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ELECTRICITY TOKEN VALUE BUTTON PRESSING SYSTEM ON HELPED PREPAID ELECTRICITY KWh METER BLUETOOTH USING MIT APP INVENTOR

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Abstract

The system of pressing the electricity token value button on the prepaid electricity kWh meter is a tool that works by filling in the electricity token value via smartphone with the MIT APP Inventor server which aims to make it easier for prepaid electricity users by not having direct contact with the prepaid kWh meter. In general, filling in the value of electricity tokens is still done manually and what happens is that there are still many people who experience problems with distance and are afraid to top up the value of electricity tokens manually. This research aims to create a control system for pressing keypad buttons on prepaid kWh meters. The control system uses Arduino Uno with the MIT APP Inventor server as input from the smartphone. Data sent from the smartphone will be received by the Bluetooth Module which is processed by the Arduino Uno as a microcontroller to control the relay driver as a selonoid controller, the selonoid as a button press will work by inputting the electrical token value that has been input. The research results show that a system of pressing the electricity token value button on the prepaid electricity kWh meter has been realized. Testing is carried out by operating and testing the tool functionally and the performance of all components as well as realizing that the tool is successful and the tool works as expected.

Keywords: MIT APP Inventor, Keypad, Smartphone

INTRODUCTION

Prepaid electricity is a form of technology developed by PLN with the aim of making it easier for electrical energy users to manage usage via kWh meters. In using this prepaid electricity system, there are conveniences and drawbacks felt by prepaid electricity users. The convenience of using prepaid electricity is accessibility and comfort. The accessibility that can be felt by prepaid electricity users is that users can buy electricity tokens in the form of online bank payment points (PPOB) and at ATMs within a very large network coverage. One of the weaknesses of the prepaid method is the customer behavior aspect. Users still have to have direct contact (physical contact) with the prepaid kWh meter used, especially when filling in the electricity token value on the prepaid kWh meter. a part from that, along with the development of technology it certainly cannot be separated from smartphones. Which is a piece of software on the smartphone that consists of an operating system and core applications. In the button pressing system, the electricity token value on the prepaid electricity kwh meter with Bluetooth assistance uses MIT App Inventor software, where the software is a platform for creating free Android applications. At MIT App Inventour, to create applications by easily designing the desired appearance and programming the application, you don't have to learn or use quite complicated programming.

In research on the button pressing system for the value of electricity tokens on prepaid electricity kWh meters assisted by Bluetooth using MIT App Inventor using HC-05, which is a wireless (cableless) communication technology that works on the 2.4 GHz frequency band, which is capable of creating a data communication service. in the form of real-time sound. The input data sent by the smartphone via the MIT App Inventor application will be received by the HC-05 which will be processed through a microcontroller in the form of an output that will control a relay, a relay which is an electronic circuit which works with an input and output system in a control

circuit. From the input sent by the smartphone via the MIT App Inventor application in the form of data that will be processed by the microcontroller and the output via the relay will control the cellonoid. A selonoid is a device that can be controlled and performs linear movements in the form of electromechanical (AC/DC). which functions as pressing the button on Prepaid kWh.

METHOD

The working principle of the system for pressing the electricity token value button on a bluetooth-assisted prepaid kWh meter using MIT App Inventor has a working system as shown in Figure 1 with the following explanation,

a. Getting started is the first step in the program. What is done at this stage is to register each component pin configuration, library and parameters (variables) used.
b. The configuration on the smartphone's Bluetooth function is to connect the smartphone to the control.
c. If the connection between the application and the control is not yet connected, repeat the Bluetooth connection from the smartphone to the control.
d. Input the value of the electricity token that will be entered and display the variable n=20 in the application which will input the value of the electricity token in the form of a variable output that will be received by the control box.
e. If the value of the electricity token value variable is wrong or not n=20 then repeat the input.
f. Set the input component on the HC 05 bluetooth module and connect it as a relay output where the Relay has ON status if it is given logic 1 from the microcontroller and the Relay will have OFF status if the logic value is 0 for the output on the selonoid.
g. The input will read the signal sent by the Bluetooth module and then convert it into a value, this stage is called the quantization stage. After quantization, it then enters the variable evaluation process, in the form of input from the server to the HC 05 bluetooth.
h. After the evaluation stage, the execution stage is carried out. The value execution is carried out based on the distance value between the server connection and the HC 05 bluetooth. If a problem occurs when the server is connected to the HC 05 bluetooth, then the execution carried out is to repeat the input and output stages. If there are no problems with the value obtained, the output, namely the selonoid, will work according to the input value of the electricity token.
i. When finished, the whole process is repeated by inputting the electricity token value.

