuit. To test the tool with commands, you can do several steps, including:

1. 1. The first step to take is to run the Arduino software. After the application loads, you will see a display like image 6.

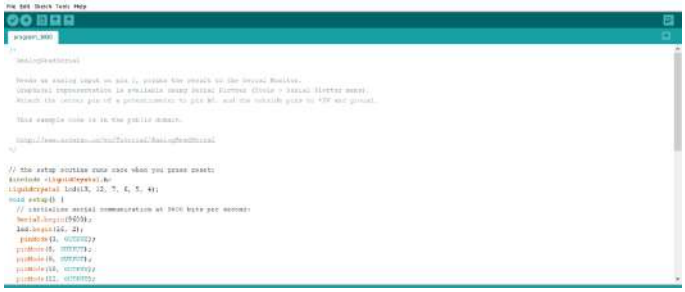

Figure 6. Arduino Software Display.

2. Next, to program the Arduino Uno microcontroller, type the program according to what is needed on the device. As seen in Figure 7.

E-ISSN : 3024-8752
P-ISSN : 3024-8744

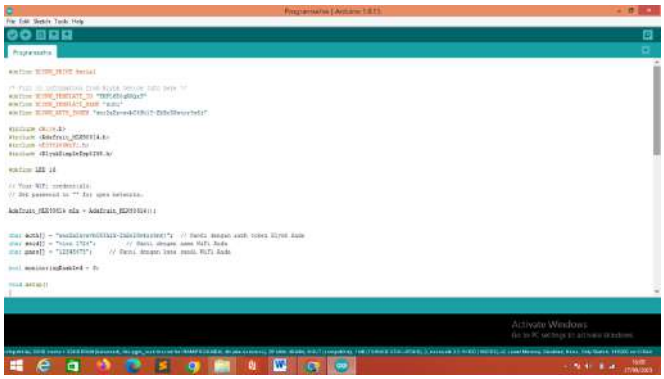

Figure 7. Program View

3. Before continuing with the microcontroller installation stage of the completed program, first save the program before compiling it. To save the program, see Figure 8.

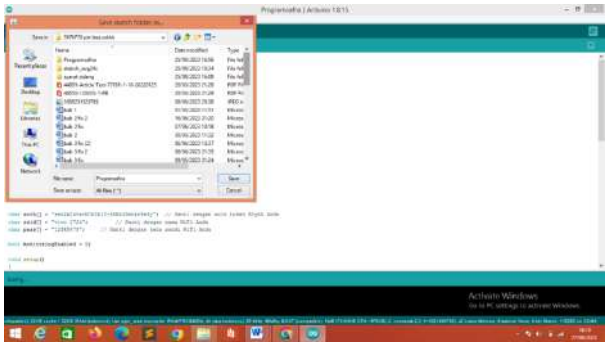

Figure 8. File Saving Process

4. Before creating a program for a series of tools, first install the library on the Arduino Uno. The method is:
   1. Click File then select Preferences.
   2. Click Tools then Boards select Boards Manager.
   3. In the search input, type esp8266.
   4. Then click Install.

   Likewise with the Blynk Library, the steps are the same, only the difference is in the search input, select Blynk. It can be seen in figure 9

Figure 9. Library Installation

3.1.1 Pengujian Koneksi WI-FI NodeMCU ESP8266 ke Smartphone

In this test, a connection process is carried out between the tool system and an Android smartphone. The connection is carried out using the WI-FI communication system transmitted by the smartphone's WI-FI network source. The step that must be taken is to turn on the device system so that the WI-FI network and NodeMCU ESP8266 can be connected.

3.2 Pengujian Hardware

After all the circuits that have been completed are designed in "IOT-Based Human Body Temperature Control Device Design", then all the completed circuits are combined. The following is an image of the results of the system design shown in Figure 10.

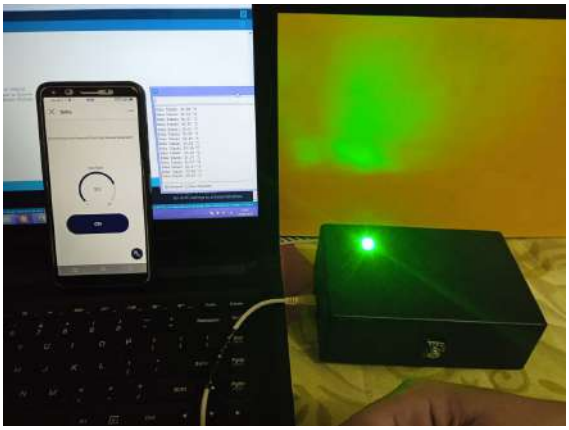

Figure10. Entire Hardware

3.2.1 Device Trial

After all components are installed and the program has been compiled, the next step is to test the tool. This testing is carried out in stages from series to series.

