



## Purwarupa Cleaning Room Web Based ICU (Intensive Care Unit)

Predyus Fan Suhery<sup>1</sup>, Ritzkal<sup>2</sup>, Ade Hendri Hendrawan<sup>3</sup>

<sup>1,2,3</sup>Technical Information

<sup>1,2,3</sup>Faculty Of Engineering And Sanis, Ibn Khaldun University Bogor, Indonesia

E-mail: [fredyus1994@gmail.com](mailto:fredyus1994@gmail.com)<sup>1</sup>, [ritzkal@ft.uika-bogor.ac.id](mailto:ritzkal@ft.uika-bogor.ac.id)<sup>2</sup>, [hendri@ft.uika-bogor.ac.id](mailto:hendri@ft.uika-bogor.ac.id)<sup>3</sup>

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### ABSTRACT

The Intensive Care Unit (ICU) is a part of an independent hospital (an agency under the director of service) a special room provided by the hospital, of course a very special room has special staff and special equipment with the aim of treating patients suffering from various diseases such as critical, injury or diseases that threaten life or potentially life threatening with the prognosis dubia. This room is very well maintained and maintained, for example, if someone wants to visit a patient who is sick who has been operated in the room (ICU), of course the conditions must be fulfilled by the visitor. For example the visitor must wash their hands and other provisions. In this study the authors designed and making a vacuum cleaner control prototype or commonly called a vacuum cleaner, to make it easier for hospital cleaning service workers, especially room cleaning services (ICU). The problem of this research is how to make a prototype tool that is controlled by Android and can send reports to the Web. This research includes several stages, the stages of analysis, the design stage, the implementation or implementation stage and the last stage is the testing stage. Current technological developments make it possible to automate the use of a vacuum cleaner which has been too troublesome in the manual way. Then an automatic vacuum cleaner was designed whose movement is directly controlled by the RC Control application, connected using Bluetooth and android we can control via Buton buttons which is already in the application, and in the application button there are several buttons that can be controlled such as the tool button moving back and forth, left and right and the vacuum cleaner button. when sending a report to the website that the vacuum cleaner tool is turned on. WEB only displays reports when the tool is turned on in the form of active tool time.

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## 1. Introduction

One of the services at the hospital is the Intensive Care Unit (ICU) service. Currently the service in the ICU is not limited to treating post-surgical patients only but also includes various types of adult patients, children, who experience more than one organ function / failure. These patients come from the Emergency Room, Operating Room, Care Room, or dispatch from other hospitals, the ICU room can be said to be very well maintained and maintained and very closely guarded by hospital security, not random people can enter, therefore, in This research is to make a web-based floor cleaning prototype which will simplify the job of a janitor or the term cleaning service [1]

Tool prototypes are used to more efficiently manage time and do not need a lot of human hands to do it from these problems, to develop room cleaning prototypes with the development of information using prototypes and sending reports to the WEB making cleaning workers more efficient, easier and controllable by Android.

Based on previous research, the author will make a study and design a vacuum clener that moves freely and is controlled by android while in the ICU room and can clean dust particles on the floor. For prototypes, designers use various types and modules such as the Arduino Mega 2560 as the control module, theBluetooth module as a connection to android and the Nodemcu module as a data sender to the Web via Wi-Fi (Wireless Fidelity). Based on the background, the problems of this thesis can be formulated into: (1) How to design an ICU (Intensive Care Unit) cleaning prototype using the Arduino Mega 2560 ?, (2) How can a room cleaner prototype send reports to the Web via a WiFi network (Wirelles Fidelity) ? The objectives of this study are as follows: (1) Build and create a series of Intensive Care Unit (ICU) Cleaning Equipment Prototypes with



Arduino Mega 2560, (2) Creating a Web that is connected to a Dust Cleaner Prototype Tool and storing the results of data reports hours of work on the Database Server.

