

TELEGRAM IMPLEMENTATION ON SECURITY AND MONITORING OF HOME DOOR KEYS BASED ON WEMOS AND INTERNET OF THINGS

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Received : 15 September 2022, Revised: 14 October 2022, Accepted : 14 October 2022

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ABSTRACT

Good home security will make homeowners feel comfortable leaving the house. The existing home door security system still has weaknesses in certain types, for example for door locks using Radio Frequency Identification (RFID), if the RFID card is damaged, it will be difficult to unlock the door. The absence of a door lock monitoring system is locked or not when the user leaves the house will also reduce the user's sense of security and comfort. This study aims to improve the security of door locks by utilizing bots on the Telegram application installed on Smartphones as door lock controls and can make it easier for users to monitor the state of house door locks from anywhere with the concept of the Internet of Things. The telegram bot is used to send commands to open or lock the house door to the WEMOS D1 Microcontroller which then becomes the Actuator control in the form of a Solenoid Door Lock with a Relay as a connector. Thus the integration of the microcontroller and the Telegram application with the IoT concept can be a door security solution. However, it does not rule out the possibility of a security hole in the system created.

Keywords : Telegram, Security, Key, Door, Internet of Things

1. Introduction

Security is important (Muhaimin et al., 2020) in everyday life. Security provides comfort and peace for everyone so that they can carry out their daily routines well. Security can start from small things, namely home and family security (Salam & Bhaskoro, 2021). Therefore, the need for security in a house is an absolute basic need. The door is the first layer that protects the contents of the room, that's why the door must be equipped with security devices (Nugraha & Husen, 2019). The house key plays an important role in the home security system (Salam & Bhaskoro, 2021). So far, it is often known that door security uses a conventional lock which has two types, namely lever and cylinder locks. The digital key consists of a pin number lock and a remote key.

The current home door lock control security system uses a lot of conventional keys (Aditya et al., 2020), passwords/pins, and RFID (Hamzah et al., 2019). However, researchers still find problems, namely there are still weaknesses found in conventional locks, such as: keys are easily broken and duplicated, lost keys, forgotten passwords/pins, damaged remotes, damaged RFID cards, and the absence of a door lock monitoring system that has been locked or not locked yet (Siallagan & Tita, 2020). Even now, there is no monitoring system for the door lock that has been locked or has not been locked, which causes if the user has left the house (Lagan & Ary, 2021), and suddenly forgets to lock the door, the user must return home.

Based on the description above, the researcher wants to make a study that aims to overcome these problems by utilizing the telegram application installed on the Smartphone combined with Wemos, the internet network, and the C Programming Language with Arduino IDE software into a new tool to control and monitor door locks (Al-Okby et al., 2021). So, with this research, the door security system is better, and users can more easily control and monitor house door locks more easily because it is based on the Internet of Things (Radzi et al., 2020; Hoque & Davidson, 2019).

2. Literature Review

Several previous studies that discussed the security of door locks as a research reference, the research conducted by Dadang Haryanto and Bayu Nugroho entitled "Arduino Uno-Based Door Lock System With Knocking Rhythm". Based on the results of their research, it can be

concluded that this automatic door lock is able to open automatically after being given a rhythmic knock with the help of a Piezoelectric sensor (Nugraha & Husen, 2019).

Research conducted by Andhika Ghifari, Indra Permana Solihin et al is about "RFID Door Lock System And Password Based On Arduino Uno With One Time Password Through SMS". From the results of their research, the system created can minimize the crime rate in terms of door breaking, because this door lock system uses 2 levels of security that uses RFID and One Time Password which OTP delivery itself is sent via SMS when the RFID card is confirmed to be correct. The security of the RFID lock system can be added using a One Time Password by using the random function to generate a 6 digit OTP code which will be sent via SMS. And the system of this tool will notify the user via SMS when someone tries to break into the door.

Another research conducted by Asep Samsul Bakhri, Karya Suhada et al entitled "Design of a Doorlock System Using an IoT-Based Blynk Application A Case Study in Private Residential Houses". Based on the results of their research, it can be concluded that the use of an automatic door lock device using Wemos is more effective in improving home security and reducing the rate of forgetting to lock the door and being able to control the device using a Smartphone (Bakhri et al., 2021).

Research "Prototype of Open Closed Door Security System with Internet Of Things-Based Telegram Bot" researched by Tri Sakti and Imam Suharjo. From the results of their research, it was concluded that the percentage obtained in the system was 85%. Because the prototype can work well where the door can be opened and closed using a fingerprint scan microcontroller with internet of things-based telegram bot system security. Fingerprint goes well according to the concept that has been applied. However, there is still a delay in fingerprinting when scanning fingerprints. The telegram bot is running well but is still limited to only displaying messages that can't send requests to the web service. When doing a fingerprint scan, the telegram bot receives a door access message that is sent directly from the web service. Web Service runs well according to the concept. The NodeMCU ESP8622 microcontroller is in accordance with the concept designed by the author and is able to run a series of existing systems and can execute according to orders and well (Sakti & Suharjo, n.d.).

