

ALARM NOTIFIER FOR DEAF PEOPLE (SOFTWARE)

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DECLARATION

“I hereby declare that the work in this report is my own except for quotation and summaries which have been duly acknowledge”

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ABSTRACT

At the beginning of the twentieth century, there was a steady increase in the number of building fire happened in Malaysia. The fires have caught the life of many victims in the past and this have caught the attention of mainstream media to better avoid casualties. In these cases, it is a wide concern that people with hearing problems and acclaimed to be the most vulnerable as not being able to hear the fire alarm is a huge problem in the case of a fire. Most of the time, these individuals are left assigned with an able guardian to which can help them in these cases but of course not all of them are assigned are quite a lot of them are left on their own way. There were some improvements along the years for emergency evacuation but there's no denying that it could be improved further. Thus this project aims to help personals to notify deaf people in a building in the case of an emergency evacuation. This project uses vibration from the phone to indicate there is an emergency. We designed an android application which is connected to a server which received data from the transmitter unit that is installed next to the fire alarm. The transmitter unit function is to receive the noise level from the alarm, the microcontroller inside the transmitter unit is configured to be only triggered from the fire alarm's bell. Other noises such as dogs barking for example wouldn't cause the microcontroller to be triggered. If the fire alarm is triggered then the transmitter unit will send the signal to this server and will be picked up by the app thus vibrating the phone. The app can be used by multiple users without any interference. The transmitter needs to be connected to a Wi-Fi that is able to send data to the internet and the android devices need to be able to connect to the internet for the app the work. The system works in real-time meaning that once the fire alarm triggered for even just a second, the app will also initiate the vibration protocols for a second. This helps to ensure that we have the optimal efficiency in transferring the signal from the transmitter unit to the app in the shortest time possible. The main priority for this project is to help those who are deaf or have hearing problems thus why the usage of vibration as they are more keen to the touch sensor.

Keywords: Deaf people, fire alarm, fire hazard, alarm system, fire evacuation

ABSTRAK

Pada permulaan abad yang ke dua puluh, terdapat bilangan kebakaran bangunan yang berlaku di Malayasia semakin meningkat mendadak. Kebakaran ini telah meragut banyak nyawa pada masa lalu dan ini telah menarik perhatian media-media utama untuk mengelakkan lebih banyak kematian. Dalam kes ini, telah membawa kebimbangan kepada orang yang mempunyai masalah pendegaran dan ia juga dikenali sebagai yang paling lemah kerana tidak dapat mendengar penggera kebakaran, ini akan membuatkan mereka masalah besar dalam hal kebakaran. Pada masa kini, orang-orang yang kurang upaya akan ditugaskan dengan penjaga yang dapat membantu mereka dalam kes-kes seperti ini tetapi sudah tentu mereka yang bertugas itu tidak cukup untuk menolong mereka. Terdapat beberapa penambahbaikan sepanjang tahun untuk pemindahan kecemasan tetapi tidak dinafikan bahawa sistem ini tidak semua masalah dapat diatasi. Oleh itu projek ini adalah untuk membantu orang yang mempunyai masalah pendegaran untuk memberitahu mereka pemindahan kecemasan di dalam bangunan tersebut. Projek ini menggunakan getaran dari telefon untuk menunjukkan terdapatnya kecemasan. Kami telah pun mencipta satu aplikasi android yang disambungkan kepada server yang menerima data dari unit penghantar yang dipasang di sebelah penggera kebakaran. Fungsi unit penghantar adalah untuk menerima tahap bunyi dari penggera kebakaran, Mikrokontroler atau dipanggil 'microcontroller' yang berada di dalam unit penghantar adalah dikonfigurasi untuk mencetuskan dari loceng kebakaran. Bunyi lain seperti nyalakan anjing sebagai contoh tidak akan menyebabkan cetusnya mikrokontroler itu. Sekiranya penggera kebakaran itu di aktifkan maka unit penghantar akan menghantar isyarat kepada server dan akan diambil oleh aplikasi yang kami telah cipta yang akan buatkan telefon pintar itu bergetar. Aplikasi ini boleh digunakan lebih daripada satu pengguna tanpa sebarang gangguan. Unit penghantar perlu sentiasa disambungkan ke WIFI untuk menghantar data ke internet dan peranti android juga perlu disambungkan ke internet untuk aktifkan aplikasi. Sistem ini berfungsi mengikut masa yang betul sebaik saja penggera kebakaran di aktifkan walaupun sekejap, aplikasinya juga akan memulakan getaran selama satu saat. Ini membantu kami untuk memastikan bahawa sistem ini cekap dalam memindahkan isyarat dari unit penghantar ke aplikasi dalam masa yang sesingkat mungkin. Keutamaan utama bagi projek ini adalah untuk membantu mereka yang mempunyai masalah pendegaran atau pekak dan dengan penggunaan getaran lebih berminat dengan sensor sentuh.