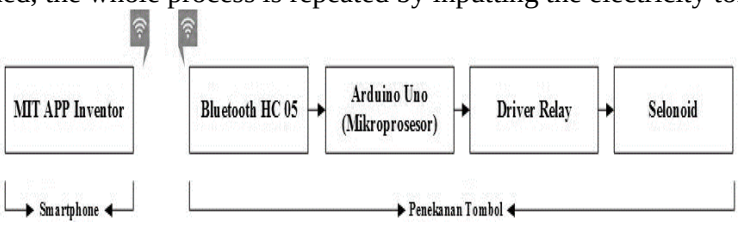


Figure 1. Block Diagram of Working System

RESULTS AND DISCUSSION

The system of pressing the electricity token value button on the Bluetooth-assisted prepaid electricity kWh meter uses MIT App Inventor which aims to operate charging the electricity token value without direct contact with the keypad. MIT APP Inventor is a software that can be developed by smartphone users without having to master coding in detail and the MIT App Inventor application can be accessed for free so it can be applied by calibrating with the HC-05 as a system for pressing the electricity token value button on the prepaid electricity kWh meter. can be seen in figure 2. In creating the working system of the MIT APP Inventor I/O in figure 3, where after carrying out the design that we want, we then carry out a program on the design that we have designed in order to send the output of the application that we have created so that it is accepted. by input on the microcontroller. The program designed in MIT App Inventor will send data to the HC-05 in the form of variables which will then be processed by the microcontroller.

Figure 2. System Realization

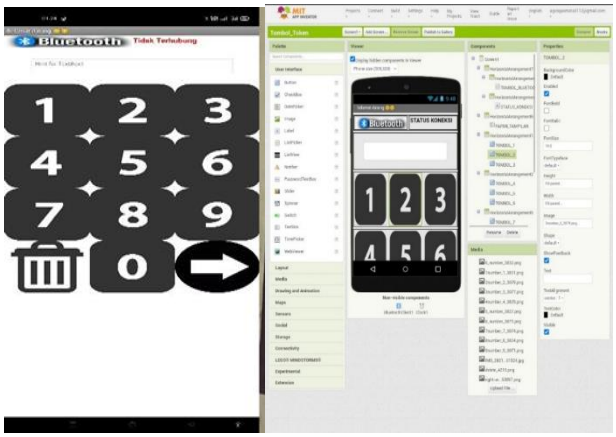
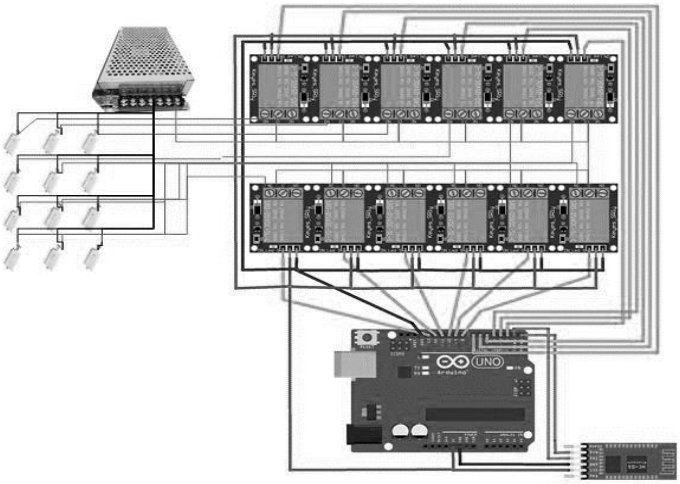


Figure 3. MIT App Invertor Design View

In Figure 4, this research uses an Arduino Uno microcontroller which uses Arduino IDE software to program the microcontroller. This software uses a language based on C programming and lists Arduino programs which are often known as sketches, "void setup ( )" { } and "void loop ( ) { }" there are two functions for each sketch in the microcontroller program.



