Interface Analysis of Bullying Monitoring Systems for Students in Avicena Rajeg School

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Abstract

The Emergency Panic Button tool has been developed to provide quick response and accessibility in emergency situations. In this research, we designed and developed an Emergency Panic Button tool using the Arduino ESP32 Devkit V1. This tool allows users to easily trigger emergency signals, send help messages to Telegram, and includes user location information and monitoring of the user's body temperature. The development method includes the integration of electronic components such as buttons, communication modules such as GSM or Wi-Fi, and body temperature sensors. We use Arduino ESP32 Devkit V1 as the main platform and utilize the Telegram API software to send help messages to specified contacts. In this research, we study the theoretical foundations related to emergency systems, Arduino technology, integration with the Telegram API, and user body temperature training. We design and implement tools by developing Arduino programs that allow training panic buttons, sending emergency messages to Telegram, acquiring locations using GPS modules or other methods, as well as training the user's body temperature using temperature sensors.

Keywords *— Emergency Button, Arduino Devkit V1, GPS, Telegram, Temperature Sensor*

1. INTRODUCTION

In this modern era, individual security and safety is a major concern. In an emergency situation, rapid response and effective accessibility can play a crucial role in ensuring the well-being and life of survivors. Therefore, the development of the Emergency Panic Button tool is important as a solution to provide fast and efficient assistance in emergency situations. In this research, we focus on developing an Emergency Panic Button tool that uses the Arduino ESP32 Devkit V1 as the main platform. Arduino ESP32 Devkit V1 was chosen because of its ability to integrate various electronic components and interact with communication modules such as GSM or Wi-Fi. This tool is also designed to send emergency messages to Telegram, a popular instant messaging application that can be easily accessed by various devices. In addition, we also consider the importance of obtaining user location information in an emergency situation. Therefore, we integrate a GPS module or other methods to acquire accurate user location information. The location information obtained will form part of the emergency messages sent to Telegram, thereby assisting the authorities in providing timely assistance. Apart from monitoring the user's location, we have also introduced monitoring the user's temperature as an important element in the Emergency Panic Button tool. User temperature monitoring is carried out using a temperature sensor connected to the Arduino ESP32 Devkit V1. This enables real-time detection of the user's body temperature, which can

provide important information regarding the user's health condition in an emergency situation. In this research, we aim to design, develop, and test an Emergency Panic Button tool that is effective, responsive, and reliable. This tool is expected to provide fast and accurate assistance to users in emergency situations, as well as provide important information such as the user's location and body temperature. Through the development of this tool, we hope to improve individual safety and provide timely assistance in emergency situations.

2. PREVIOUS RESEARCH

2.1. System

According to Abdul Kadir (2018), the system is a series of formal procedures where data is grouped, processed into information, and distributed to users.

According to Bambang Hartono (2019), a system is a set of various parts or elements that are interconnected in an organized manner based on their functions, to become a unit.

2.2. Arduino

According to Kadir (2016) in his book entitled "Arduino Simulation" argues that Arduino is hardware as well as software that allows anyone to make prototypes of microcontroller-based electronic circuits easily and quickly. Arduino provides an easy-to-use software development environment, and a variety of modules and components that can be connected to create complex electronic systems. Arduino ESP32 Devkit V1 is a variant of the Arduino board that supports Wi-Fi and Bluetooth connections, and has higher capabilities in terms of processing and communication.

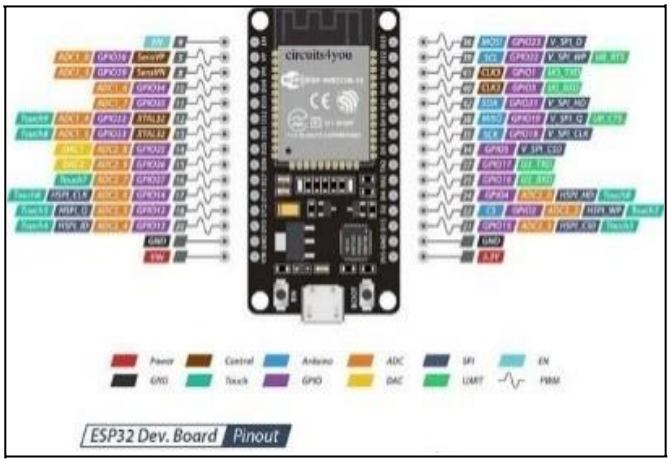

Figure 1. Arduino ESP 32 Devkit V1

2.3. Telegram

According to Fifit Fitriansyah & Aryafadilah (2020) in their journal entitled "Using Telegram as Communication in Online Learning" argues that Telgeram is a cloud-based application that makes it easier for users to access telegram accounts from different devices and simultaneously.

