Emergency Tower System For An Accident

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ABSTRACT

An emergency is an accident that cannot be predicted when it will happen. An emergency is a patient's clinical condition that needs immediate medical action, to save lives and prevent further disability. Campus is a place with high mobility in the academic community, so the potential for an emergency to occur in the campus area is quite large Apart from accidents. Therefore, the process of handling emergency cases in the campus area can be carried out by developing a risk management ecosystem through an emergency tower that is integrated with the Detector Tower wirelessly. An emergency tower is a tower to provide information related to an emergency. This tower uses an esp8266 as a microcontroller to send information, sirens for an indicator that there is an accident, and a door lock to lock the first aid box. The result the emergency tower is can send alert information and do two-way communication with the Detector Tower. While waiting the Emergency tower is equipped with a first aid kit box that can be used as well as CCTV that will monitor events in the area. The emergency tower system has 100% that can help to handle emergency situations.

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1. INTRODUCTION

An emergency is an accident that cannot be predicted[1]. Based on the Regulation of the Minister of Health in Republic of Indonesia Number 19 of 2016 concerning the Integrated Emergency Management System, Emergency is a clinical patient condition that requires immediate medical action, in order to save lives and prevent further disability[2]. Campus is a place with high mobility of the academic community, so the potential for an emergency will happen in the campus area is quite large. Emergency cases that are often encountered include cardiac arrest, asthma attacks, loss of consciousness, and bleeding due to accidents[3].

Accidents or injuries can become emergency cases and cause serious injuries and even death if not handled properly Apart from accidents, emergency cases that require prompt and appropriate treatment are sudden cardiac arrest. The life expectancy of a patient with sudden cardiac arrest is highly dependent on the competence of rescuers to provide basic life support as well as the speed at which personnel arrive to perform defibrillation, and the time needed to evacuate to the hospital for Out-of Hospital Cardiac Arrest (OHCA) patients[4].

Cardiac arrest needs to be handled as quickly as possible in less than 10 minutes, so it requires the closest assistance to the location. Emergency management has a philosophy that "time saving is life saving". This philosophy means that all actions taken during an emergency must be truly effective and efficient because in these conditions the patient can lose his life in a few minutes[5].

Those who provide first aid must be able to assess the situation quickly and calmly, prevent life-threatening conditions by protecting injured victims from danger, provide appropriate medical treatment and contact emergency services immediately in serious cases[6]. Therefore, the process of handling

emergency cases in the campus area can be carried out by developing a risk management ecosystem through an Emergency Tower that integrated with the Detector Tower wirelessly[7]. Emergency is a condition that need take a serious aware or danger situation that will make a bad condition. Special action required with right procedures and rules of everyday life to control that condition. It called emergency[8].

Emergency Tower is a tool designed to speed up the process of sending information to parties who can provide handling in emergency cases. The process of sending information is very important, because the information system becomes the nerve of the entire system to convey various data and information that needed to coordinate the activities of the entire system quickly, on time, accurately and relevantly[9]. Emergency Towers are installed at several strategic points that have a high level of mobility and are easily accessible by people in the campus area. Emergency Tower is in the form of a tower which is equipped with 1 button to provide information regarding emergency conditions that occur. The Emergency Tower is equipped with a character LCD so that the user can view the display of sending and receiving information to parties who can handle these conditions. The Emergency Tower can send alert information and communicate with the Detector Tower which can provide emergency handling through the Detector Tower installed at the location of the officer in charge. The Emergency Tower is equipped with a first aid kit that can be used in case of an emergency.