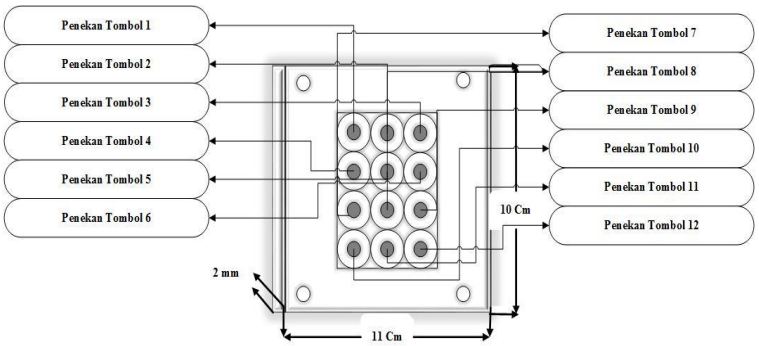


Figure 4. Relay Driver Circuit on Selonoid

In Figures 3, 4 and 5 you can see the appearance of the MIT APP Inventor and the relay output circuit to the cylinder as the operation of the suppression system. There is HC-05 which aims to receive input from smartphones as seen in Figure 5 and the display in Table 1, namely the results of tests carried out to ensure Bluetooth is working properly. Testing is carried out in the presence of obstacles or with all obstacles such as walls and glass. The Bluetooth and MIT APP Inventor module testing can be seen as in Table 1.

Table 1. MIT APP Inventor Testing

No	Distance (m)	Obstacle			Note
		Wall	Glass	Air	
1	1 m	*Connect*	*Connect*	*Connect*	*Valid*
2	2m	*Connect*	*Connect*	*Connect*	*Valid*
3	3m	*Connect*	*Connect*	*Connect*	*Valid*
4	4m	*Connect*	*Connect*	*Connect*	*Valid*
5	5m	*Connect*	*Connect*	*Connect*	*Valid*

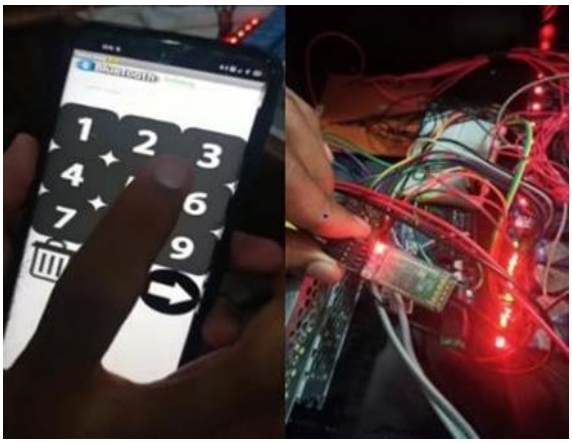
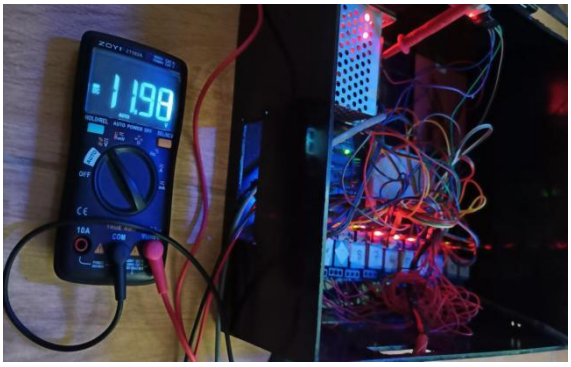


Figure 5. HC-05 Module Testing

In table 2 and figure 6, the power supply testing aims to determine the power consumption required by the equipment in the research. Power supply testing is carried out by recording the voltage and current values using a multimeter measuring instrument.