## 2. Research Method

The research method used is the experimental method. This research method aims to make observations that are interrelated between cause and effect. The method in this study is as follows.

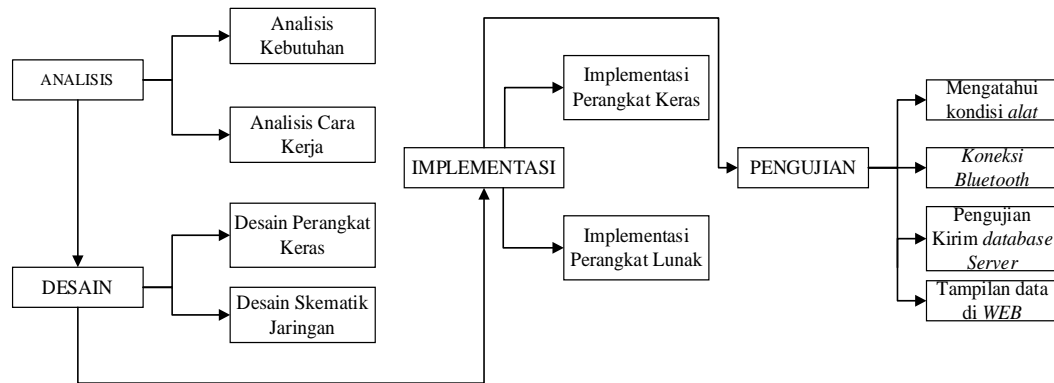


Fig 1. Research Method

## 3. Result

### 3.1 Analyze how it works.

In the process of working, it will explain how the system works in this study. The following figure will explain the analysis of how it works in this system.

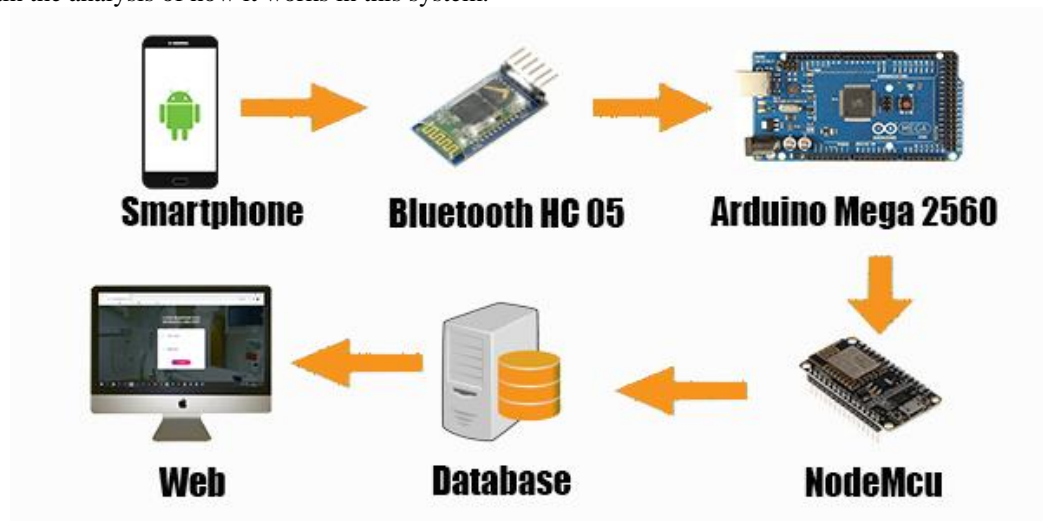


Fig 2. How the System Works

Figure 2 explains how this research system works by turning on the Smartphone RC Control application so that HC 05 can be connected if it is connected, then the next step is the RC control application will be connected via Bluetooth so just move the tool via a smartphone when the vacuum cleaner tool is active, NodeMcu sends data. to the database and the database displays to the Web Interface data

### 3.2 Design

#### 1) Schematic diagram

At this stage several schematic diagrams related to research are carried out, starting from the overall diagram, the Bluetooth schematic diagram with the Arduino Uno, the Arduino Uno schematic with the

L298N Driver, the Arduino Schematic with the L298N Driver and the DC Motor. The following are some of the schematic diagram stages in this study :

The device used in the overall system schematic diagram is as in table 1 and Figure 3 shows the circuit is divided into 3 stages (1) Bluetooth HC 05 circuit diagram with Arduino UNO and stage (2) L298N driver diagram circuit with Arduino UNO (3) circuit diagram vacuum clener and Arduino UNO.

