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Fire Alarm Application with Short Message Service (SMS) and Arduino FOR Reminder Information Display System in Puri Permai Tbk Housing

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A B S T R A C T

Security disturbances do not only come from people who will do bad things but from other factors as well, for example the occurrence of fires which is a threat to us. Fire disasters can occur at any time regardless of time or place. The fire disaster will definitely cause damage, loss, maybe even casualties. If this happens in a government agency / office, then the loss incurred is the loss of important / valuable documents, thus affecting the implementation of daily tasks. So fire prevention and control is important. This prototyping method will produce a system prototype as an intermediary for developers and users in order to interact in the process of information system development activities. In order for the prototype making process to be successful, it is by defining the rules at an early stage, namely the developer and the user must have an understanding that the prototype was built to define initial requirements. When mQ2 detects smoke and the flame sensor detects a fire, then the buzzer turns on. Sim800l successfully sends a message when mQ2 detects smoke and the flame sensor detects a fire.

1. Introduction

The need for security communication facilities and infrastructure is also at present. This is a factor that all of us should pay attention to[1,2]. Security disturbances do not only come from the presence of people who will do evil, but from other factors as well, such as the occurrence of fires which are a threat to us. Fire disasters can occur at any time regardless of time or place[3]. The fire disaster will certainly cause damage, loss, maybe even fatalities. If this happens in a government agency/office, then the loss experienced is the loss of important/valuable documents, thus affecting the implementation of daily tasks. So fire prevention and control is important[4].

There were many difficulties in dealing with fires, such as delays in information to the building owner due to the building owner not being at the scene or far outside the building where the building was empty without a guard so that the fire would continue to spread throughout the building and cause substantial material losses. This study will develop a fire detection tool that previously existed by adding mobile media to send SMS to notify signs of fire, using the MQ2 sensor with the main control system being the Arduino Uno R3 microcontroller and using control relay over SMS to control the cellphone so that it can send SMS as a sign of fire[5]. when the temperature has reached more than 60°C, the microcontroller will automatically instruct and will send data in the form of a warning such as, the buzzer alarm will sound, the GSM Sim800L will send a warning message to the homeowner. The formulation of the problem in this study are (1) How to create a fire detection system, (2) How to send SMS messages from the device contained in the microcontroller to the destination number. The objectives of the research are (i) to make a fire and smoke detector model with SMS Gateway output, (ii) to be able to send an SMS (Short Message Service) warning from the device.

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2. Research Methods

The method used by the author in developing this writing system is using the prototype method. This prototyping method will produce a prototype system as an intermediary for developers and users so that they can interact in the process of information system development activities. In order for the prototyping process to be successful, it is necessary to define the rules at an early stage, namely developers and users must have an understanding that the prototype was built to define initial requirements.

3. Result

3.1 Design

a. System block diagram

In the figure it is explained that the MQ-2 sensor is an input and the Arduino Uno is processed and forwarded to the light actuator as an LED light indicator and the sound actuator as a buzzer sound that has been configured as an output.