2. RESEARCH METHOD

The Emergency Tower made in this Study consists of components that are used both software and hardware such as:

2.1. Design Block Diagram

It is one part of the design of making this tool because from this block we can know the working principle of the whole circuit. Simplify the design process for making tools so that a system that is in accordance with the previous design will be formed. The following block diagram of the system can be seen in Figure 1.
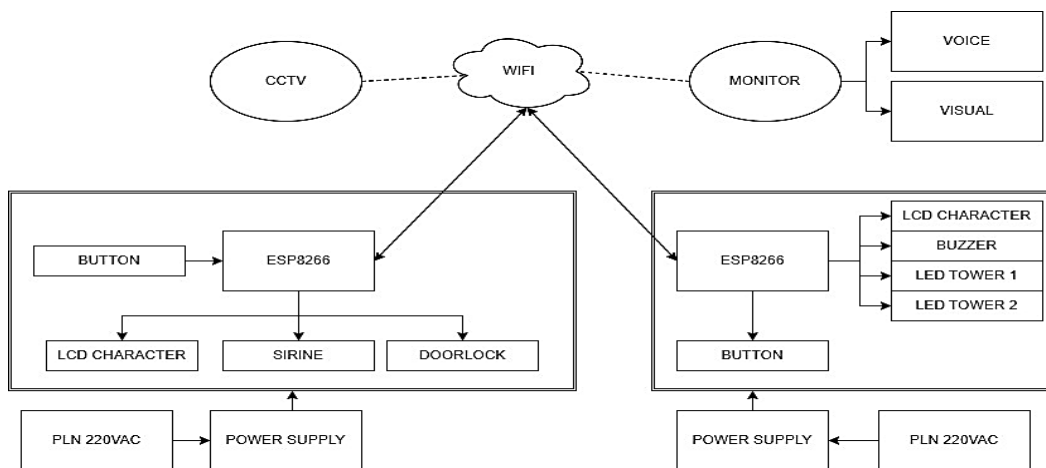
Figure 1. Design Block Diagram

The Block diagram of the system in Figure 1 can be explained as the system on an emergency tower using ESP8266 as one of those microcontrollers. Esp8266 from transmitter tower will send a signal when push button get press by someone, the energy source used in the emergency tower and detector tower comes from a 220VAC. 220VAC will converted to a power supply circuit to produce an output of 12VDC. When the push button on the emergency tower is pressed, it will activate the sirens and make the door lock open the first aid box. The tower is also equipped with a LCD Character which will display information such as "help is coming soon" for the user. When the push button is pressed ESP8266 will send a signal to ESP8266 on the detector tower via wifi[10].

When the detector tower gets a signal from transmitter tower, the detector tower will activate a buzzer indicating an emergency and attract people to come[11], ESP8266 will activate LED Tower 1 or 2, according to the one sending the help signal. If the button is pressed it will send a signal to the LCD Character emergency tower to active and can make a word " Help is coming soon"[12].the rotary warning light and the sirens on the Emergency Tower will turn off.

There is CCTV that can be used to monitor events that occur as well as two-way communication connected to the receiver or Detector Tower, with this CCTV will provide more accurate information[13].

3. RESULTS AND DISCUSSION

This section contain the design results from testing each hardware and software used as a whole thet makes up the system on the emergency tower system. the tests carried out include measuring the speed of sending signal, first aid box, and cctv able to do two way communication also monitoring. The physical picture of the device design can be seen in Figure. 2