**Tabel 1**  
Diagram Skematika Sistem Keseluruhan

No	Device	Function
1	Arduino Uno	To process L298N driver data, Bluetooth and Vacuum Cleaner.
2	NodeMcu	To connect Arduino to a web server, use a wireless network or it can be called a wireless network.
3	Driver L298	can control the direction of rotation of the DC motor speed.
4	Vacum cleaner	Vacuum cleaner.
5	Motor DC	Move the vacuum clener while walking through the room.
6	Bluetooth HC 05	Android smartphone connector.

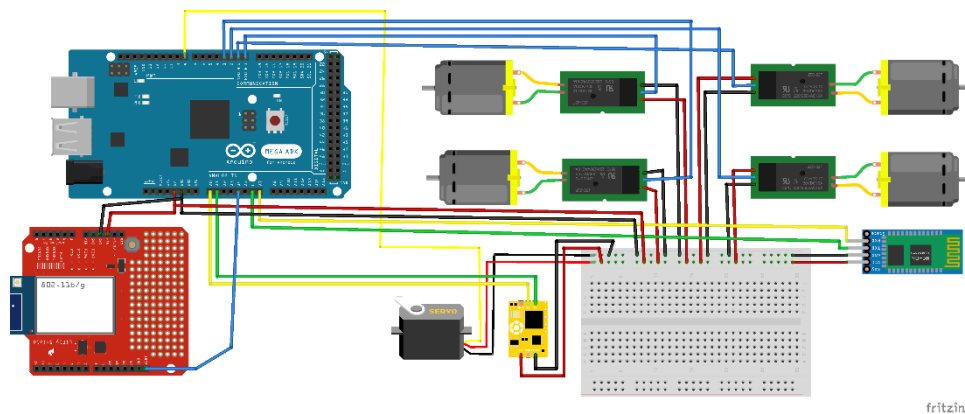


Fig 3. Schematic diagram

2) Network Design.

The network design of the room cleaning tool shows that Arduino Uno shows that it receives data connected to a vacuum Clener and a DC motor to give instructions to Esp / NodeMcu and send data to the server

