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DESIGN AN ARDUINO-BASED VEGETABLE PLANT WATERING SYSTEM WITH SOIL MOISTURE SENSOR

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ABSTRACT

Light controllers in a room be it in a home, school, warehouse, or building can provide reports within a certain time span. With the control of the tools in the room, such as LED lights used at night and servos with valves that can open and close during the day, requires further supervision and control of the tool because its use will always be used when the room is not empty (filled with humans). The monitoring and control system on this device has two control systems, namely with automatic and manual control. When the automatic control is active it will break the manual control and will work with the system that has been created. Automatic control in this tool is only used in LDR sensor modules and LED lights, where when the sensor detects the presence of light then the LED will die and vice versa. The results of the values and conditions will be directly displayed in the Blynk application. When manual controls are active, the system can also be used in conjunction with automatic controls and controls are in the Blynk application. And for manual control is only used to control light in LED lights and servo only.

Keyword:
Node MCU
Monitoring
Control
IoT

1. INTRODUCING

In the field of technology and control in a system lately developed with technology that can produce new innovations and lead to better direction[1]–[3]. This can be seen from household electrical appliances that can be controlled remotely[4]–[6]. So that the technology can help and relieve humans in controlling istems and tools manually and automatically[7]–[9].

Media that can be utilized in improving the efficiency of work is the internet. Internet provides various functions and facilities that can be used as information and communication media. The development of technology that can be utilized from the existence of internet interconnection is able to maximize the operation of electronicase that can be operated inonline through the website orpunapasiasimobile. So that it can be easy to accommodatenamemantauataupun controlling the management of imagination and anywhere with a location that will be prepared technologykendalijarakjarak The system is far away, making it easier for users inmengontrolpencahayaanlampubaikrumahataupungedung which is a short distance away from the location.

The Internet of Things (IoT) is a concept that aims to expand the benefits of connected internet interconnectivity[10]–[12]. So that the technology of the world in a room also experienced previous developments using the power that is electrified becomes a can sourced from power or the top of the world. Node MCU is an Internet of Things (IoT) platform that is A Source. Node MCU can be analogous to the Arduino board ESP8266, which consists of hardware in the form of System on ChipESP8266 from esp8266 made by Espressif System. The firmware used uses the Lua Scripting

programming language. The term Node MCU by default actually refers to the firmware used rather than the hardware development kit[13]–[15].

This control system technology is needed by reviewing all aspects both of the level of energy efficiency and time and in terms of saving electricity used. In performing the control task, one only needs to do it from a computer or mobile device that already has a system or software features that have been built or designed[16]–[19]. By utilizing the connection from the internet combined with Node MCU and LDR Sensor Module (Light Sensor) is expected to later be able to control the lighting of lights in Tubular Daylight contained in the house[20].

IoT (Internet of Things) is a concept that aims to expand the benefits of continuously connected internet connectivity. As for capabilities such as data sharing, remote control, and so on, including objects in the real world. For example, food, electronics, collections, any equipment, including living objects that are all connected locally and globally through embedded and always-active sensors.

2. RESEARCH METHODS

The design of this whole suite of tools consists of several important elements that are integrated into each other. These important elements are input circuits, controller circuits, output circuits and also software used to program. A series consisting of electronic components either in the form of inputs or outputs needed by microcontrollers in order to function properly. The entire suite of tools can be seen in the following image

