

Internet of Things-Based Entrepreneurship Lockers

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Abstract— The development of the internet, which was originally only a medium of communication, is now more varied and sophisticated. An example of the development of the internet is Internet Of Things (IoT) , which in this study will discuss the implementation of IoT. As a form of pandemic recovery for IoT entrepreneurial activities, researchers developed lockers that can help entrepreneurial actors (especially on campus) to get up during the recovery period from the pandemic. The general concept of this locker is that the seller puts his merchandise into the locker and the buyer will pick it up by paying through QRIS. In other words, this locker provides convenience in transactions because it is done cashless. The design begins with making the work steps and logic flow of the locker which then makes the circuit scheme of the hardware. The hardware circuits used have their respective roles and support each other. This research hopes that with the IoT-based entrepreneurial lockers, it is expected not only to help partners / entrepreneurial actors on campus, but also attract new partners and encourage campus residents to dare to be entrepreneurs.

Keywords— Internet, Internet of Things, Lockers, Pandemic

I. INTRODUCTION

Internet is a communication media that is global in scale so that it can connect with each other no matter the distance [1]. The internet from year to year began to experience development, from the beginning which was only a medium of communication such as electronic mail, to become more

modern and varied [2]. The variations of internet development are numerous, from initially writing-based communication media to more interactive with face to face or chatting through devices[3].

Internet of Things (IoT) is a concept of how to unite various processes such as identification, networking, and computing with various technologies. Aiming to connect between devices / objects that can be accessed via the internet network and can be accessed anytime and anywhere as long as they have an internet network [4]. This provides effectiveness and efficiency in time and work[5]. This can enable large-scale innovation that can be applied to various things, such as health, smart city, smart home, process automation, etc [6]. Therefore, IoT provides a lot of convenience in 2022 because all advanced devices must have access to the internet, this supports the development of IoT[7].

The ease of internet accessibility in this day and age has begun to give rise to innovative findings, including the innovation of online sales stalls or what we more commonly know as online marketplaces or e-commerce [8]. In general, e-commerce is an internet-based business model where it gathers sellers and buyers on one web/application [9]. Because the meeting between buyers and sellers is done online, the transaction is done cashless[10].

Similar to the concept of transactions in e-commerce, the creation of IoT-based entrepreneurial lockers also implements cashless transaction features, namely using QRIS (Quick Response Code Indonesia Standard) as a payment method. This feature

is expected to reduce dependence on other people's services which in fact will also incur other additional costs. So that with this locker will reduce costs that can be minimized [11].

The implementation of information technology in the field of entrepreneurship will increase the attractiveness that has an effect on the emergence of new partners of entrepreneurship on campus, and provide new things for all aspects involved, especially by campus / school residents and for old partners [12]. With the recreation of IoT-based entrepreneurial lockers, it shows directly the ease gained in the application of IoT in terms of effectiveness and ease of transactions.

II. METHOD

The designed IoT-based lockers are entrepreneurial lockers that can be used by Micro, Small and Medium Enterprises (MSMEs), school/campus canteens, partners who want to cooperate, etc. The assembly

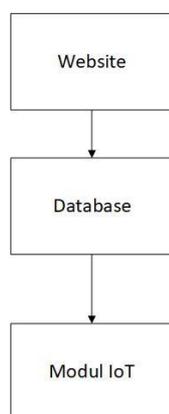


Figure 1. Working Process

details are as follows. The first step is to determine the IoT module and the outline of the working process.

After determining the work process, the next step is to test the development of the IoT module for entrepreneurial lockers shown in the flow chart below.

In the assembly, it requires Wemos Espduino, 16 channel relay, 12V 0,35A solenoid, 12V 5A adapter as much as 1 piece, and 3 female to male jumpers and 1 set of electronic screwdrivers. Besides hardware, it requires xampp software, text editor, and arduino IDE.