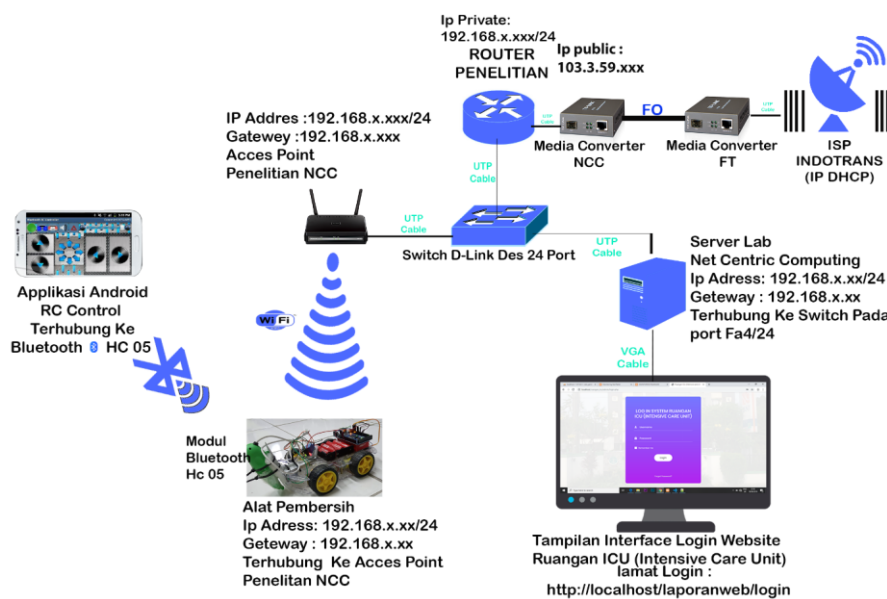


Fig 4. Network Design



In Figure 4 is a network design of a room cleaning tool made acrylic controlled via Android, to connect Arduino Uno to a server using a Wireless Fidelity (WiFi) network with the NCC Research Access Point and save data to the Net Centric Computing server database.

### 3.3 Testing

At this stage all the features that have been made are tested. The system is monitoring tools working and cleaning the room. The first thing (1) is to position the tool on the floor to be ready to be moved / controlled.

#### 1) Positioning the tool to the room / floor

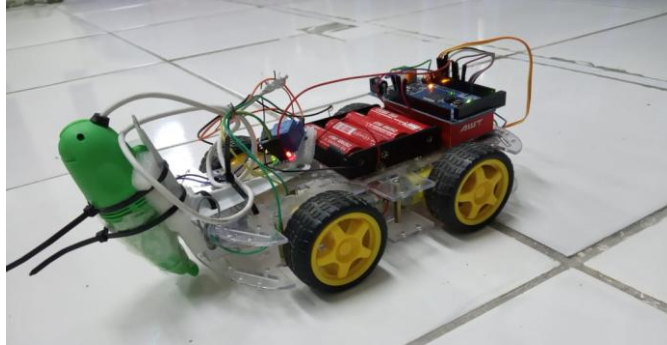


Fig 5. The tool is ready to move

#### 2) Control Application

Figure 6 explains that the control tool is activated by connecting to the Bluetooth network by pressing the green button above the left corner of the application, if it is green, it means that the device is synchronized and connected.

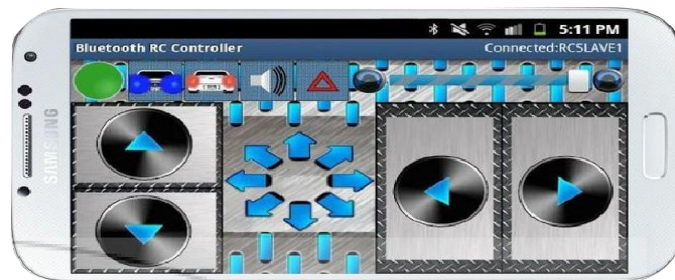


Fig 6. Control Application

#### 3) Check the serial monitor on Arduino

Figure 7 explains that before checking on the database or web, first checking on the serial monitor and having to connect to the localhost server address as shown in Figure 7 and the cleaning tool must connect to the Hospital WiFi with IP 192.168.xx.xx so that it can be sent to the database server