Table 2. Power Supply Testing

No	Relays	V		A	Watt	s
		Inputs	Outputs			
1	Relay 1	12	11.98	0.44	5.27	2
2	Relay 2	12	11.97	0.43	5.14	2
3	Relay 3	12	11.98	0.48	5.75	2
4	Relay 4	12	11.96	0.38	4.54	2
5	Relay 5	12	11.97	0.47	5.62	2
6	Relay 6	12	11.98	0.46	4.19	2
7	Relay 7	12	11.97	0.36	4.30	2
8	Relay 8	12	11.97	0.48	5.74	2
9	Relay 9	12	11.95	0.47	5.61	2
10	Relay 10	12	11.98	0.38	4.55	2
11	Relay 11	12	11.97	0.48	5.74	2
12	Relay 12	12	11.98	0.47	5.63	2



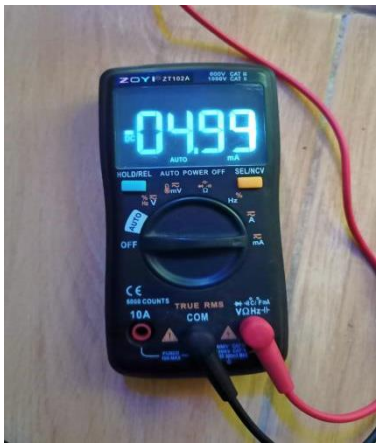


Figure 6. Power Supply Testing

In Figure 7, the selonoid test is an output where the input is determined based on the value inputted via the MIT APP Inventor. It works as desired with the selonoid output, a server connected to Bluetooth with a limited distance that controls the relay for the output on the selonoid works according to which are desired. The test can be seen in table 3 below.

Table 3. Overall Testing

No	Knob	Relays	Selonoid	Note
1	1	Relay 1	Selonoid 1	Valid
2	2	Relay 2	Selonoid 2	Valid
3	3	Relay 3	Selonoid 3	Valid
4	4	Relay 4	Selonoid 4	Valid
5	5	Relay 5	Selonoid 5	Valid
6	6	Relay 6	Selonoid 6	Valid
7	7	Relay 7	Selonoid 7	Valid
8	8	Relay 8	Selonoid 8	Valid
9	9	Relay 9	Selonoid 9	Valid
10	Wipe	Relay 10	Selonoid 10	Valid
11	0	Relay 11	Selonoid 11	Valid
12	Send	Relay 12	Selonoid 12	Valid

Figure 7. Relays and Selonoids

In the system of pressing the electricity token value button on prepaid electricity kWh meters with Bluetooth assistance using MIT App Inventor. The focus of this study is to develop a system for charging electricity token values on prepaid electricity kWh meters using the HC-05 Bluetooth distance sensor module, which in general, charges the value. Electricity tokens are still done manually and what happens is that many people experience problems with distance and are afraid to top up the value of electricity tokens manually. The function of this tool is to make it easier for prepaid electricity users by not having direct contact with the prepaid kWh meter and to provide more comfort and safety to prepaid electricity users.

On the other hand, various sensors that are widely available on the market can also be used to develop this research in the future. For the pressing system tool, namely the selonoid, it is necessary to pay attention to the specifications of the selonoid in order to determine the strength of the compressive momentum, where the selonoid itself will work when an electric voltage is supplied [4]. The HC-05 Module still has many limitations, one of which is distance. In the future, this can certainly still be studied in developing a system tool for emphasizing the value of electricity tokens on prepaid kWh meters.

CLOSING

Conclusion

The system for pressing the electricity token value button on the prepaid electricity kWh meter with Bluetooth assistance uses MIT App Inventor, which works by inputting the value of the electricity token using a smartphone using the MIT APP Inventor application server and processed by an Arduino Uno microcontroller with 12 cylinders as a keypad pressing system for kWh. prepaid electricity meter and Bluetooth connection as input using the MIT APP Inventor application on a smartphone. which aims to create a keypad button pressing control system on prepaid kWh meters with a control system using Arduino Uno and the MIT APP Inventor server as input from a smartphone.

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