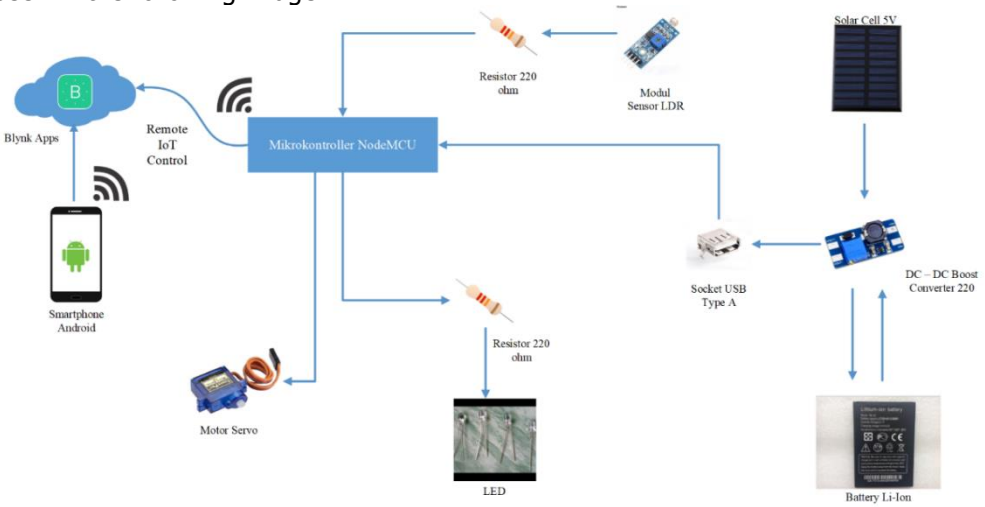

Figure 1. Overall Suite of Tools

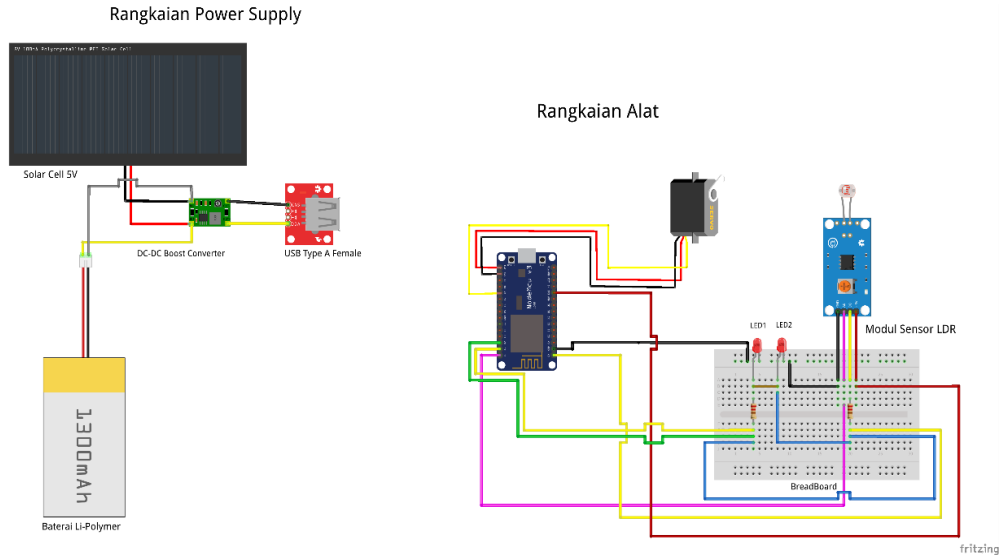

Figure 2. Schematics of The Whole Suite of Tools

3. RESULTS AND ANALYSIS

Flowchart diagram is a type of diagram that represents algorithms, work flow or processes, which displays steps in the form of graphical symbols, in the flowchart diagram below explaining how the tool works and processes while working