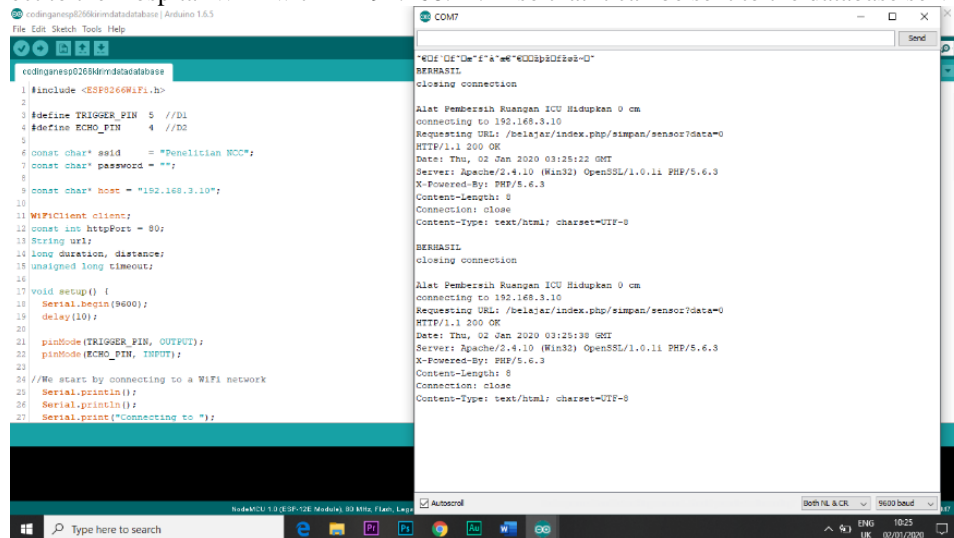
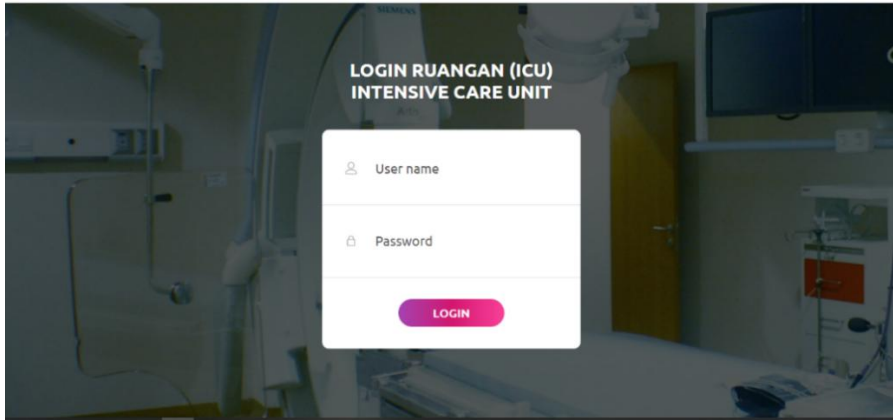


Fig 7. Check the serial monitor on Arduino

**3.4 The second stage (2) checks the tool data via the web**

**1) Initial Display Web Login Interface.**

It shows that the initial appearance of the ICU room login web (intensive Care Unit) web interface consists of a login and a tool's Working Hours display.



**Fig 8.** Initial Display Web Login Interface.

**2) Display of Active Tool Hours Report.**

No	ID alat	Data Alat	Waktu dan tanggal alat Bergerak
1	189	0 di nyalakan	20-Jul-2020 16:20:56
2	190	0 di nyalakan	20-Jul-2020 16:21:12
3	191	0 di nyalakan	20-Jul-2020 16:21:28
4	192	0 di nyalakan	20-Jul-2020 16:21:44
5	193	0 di nyalakan	20-Jul-2020 16:22:00
6	194	0 di nyalakan	20-Jul-2020 16:22:16
7	195	0 di nyalakan	20-Jul-2020 16:22:32
8	196	0 di nyalakan	20-Jul-2020 16:22:48
9	197	0 di nyalakan	20-Jul-2020 16:23:04
10	198	0 di nyalakan	20-Jul-2020 16:23:19
11	199	0 di nyalakan	20-Jul-2020 16:23:35

**Fig 9.** Tool Hours Display

**4. Conclusion**

Based on the discussion and results of this study, the following conclusions were obtained (1) Making a Physical Design of an Intensive Care Unit (ICU) Clean Room using the Arduino Mega 2560 and starting with Needs Analysis, Schematic Design, Software Implementation / Hardware and Bluetooth Connection Testing, Database Server, Data appearing Web Interface. (2) The Intensive Care Unit (ICU) room cleaning prototype is only limited to the initial form, which is when this tool is turned on and controlled through the RC control application and the tool sends data to the website and the results of the report are in the form of working hours.

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