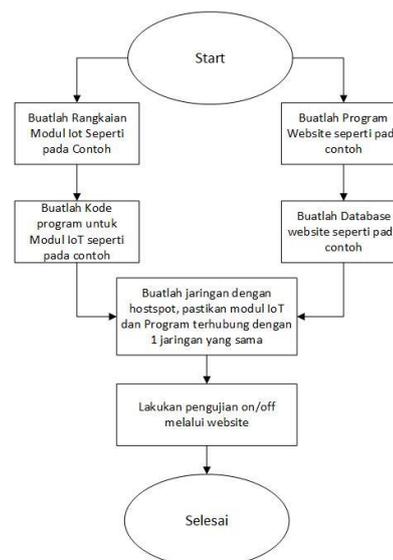


Figure 2. IoT module development

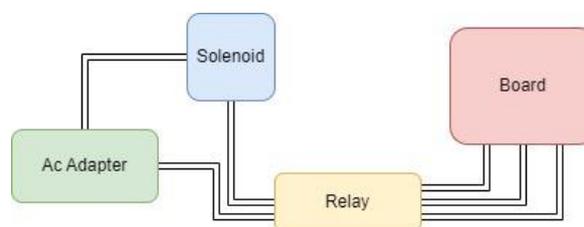


Figure 3. Hardware Assembly Schematic

a schematic overview of the hardware circuit is shown in figure 3.

After the assembly of the schematic circuit is complete, it can be continued by configuring in the Arduino IDE for adjustment

III. RESULTS AND DISCUSSION

The application of IoT in entrepreneurial lockers is designed with several hardware that can help run entrepreneurial lockers. In the picture below, is an adapter that functions as a motor drive in the relay. The use of a 12V 2A adapter serves as an additional power provider to the relay to move the solenoid.



Figure 4. Main Adapter

The relay used is a 16-channel relay, but only 12 channels are used to adjust to the adapter voltage and the number of solenoids. Relay is hardware that runs according to the principle of electromagnetics, relays move contactors to turn on or to turn off and vice versa with a source of electric power. The induction effect of the magnet arising from the electric induction coil makes the contractor open and close events. Then, the difference that distinguishes between relays and switches in general is during the process of turning on and off. If the process of turning on and off is done manually, the relay can do it automatically. In addition, relays have the function of protecting other hardware from



Figure 5. 16 Channels Relay

short circuits, helping to minimize voltage drops, and making the circuit simpler so that it is more concise. Solenoid used 12 pieces with each voltage 12V 0.35A each solenoid. Solenoid serves as the opening and closing of the locker door, the power to move the

solenoid is received through the power supply adapter. The way the solenoid works in general is when the coil gets an electric current that makes the coil produce a magnetic field, the magnetic field from the coil will trigger the plunger inside the coil to enter the center of the coil and compress the spring located at one end of the plunger. The speed and force of the plunger all depend on the magnetic flux strength of the coil. The electromagnetic field will disappear when the electric current is turned off, so the energy stored in the compressed spring will push the plunger out back to its original position. Solenoids are suitable for entrepreneurial lockers because these lockers



Figure 6. Solenoid

That way, the use of relay and solenoid modules becomes a combination of automation to open and close the locker where the relay will provide electric current for the solenoid to open and close.



Figure 7. Power Supply Adapter

The power supply adapter is used to supply power to the solenoid so that it can move. The division of power is flowed in parallel to each relay and solenoid, for solenoids need 12V 0.35A voltage. The division of power in parallel only divides the amperage, so using an adapter with a voltage of 5A is enough to open 12 solenoids with a voltage of 0.35A

The use of Wemos Espduino serves to receive signals from the internet which are then transferred to the relay to carry out commands from the user. Wemos Espduino is used as a signal receiver board because Wemos Espduino is a wifi-based module development board that supports the work steps of IoT-based entrepreneurial lockers. In

addition, there is a shield module as a plug and play hardware supporter that is easy to use.



Figure 8. Wemos Espduino

The presence of IoT devices with remote control can reduce physical interaction and speed up the work process. Because the adoption of IoT technology is expected to have efficiency and effectiveness in work

IV. CONCLUSION

In the development of IoT-based entrepreneurial lockers, researchers are looking for basic initial ideas based on circumstances that occur in the surrounding environment, especially the campus environment. The development of IoT-based entrepreneurial lockers is based on a pandemic that makes activities stop and must always keep a distance in the present. That way, it requires a tool that provides convenience in the purchasing process and does not cost much. Certainly, entrepreneurial

lockers provide the above 2 things, with cashless payments and no additional costs for employees due to job automation.

In developing lockers, the initial process is done by preparing hardware and schematics for the application of IoT-based entrepreneurial lockers. That way, it will provide convenience in the design and development of IoT-based entrepreneurial lockers.

With this locker, it will not only help existing partners, but will attract more campus residents because this will be the latest attraction to attract partners / students / lecturers / staff to take part. That way, entrepreneurial activities on campus become more varied.

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