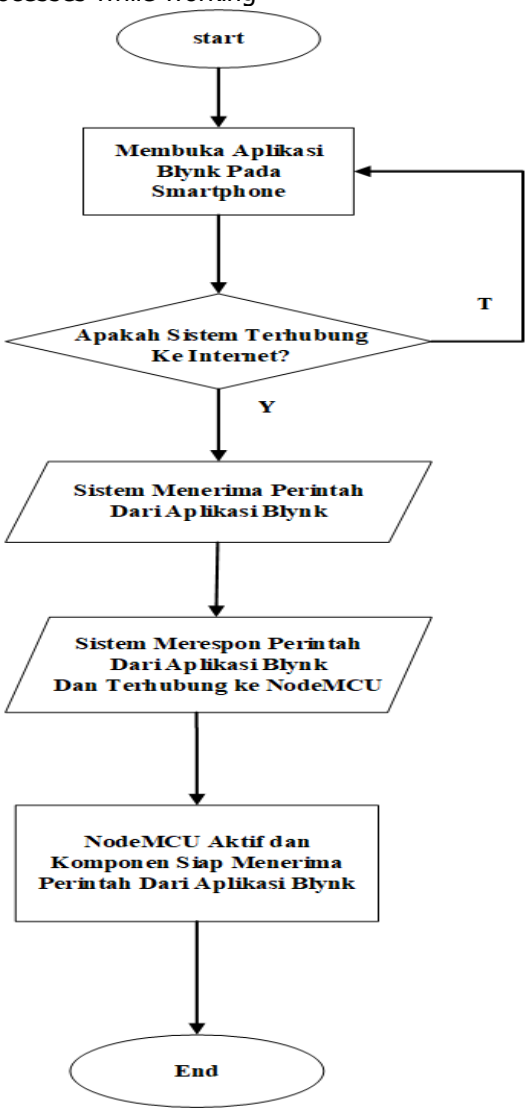

Figure 3. Flowchart on Applications

1. At the beginning of the system will prepare all components such as NodeMCU, LDR Sensor, Servo, and LED Lights that are connected to each other.
2. The system will display its values and conditions, whether the condition is High / Low.
3. If the LDR Sensor receives input in the form of light <500 and >500 it will display the values and conditions of High (Dark) and Low (Light), if the light inputs below <500 will display low values and conditions (Light) then the LED light can turn off automatically. Vice versa if the light inputted above >500 will display high (Dark) values and conditions then the LED light can turn on automatically.
4. Open the blynk application then press the previously created button to execute the command until the system receives commands from the blynk application to activate the components on the tool in accordance with the commands that can be from the blynk application.

The design of buttons in this application is very important, because later that is used as light control is able to be a button that has been determined by the pin so that the user can easily control it. Here are the buttons found in the app.

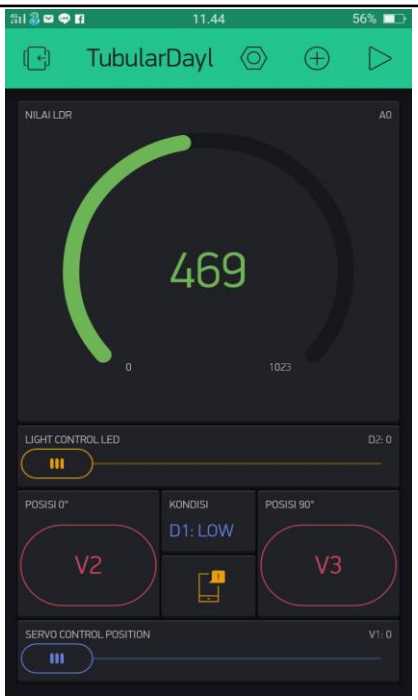

Figure 4. Buttons Found in The Application With Pins

1. Pin A0 in the application is used to read the values on the LDR sensor.
2. Pin D2 in the application is used to adjust the lighting on LED (Bright / Dim) lights used at night.
3. Pin D1 is used to read the conditions of the LDR (High/Low) sensor.
4. V2 pin is used to move the servo at 0o (Close).
5. The V3 pin is used to move the servo at the 90o (Open) position.
6. The V1 pin is used to move the servo at various angular positions ranging from 0o to 180o angle.

The purpose of microcontroller testing on this tool is to find out if the tool that has been made can function properly and is in accordance with its design. Testing on this tool includes testing of each block as well as testing as a whole. Testing of each of these blocks aims to find out the location of errors and facilitate in microcontroller analysis in case of damage.