According to (Fahana & Ridho, 2018). Telegram is a cloud-based instant messaging application focused on speed and security. Telegram is designed to make it easier for users to send text, audio, video, image and sticker messages to each other safely. Telegram API (Application Programming Interface) is a programming interface that allows developers to interact with Telegram, such as sending and receiving messages through their own programs. Using the Telegram API, the Emergency Panic Button tool can send emergency messages to specified contacts, enabling users to request assistance quickly and efficiently.

2.4. Bot Telegram

An internet bot or what we are more familiar with as a web robot, is an automatic-based software application that executes all commands via the internet. Bots usually carry out commands that are basically easy and structured, but at a higher level than just humans. (Mubarak, 2019).

Basically, Telegram bots must have a design. The design is intended to receive information like other instant messenger applications. Bots are programs related to servers and also to obtain information using a telegram client connected to the server admin mobile device. (Jefree Fahana1, 2017).

2.5. API

According to Hasanudin & Hari Asgar (2022) in their journal "*Design and Build the Weshare Application Rest Api as an Effort to Simple Humanitarian Donation Services*" API is an interface used to access applications or services from a program. The API allows developers to use existing functionality from other applications, eliminating the need to rebuild from scratch.

2.6. User Temperature Monitoring

Figure 2. MLX90614 Temperature Module

According to Wa Ode Siti Nur Alam & Achmad Nur Aliansyah (2022) in their journal "Accuracy of the AMG8833 Sensor and MLX90614 Sensor in Measuring Body Temperature" the MLX90614 sensor is a sensor used to measure the temperature of an object by utilizing the emission of infrared wave radiation from the reflection of an object. This can be done using a temperature sensor connected to Arduino. Monitoring a user's temperature can provide important information regarding health conditions, such as the detection of a fever or a

significant change in temperature. The user's temperature information can be used as a parameter in the need for medical assistance or action needed in an emergency situation.

3. METHODOLOGY

1. Preliminary studies
   Conduct a literature study to understand concepts and technologies related to the manufacture of the Emergency Panic Button tool, Arduino ESP32 Devkit V1, integration with the Telegram API, and monitoring user temperature.

2. Tool Planning
   Design an electronic circuit schematic consisting of Arduino ESP32 Devkit V1, panic button, communication module (GSM or Wi-Fi), GPS module (or alternative method for location acquisition), and user's body temperature sensor.

3. Software Development
   Develop programs using the Arduino IDE to set tool functions, such as detecting panic buttons, sending emergency messages to Use Arduino-compatible programming languages, such as Arduino C/C++.

4. Implementation
   Implement electronic circuit schemes and install electronic components according to the design. Connect the developed software to Arduino ESP32 Devkit V1 and test the function of the tool as a whole.

5. Testing And Evaluation
   Perform a series of tests to ensure the function and performance of the resulting tool. Testing the panic button, sending emergency messages to Telegram, location acquisition and sending, and monitoring user temperature. Evaluate the reliability, responsiveness and accuracy of the tool in emergency situations.

6. Data analysis
   Analyze the data obtained during testing and evaluation. Evaluate the performance of the tool based on previously defined criteria.

7. Improvements And Fixes
   If deficiencies or problems are found during testing, make repairs and adjustments to the hardware and software of the tool.Perform repeated iterations and improvements to improve the function and performance of the tool.

8. Documentation
   Documenting in detail the design, development,
   implementation, testing and evaluation of the Emergency Panic Button tool.Prepare journal reports that cover all aspects of research, including test results, data analysis, and conclusions.