1. Testing the NodeMCU ESP8266 Microcontroller Circuit

To find out whether the NodeMCU ESP8266 microcontroller circuit is working properly, testing is carried out. Testing this section was carried out by providing a program to the NodeMCU ESP8266 microcontroller.

2. Downloader Programmer Testing

Testing this downloader circuit can be done by transferring program data from the computer to the Arduino microcontroller. The downloader is first connected to the PC, via the USB port. The program data is typed into the Arduino software using C language then compiled and downloaded to the microcontroller. If there are no errors in the downloading process, then the downloader and microcontroller used are in good condition.

3.3 Sample Testing

Testing the tool was carried out by entering the program into the NodeMCU ESP8266 microcontroller, then testing the tool on five people by reading the temperature value for each person. It can be seen in figure 11.

E-ISSN : 3024-8752
P-ISSN : 3024-8744

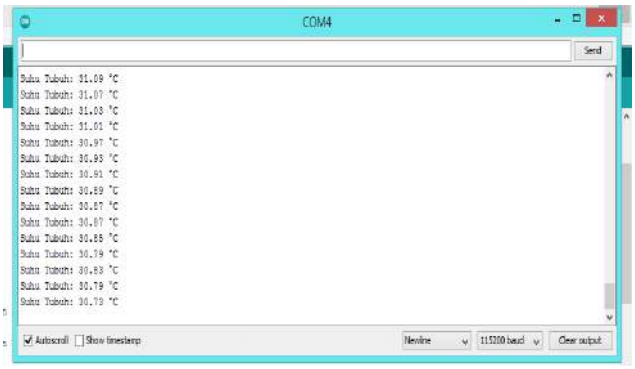

Figure 11. Tool Design Testing

And the results can be seen in Table 1

Table 1. Sensor Test Data

NO	Data	Hasil Pengujian Suhu (C)
1	Orang 1	31.09
2	Orang 2	31.07
3	Orang 3	31.03
4	Orang 4	31.01
5	Orang 5	30.97

From the test results it can be seen that the temperature value for each person has an average value of 30.71-31.25 Celsius.

3.4 Blynk Output Results

The application output results are designed using the Blynk application, where the Blynk application can be downloaded via Google Playstore. It can be seen in figure 12. The Blynk application functions as an output to display the results of testing temperature values

Figure 12. Blynk Application Output Results

4. CONCLUSION

The NodeMCU ESP8266 functions as a controller, data receiver and data processor as well as a WI-FI signal receiver that can be connected to Android so that it can provide information on the human body temperature when detected by the Gy-906 sensor non-contactly. The Android smartphone functions as a display of the tool's reading results using the WI-FI communication system.

REFERENCE

[1] Widodo Budiharto. 2011. *Aneka Proyek Mikrokontroler.* Graha Ilmu. Yogyakarta.
[2] Janner Simarmata. 2006. *Pengenalan Teknologi Komputer dan Informasi*. Andi Yogyakarta. Yogyakarta.
[3] Rusman Hakim. 1998. *Belajar Sendiri Mengenal Sistem Komputer*. Gramedia.Jakarta.
[4] Sudjadi, 2005. *Teori dan aplikasi mikrokontroler*. Graha Ilmu. Yogyakarta.
[5] Syahwil, Muhammad. 2013. *Panduan Mudah Simulasi & Praktek Mikrokontroler Arduiono.* ANDI OFFSET. Yogyakarta.
[6] Situmorang, Marhaposan. 2011. *Dasar-dasar Mikrokontroler MCS-5.* USU press. Medan.
[7]P. Insap Santosa. 1991. Teknik Digital. Andi Yogyakarta. Yogyakarta.
[8]R. Harso Adjie. 2013. *Merancang USB I/O Board Menggunakan Chip PIC 18F4550.* Graha Ilmu. Yogyakarta.
[9] Sugiri, Satria. 2008. *Belajar Sendiri Merakit Komponen Komputer.* Andi Offset. Yogyakarta