3. Research Methods

The method used in this research is SDLC. SDLC or Software Development Life Cycle is the process of developing or changing a software system by using the models and methodologies used by people to develop previous software systems, based on best practices or methods that have been well tested (Akinsola et al., 2020).

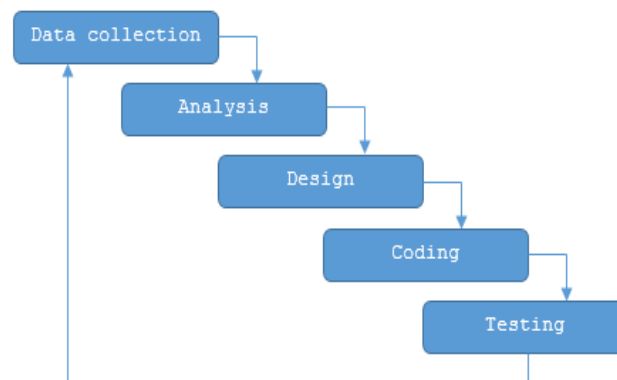


Fig 1. SDLC Method Diagram

1. Data Collection

At this stage, the Chief Researcher and research members collect data from books, journals, proceedings, and search engines related to the research title. The indicator achieved at this stage is the collection of all data related to the research title.

2. Analysis

At this stage, the Chief Researcher and research members analyze the hardware and software requirements needed to create a system based on previously collected data. The indicator achieved at this stage is that the hardware and software requirements that will be used in the system are known.

3. Design

At this stage, the lead researcher makes a general description of the system design such as Context Diagrams, Data Flow Diagrams, and Flowcharts for coding. In addition to the general system design, a detailed system design will be made such as the design of the system's physical form, and the electronic circuit schematic of the system made by research members. The indicators that will be achieved at this stage are the form of a general and detailed system design description that has been made. The design drawings of the physical system can be seen in Figures 2.



Fig 2. Physical Design

4. Coding

In this stage, the lead researcher collaborates with research members to create program code on Wemos using the C programming language with Arduino IDE software and create a telegram bot on the telegram application installed on the Smartphone. The indicator achieved at this stage is that the system has been included in the program so that when testing, the system can work well and according to research objectives.

5. Testing

At this stage, the system that has been created will be tested by the lead researcher and research members. The target indicator to be achieved at this stage is that the Telegram application can control (Haris Tri Saputra et al., 2022) and monitor door lock status remotely.

4. Results and Discussions

To get results that are in accordance with the design, a block diagram design is made consisting of input, processing, and output devices. The following is a block diagram design created to describe the system command flow.

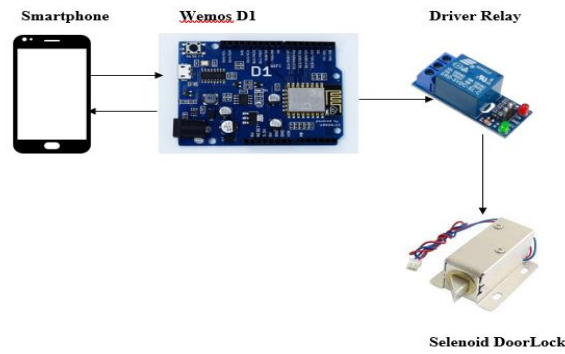


Fig 3. Block Diagram Design

Information :

1. Smartphone serves to send commands to open and close the door.
2. The command is sent to the microcontroller for further control of the actuator in the form of a solenoid door lock with a relay connector.

The following is an example of the program code applied to Wemos D1 using the C programming language with Arduino IDE software and creating a telegram bot on the telegram application installed on the Smartphone.

```

sketch_sep22a | Arduino 1.8.19
File Edit Sketch Tools Help
sketch_sep22a.g
}

void loop() {
  TelegramMessage msg;

  if (myBot.getMessage(msg)) {
    if (msg.text.equalsIgnoreCase("/start")) {
      myBot.sendMessage(msg.sender.id, "Halo...\nSelamat Datang Di Sistem Kontrol dan Monitoring Pintu.\nJan Lupo Subscribe Your
      myBot.sendMessage(msg.sender.id, "Gunakan Tombol dibawah ini untuk membuka dan mengunci pintu ☺", Tbl);
      Serial.println("\nUser memisai Bot \n");
      TampilkanTombol = true;
    } else if (msg.text.equalsIgnoreCase("Buka/Tutup Pintu")) {
      if (kunci == LOW) {
        myBot.sendMessage(msg.sender.id, "Pintu Sedang Terbuka\nApakah Mau mengunci pintu?", Tblploff);
        Serial.println("\nUser mengirim perintah 'kunci' \nPintu Sudah Terbuka \n");
      } else {
        myBot.sendMessage(msg.sender.id, "Pintu Sedang Terkunci\nApakah mau membuka pintu?", Tblpion);
        Serial.println("\nUser mengirim perintah 'kunci' \nPintu Sudah Terkunci \n");
      }
    }
  }
}
    
```