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CHAPTER 1

INTRODUCTION

1.1 Background

In February 2018 alone, there are a total of 572 building fire happened in Malaysia. During which the fire alarm is triggered, the building will be evacuated. Usually, the fire alarm used is the standard bell alarm which triggers a high tone ring across the building. This could be a problem in the case for deaf people as their inability to hear it could potentially be too late for them to evacuate. Thus, I decided to do this project in the hopes of giving alternatives to warn deaf people in case of a fire drill. In Malaysia alone, there is estimated 160,000 Malaysians who are vocally incapable. The adult Deaf tend to congregate in cities or towns where they can find jobs and socialize with other Deaf. In Malaysia each state has at least one school for Deaf children, with a total of 23 elementary schools, two vocational schools and one secondary school. Most are residential schools where local Deaf children live at home. With this many amount of deaf people, It should be a necessity for the safety of the deaf individuals to be improved especially in the case of a fire. I thought of a system which involves something that is a necessity for the people who are deaf. Initially, the idea was to create a watch or a bracelet of some sort that is connected wirelessly to a transmitter unit. This proves to be a non-practical solution as the watch itself would be bulky and heavy causing discomfort while wearing it. Then, the idea to use the phone's own vibration motor came and it sprung up new sketches and plans for the project. The transmitter unit is consists of mainly a microcontroller, a sound vibration

sensor and some small electronic components such as resistors, capacitors and etc. The transmitter unit is connected using wifi though the wifi needs to have access to the internet for the system to work. To vibrate the motor on the phone in the case of a fire, an app is created to gather the current data from the transmitter unit and process it. The app needs also to be connected to the internet as the “middle man” between the transmitter unit and the phone’s app is an online database/server that is specially configured for this purpose. The app will turn on the motor causing the phone to vibrate if there is a fire alarm and it will turn the motor off once there is no fire alarm detected. The transmitter unit is located next to a fire alarm and this system can be shared up to 20 people or possibly more (testing sessions done for 20 devices).

1.2 Problem Statement

Nowadays we have heard of so many occurrence of fire in a building and usually process of evacuation is handled safely without any problem but it is a known worry if the building has a number of deaf people, the evacuation process would be slower since the deaf people wouldn’t hear the alarm. We’re doing this project to give an alternative to alert deaf people during a fire to evacuate a building as fast as possible.

1.3 Objective

- To design a system that gather signal from fire alarm and transmit to a connected phone.

- To program a working system in which the phone is vibrated when the signal reached a certain limit.

1.4 Limitations

Throughout this project, I have met with a few of limitations that causes quite a stir of problems. For starters, due to complexitiy in coding the application and the limitations of using the MIT App Inventor, the system can be only used for one location only for now.

Other than that, due to the same reasons, the application needs to be opened before the application can alert the user using vibration and the app must not be cleared after it is used as it needs to be in the background always.

Lastly, The phone must be connected to the internet, this is not a problem if it is connected to wifi but, it will be a problem for data network users. As to recent testings, it is figured that by using 2G and 3G technologies connections, the respond time decreased drastically. Thus it is advised for users to use wifi or 4G/LTE connections to get the best out of the system.

1.5 Scope

The scope is within the range of the wifi reception of the device near the fire alarm which is about 100-200 meter.