3.1. Emergency Tower design result

1. Emergency Tower System

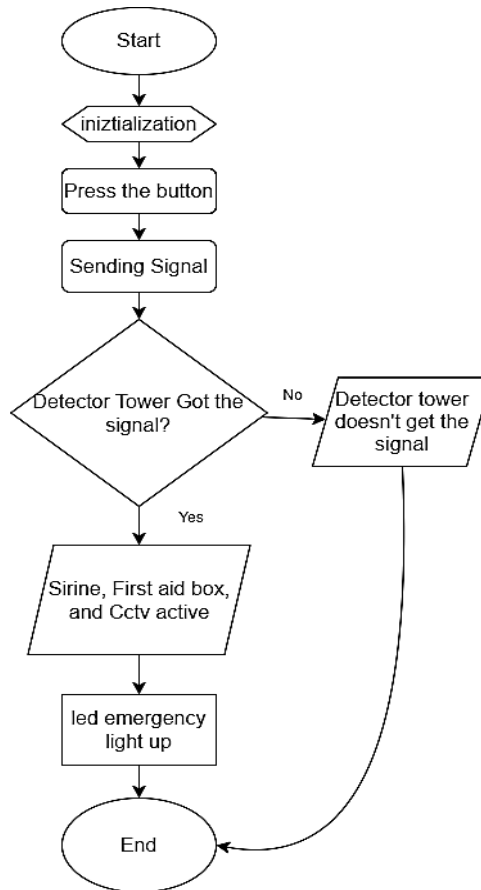**Figure 2.** Outdoor Sending Tower

Description:

1. Indoor Tower.
2. Detector Tower.
3. Outdoor Tower.
4. Button.
5. Sirine.
6. Lcd Character.
7. Doorlock.
8. SOP.
9. CCTV.
10. Feedback button.

The process of improving the hardware design so that the device operates in accordance with the workflow of the work system is known as software design. Fig 3. Show the flowchart for the system.

Using Fig. 3's flowchart as a guide, The emergency tower system was design to help speed up information on emergency situasion. The main components of emergency tower system are using ESP8266, LCD Character, CCTV, Sirens and Led. This tower will placed for places that have the potential for emergency situasion. Emergency Tower System has two typical, namely the sending tower and receiving tower where the sending tower button pressed by someone will send a help signal via the wifi server and then the signal wil received to the helper that gonna know there is an emergency situation at that place through a light up led. There is a first aid kit box that is useful for assisting victims with first aid to prevent further death and disability. There is a CCTV device on the Emergency Tower

System. This CCTV can do two way communication between the user and the helper, which will display video and visuals. After two way communication, the helper will send a feedback signal to notify the user that emergency information has been received.

Figure 3 Flowchart System

Outdoor tower is made for outdoors place, that can be placed at an open space like park, zoo, campus page, factory, and the others. This tower has a button that when the button get press by someone the sirine's tower and warning light rotary's tower will active also the first aid box can be open so that we can use the first aid inside that box. This tower has a LCD Character that will display an emergency words so the user will know that the helper on the way. User also can communicate with the helpers by using cctv because cctv can do two way communication. This tower has a pole that can place anywhere.

Indoor tower is made for indoors place, so that indoor place also has a sending tower to transmit an emergency information to the receive tower. This Indoor Tower has a button that when the button get press by someone the sirine's tower and warning light rotary's tower will active also the first aid box can be open so that we can use the first aid inside that box. This tower has a LCD Character that will display an emergency words so the user will know that the helper on the way. User also can communicate with the helpers by using cctv because cctv can do two way communication. The different of indoor and outdoor tower is the size of tower, the tower has two typical size because an emergency situation can happen anywhere and anytime.

This reveiving tower is a notification box that there is an emergency at that place. This receiving tower has two indicator led that will light up when push button's sending tower get press by someone so the helper will know that has an emergency situation at that place. This receiving tower also has display that gonna display an emergency words, Emergency information will be sent back to the sender so that the sender knows that the emergency information has been received. Receiving tower has a standard operating procedure that how led gonna light up when there is an emergency situation.

3.2. CCTV application design results

1. CCTV Barcode

This application can open by scanning the barcode at cctv's behind, after the cctv connected with the phone we don't need to scanning anymore because the cctv will save who scan the barcode. CCTV Barcode picture can see at figure 5.