This test is done to find out if wifi connectivity from NodeMCU Microcontroller to Smartphone can run well by connecting authentication codes from Blynk, SSID and Password applications on smartphones.

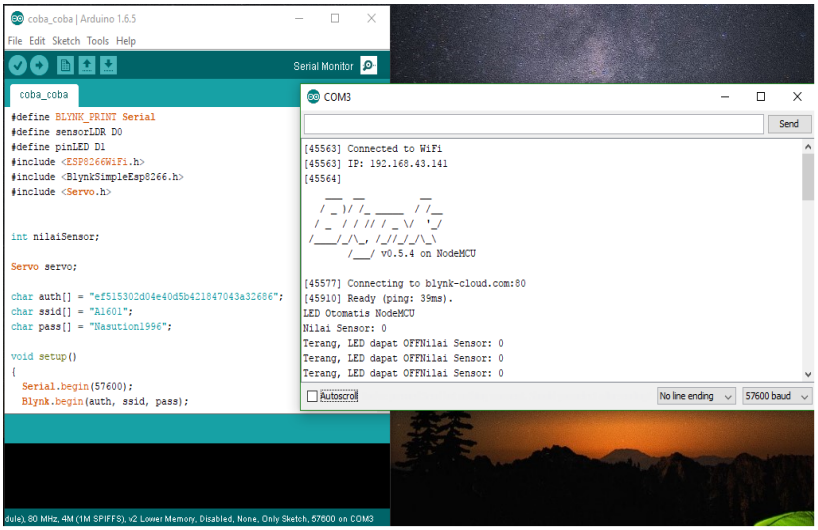

Figure 5. Wifi Connectivity on Tools

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The use of servo motors in this tool is used to open and close like the valve. When we want to open it to get light from the sun during the day, we only need to press the button listed in the application that is for the open button to press position 90^0 then the valve of the servo will open with an angle of 90^0. If you want to close it again just need to press the position 0^0 button then the valve of the servo will close with an angle of 0^0. And if you want to set the lighting during the day, then you can set it with the slider button (Servo Control Position) contained in the application, namely with an angular rotation from 0 to 180^0. The results of the trial at angles 0^0, 40^0, and 90^0 can be seen in the image below.

Figure 6. Servo Trial At Corner 0^0

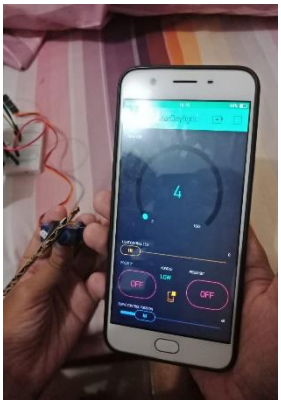

Figure 7. Servo Trial At Corner 40^0

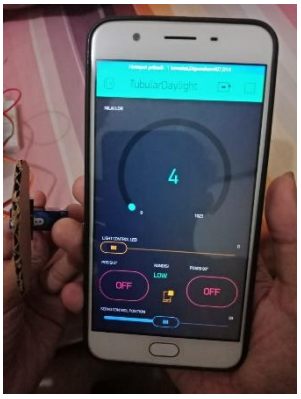

Figure 8. Servo Trial At Corner 90^0

4. CONCLUSION

Based on the results of this study, it can be concluded that the results of the investigation have been completed. The results can be tested and the prototype can be used. But there are still many shortcomings and system errors due to the design and programming of rudimentary tools. However, in the process of doing research on this tool can be said to be successful because the tool is expected to work properly. It is expected to be developed by the next researcher. To be able to develop this tool, it is expected that developers can further modify the components and program algorithms used in the design of this tool The addition of more sensors so that the system can work more perfectly and more detailedly. Using a solar cell power supply whose battery capacity is larger and lasts longer. You can add a router if you want to get a wider internet connection.

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