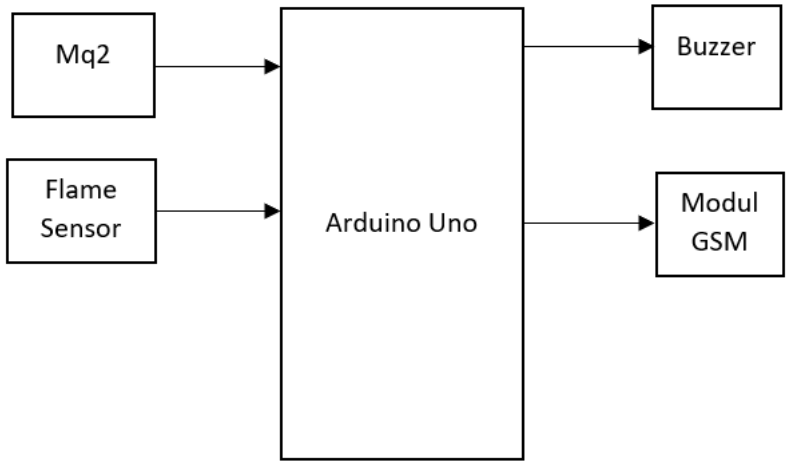

Fig 1. System block diagram

b. System structure design

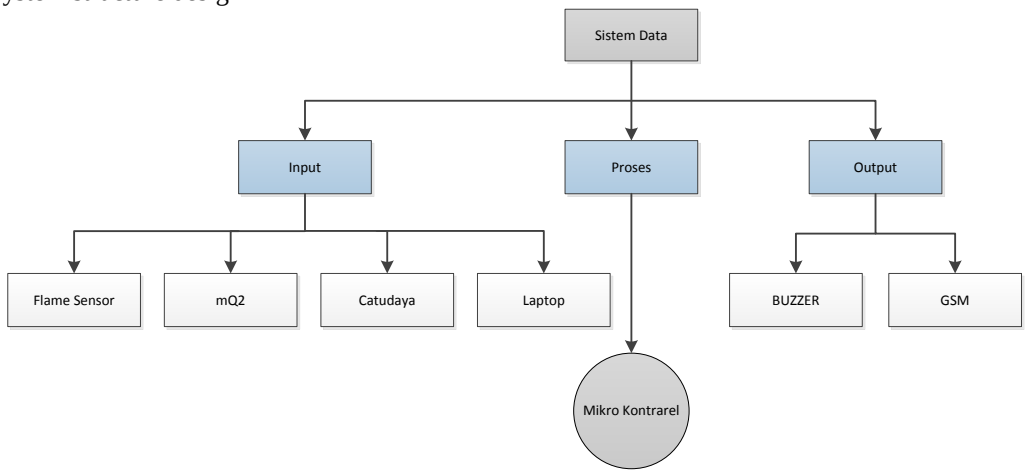

Fig 2. System structure design

In the picture above is a system structure design drawing (HIPO) which describes the HIPO structure and program documentation tools based on their functions to improve the efficiency of program

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maintenance efforts. This structure also provides a visual description of the inputs to be used and the outputs to be produced by each function at each level of the diagram.

3.2 Testing

Testing is a process of implementing a program with the aim of finding an error. A good test case is one if the test has the possibility of finding an unrevealed error.

a. GSM Module Testing

This tool is used to send SMS notification notifications to a predetermined destination number.

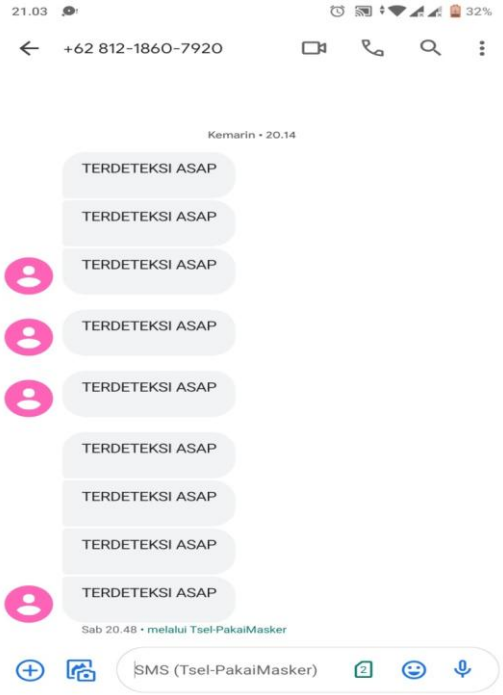
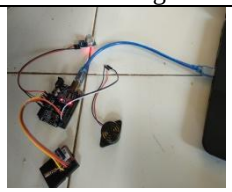


Fig 3. System structure design

b. Black Box

Based on the specified functions of the product, tests can be carried out by demonstrating that each function has fully operated as expected, and at the same time, searching for errors in each function is also known as black box testing.

Table 1.
Black Box Testing

Cases and Test Results				
Scenario	Tes Case	What to Expect	Testing	Result
Set the mQ2 test code, flame sensor and buzzer to detect smoke and fire.		When the mQ2 detects smoke and the flame sensor detects a fire, the buzzer turns on		Valid
Generate code test sim800l so it can be used to send a message when mQ2 detects the presence of		Sim800l successfully sent message when mQ2 detect there is smoke and the flame		Valid

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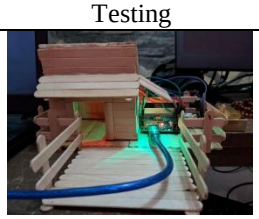
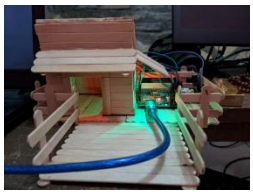
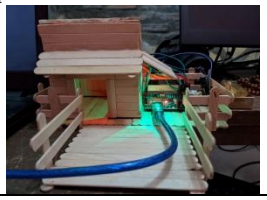
Cases and Test Results				
Scenario	Tes Case	What to Expect	Testing	Result
smoke and the flame sensor detects the presence of fire.		sensor detects there is fire		
Assemble all the components of the mQ2, flame sensor, and Buzzer and sim800l into the circuit that has been made.		The smoke detecto works as expected		Valid

4. Conclusion

Based on the results of testing and designing a fire alarm application system with short message service (SMS) and arduino for reminder information display system at Puri Permai TBK Housing. It can be concluded that Arduino's ability to control a series of fire alarm detection systems in the Puri Permai TBK Housing complex runs smoothly, detects a fire, and sends SMS notifications, can work as expected by the buzzer.

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