Figure 4. CCTV Barcode

2. Display page

This display will show the conditions that happen when an emergency time. This display can be used to monitor the case that happen during an emergeny time. Display page can see at figure 6.
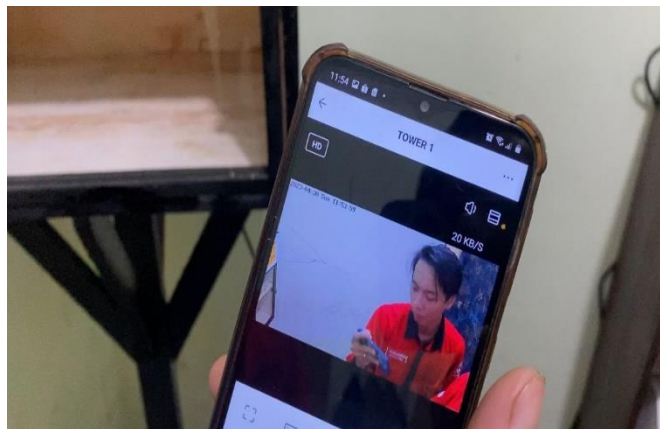

Figure 5.Display Page

3.3. System Testing Discussion

In This Section is the result of a discussion of system testing carried out on an emergency tower system that have been made according to the purpose or not.

The result achieved was the creation of emergency tower system which was design to help speed up information on emergency situasion. The main components of emergency tower system are using ESP8266, LCD Character, CCTV, Sirens and Led. This tower will placed for places that have the potential for emergency situasion. Emergency Tower System has two typical, namely the sending tower and receiving tower where the sending tower button pressed by someone will send a help signal via the wifi server and then the signal wil received to the helper that gonna know there is an emergency situation at that place through a light up led. There is a first aid kit box that is useful for assisting victims with first aid to prevent further death and disability. There is a CCTV device on the Emergency Tower System. This CCTV can do two way communication between the user and the helper, which will display

video and visuals. After two way communication, the helper will send a feedback signal to notify the user that emergency information has been received. Emergency Tower System can see at figure 7.

Figure 6. Emergency Tower System

After the Emergency Tower System was finished, the emergency tower system got conducted abd feasibility testing, where there were 3 tests, namely:

The speed of sending a signal to the receiving tower, the first aid kit can open when the help button is pressed and cctv can do two way communication which display visual and voice.

Emergency Tower System was testing in the Yogyakarta Muhammadiyah University campus area. In addition, the success function test of emergency Tower System was carried out 4 times with different positions. Device testing is carried out so the device can work according to the function and the purpose. the emergency tower system need to be testing, where there were 3 tests, include:

The speed of sending a signal to the receiving tower. The first aid kit can open when the help button is pressed and cctv can do two way communication which display visual and voice.

1. First Test

Tabel 1. The speed of sending a signal to the receiving tower.

NO	LOCATION	TIME	DESCRIPTION
1	UMY fkik building	0 second	Success
2	UMY parking area	0 second	Success
3	UMY sportorium	0 second	Success
4	UMY sport center	0 second	Success

2. Second Test

Tabel 2. The first aid kit can open when the help button is pressed

NO	LOCATION	DESCRIPTION
1	UMY fkik building (150 m)	Success
2	UMY parking area (200 m)	Success
3	UMY sportorium (247 m)	Success
4	UMY sport center (500 m)	Success

3. Third Test

Tabel 3. CCTV can do two way communication which display visual and voice

NO	LOCATION	DESCRIPTION
1	UMY fkik building	Success
2	UMY parking area	Success
3	UMY sportorium	Success
4	UMY sport center	Success

Based on the resuls testing shown at tables 1,2 and 3, the Emergency Tower System has functioned according to the purpose of manufacture. The test points at Yogyakarta muhammdiyah university with the appropriate test results shown on figure 8.

Figure 7. Universitas Muhammdiyah Yogyakarta

After 3 test that heve been carried out, it can be seen that the Emergency Tower System can function and susitable for use according to the standard functions and the purpose of making the tool.

4. CONCLUSION

Based on the results of the design, manufacture, testing and analysis that have been carried out from the implementation of this research it can be conclded that Receiver tower will lights up when the sending tower's help button is pressed and the First aid kit box that only opens when the dispatch tower's help button is pressed also CCTV that able to see the situation when the emergency happen and do two way communication.

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