Fig 4. Coding

The results obtained after testing and implementation on the system are :

A. Initial View



Fig 5. Initial View

Figure 5 shows the initial view of the Telegram Bot connected to the device where the user will give orders to the system.

B. Door Lock Monitoring

Figure 6 shows the current condition of the door lock as initiation and monitoring of the lock condition for the user to open or lock the door.



Fig 6. Initial View

C. Unlocking and Locking the Door

The main function of this system is to monitor the condition of the door and give orders to open or lock the door.

1. Unlock The Door

The command to unlock the door and the output on the solenoid door lock can be seen in Figure 7.

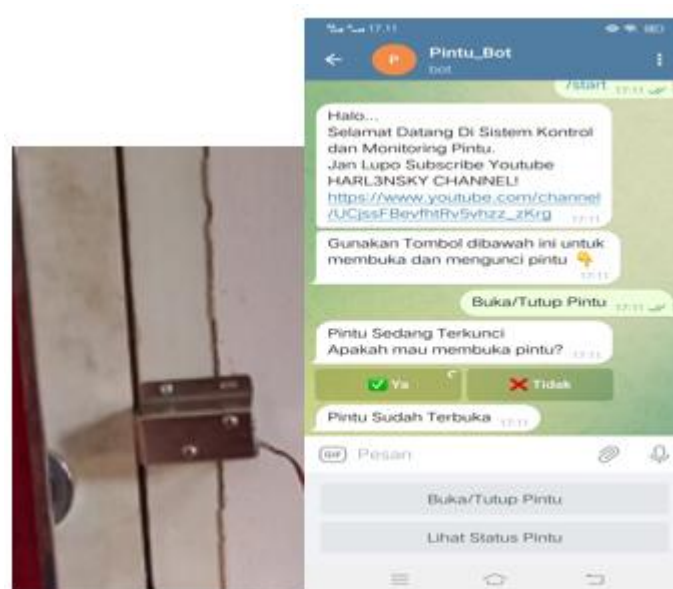


Fig 7. Unlock The Door

Figure 7 shows that the door lock has been opened, and will display the current status or condition of the door lock.

2. Lock The Door

The command to lock the door and the output on the solenoid door lock can be seen in Figure 8.

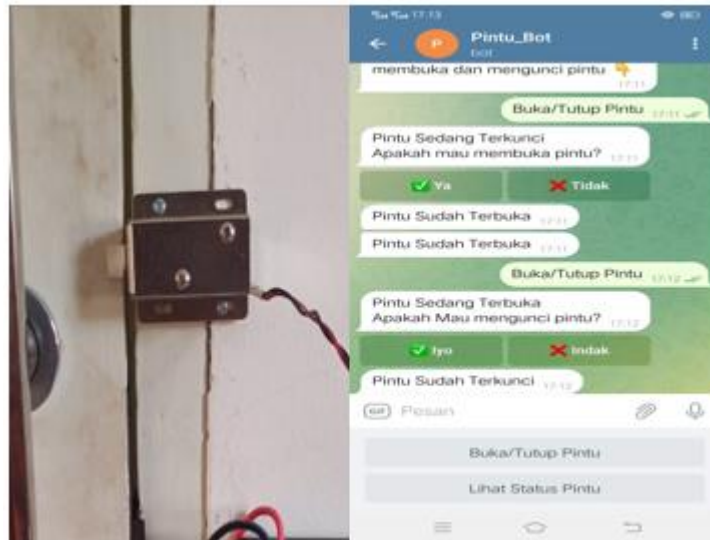


Fig 8. Lock The Door

Figure 8 shows that the door has been locked, and will display the current status or condition of the door lock.

5. Conclusion

Based on the research that has been done, it can be concluded that the control and monitoring system for house door locks with a combination of WEMOS D1 microcontrollers, Telegram, and Internet of Things-based can work well and the results are in accordance with the design made.

Acknowledgement

The researcher would like to thank RISTEK-BRIN which has provided funding for this research, and thanks also to the academic community of Hang Tuah University Pekanbaru who have always supported in conducting this novice lecturer research.

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