Table 1. Research Tools and Materials

No	Nama Device	Information
1	Arduino Esp32 Devkit V1	as a microcontroller
2	Internet	IoT Connection
3	Fingerprint R503	Trigger TombolEmergency
4	GPS UBLOX NEO-6M & Antenna Module	As Satellite location Catcher For TelegramBot Sent
5	MLX90614 Temperature Sensor	To get the temperaturewhen the emergency button is pressed
6	Battery 4x Aa 1.5 V	For Power Microcontrollers
7	Telegram	As Interface displaysmessages sent
8	Black Housing 2.54 mm	To be used to disconnectand connect electronic networks

4. NETWORK DESIGN

After concluding and obtaining, the next step is to design a circuit that can send data when the button is pressed. With the aim for students when they get bullying situations can help teachers to prevent these situations. using the telegram application as an interface that displays data sent by students when the button is pressed. So that the teacher can control through the telegram application.

Figure 3. Telegram

The Telegram application is used to display data sent by students containing data on the student's name, body temperature, student location.

4.1. Coding

After the design and circuit scheme have been made, the next step is to create a programming algorithm using the Arduino IDE. Some of the algorithms created are:

Button Algorithm When the button is pressed it will send data to the telegram application using the telegram bot.

```
void loop() {

 //String fingerprintName;
 static const double LONDON_LAT = 51.508131, LONDON_LON = -0.128002;
// Fingerprint
 uint8_t p = finger.getImage();
 switch (p) {
   case FINGERPRINT_OK:
     panicButtonPressed = true;
     break;
   default:
     panicButtonPressed = false;
     break;
 }
```

Figure 4. Emergency Button Algorithm

4.2. Testing

The next step is to do a trial runsystem that has been made can run according to what is desired. If it is not appropriate, then the stage will be repeated. Return to the first stage untilsystem running as expected. To further explain how it workssystem, then it can also be seen through the workflowsystem which is shown in the following figure.

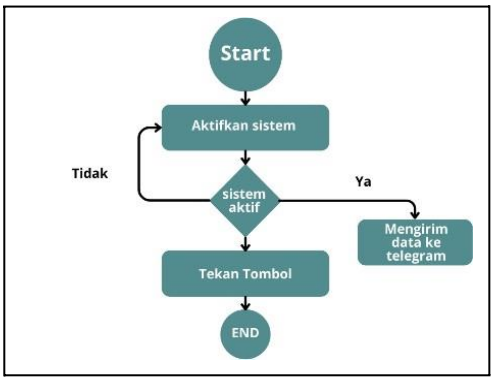

Figure 5. Flowchart of How it WorksSystem

Based on the results of the design and coding that has been done, it can be explained how it workssystem that is:

1. The button is activated and the battery holder is attached to the emergency button device
2. When the button is in standby / on, the emergency button is ready to be used and pressed
3. After the button is pressed a notification will appear in the telegram group that was created and registered before
4. If successful, the data will appear in the telegram group containing the student's name, body temperature, and the student's location.
5. Connect the tool to an internet connection through the coding that has been registered.

4.3. Results and Discussion

At this stage will discuss the results of the trialsystem using the emergency button as the main device that is used to send bullying incidents. Before conducting trials on students, previously the authors conducted trials onsystem which has been made.

1. Emergency Panic Button Trial

At this stage, testing is carried out to try whether the emergency button can work after being pressed, testing is carried out only in the form of a prototype when bullying occurs. The test scenario is presented in the following table

Table 2. Test Scenario

No	Scenario	Observation result
1	Activate the emergency button tool	Simultaneously with the active tool (seen from the button indicator)
2	Pressing the EmergencyButton	When the data is sent it will appear in the telegram group

2. Image of Active Emergency Button

Figure 7 shows that when the system is activated, the indicator light will light up

Figure 6. Active System

5. CONCLUSION

Based on the results of system testing, it can be concluded that:

1. The system was tested on students in normal situations, not yet tested in bullying situations.
2. The system created can run according to the initial plan where when the emergency button is pressed, the tool will send data parameters to the teacher's telegram / telegram group. The emergency button can work as expected when the button is pressed

The weakness of this system is that if the device does not have an internet connection, thensystem unable to work properly.

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