CHAPTER 2

LITERATURE REVIEW

2.1 Fire Alarm System

A fire alarm system has a number of devices working together to detect and warn people through visual and audio appliances when smoke, fire, carbon monoxide or other emergencies are present. These alarms may be activated automatically from smoke detectors, and heat detectors or may also be activated via manual fire alarm activation devices such as manual call points or pull stations. Alarms can be either motorized bells or wall mountable sounders or horns. [1] They can also be speaker strobes which sound an alarm, followed by a voice evacuation message which warns people inside the building not to use the elevators. [1] Fire alarm sounders can be set to certain frequencies and different tones including low, medium and high, depending on the country and manufacturer of the device. Most fire alarm systems in Europe sound like a siren with alternating frequencies. Fire alarm electronic devices are known as horns in the United States and Canada, and can be either continuous or set to different codes. Fire alarm warning devices can also be set to different volume levels. [2]

Parts of a fire alarm system:

- Fire alarm control panel (FACP) AKA fire alarm control unit (FACU); This component, the hub of the system, monitors inputs and system integrity, controls outputs and relays information. [3]

- Primary power supply: Commonly the non-switched 120 or 240-volt alternating current source supplied from a commercial power utility. In non-residential applications, a branch circuit is dedicated to the fire alarm system and its constituents. "Dedicated branch circuits" should not be confused with "Individual branch circuits" which supply energy to a single appliance. [3]
- Secondary (backup) power supplies: This component, commonly consisting of sealed lead-acid storage batteries or other emergency sources including generators, is used to supply energy in the event of a primary power failure. The batteries can be either inside the bottom of the panel or inside a separate battery box installed near the panel.
- Initiating devices: These components act as inputs to the fire alarm control unit and are either manually or automatically activated. Examples would be devices such as pull stations, heat detectors, and smoke detectors. Heat and smoke detectors have different categories of both kinds. Some categories are beam, photoelectric, ionization, aspiration, and duct.
- Fire alarm notification appliance: This component uses energy supplied from the fire alarm system or other stored energy source, to inform the proximate persons of the need to take action, usually to evacuate. This is done by means of a pulsing incandescent light, flashing strobe light, electromechanical horn, siren, electronic horn, chime, bell, speaker, or a combination of these devices. Strobes are either made of a xenon tube (most common) or recently LEDs. [3]
- Building safety interfaces: This interface allows the fire alarm system to control aspects of the built environment and to prepare the building for fire, and to control the spread of smoke fumes and fire by influencing air movement, lighting, process control, human transport and exit.

Initiating devices:

- Manually actuated devices; also known as fire alarm boxes, manual pull stations, or simply pull stations, break glass stations, and (in Europe) call

points. Devices for manual fire alarm activation are installed to be readily located (near the exits), identified, and operated. They are usually actuated by means of physical interaction, such as pulling a lever or breaking glass. [3]

- Automatically actuated devices can take many forms intended to respond to any number of detectable physical changes associated with fire: convected thermal energy; heat detector, products of combustion; smoke detector, radiant energy; flame detector, combustion gases; fire gas detector, and release of extinguishing agents; water-flow detector. The newest innovations can use cameras and computer algorithms to analyze the visible effects of fire and movement in applications inappropriate for or hostile to other detection methods

An electric bell is a mechanical bell that functions by means of an electromagnet. When an electric current is applied, it produces a repetitive buzzing or clanging sound. Electric bells have been widely used at railroad crossings, in telephones, fire and burglar alarms, as school bells, doorbells, and alarms in industrial plants, since the late 1800s, but they are now being widely replaced with electronic sounders. An electric bell consists of one or more electromagnets, made of a coil of insulated wire around an iron core, which attract a springy iron armature with a clapper. [3] When an electric current flows through the coils, the electromagnet creates a magnetic field which pulls the armature towards it, causing the clapper to strike the bell.

2.2 Fire Safety

Fire safety is the set of practices intended to reduce the destruction caused by fire. Fire safety measures include those that are intended to prevent ignition of an uncontrolled fire, and those that are used to limit the development and effects of a fire after it starts.

Fire safety measures include those that are planned during the construction of a building or implemented in structures that are already standing, and those that are taught to occupants of the building. [4]

Threats to fire safety are commonly referred to as fire hazards. A fire hazard may include a situation that increases the likelihood of a fire or may impede escape in the event a fire occurs.

Fire safety is often a component of building safety. Those who inspect buildings for violations of the Fire Code and go into schools to educate children on Fire Safety topics are fire department members known as Fire Prevention Officers. The Chief Fire Prevention Officer or Chief of Fire Prevention will normally train newcomers to the Fire Prevention Division and may also conduct inspections or make presentations.

2.3 Elements of a fire safety policy

Fire safety policies apply at the construction of a building and throughout its operating life. Building codes are enacted by local, sub-national, or national governments to ensure such features as adequate fire exits, signage, and construction details such as fire stops and fire rated doors, windows, and walls. Fire safety is also an objective of electrical codes to prevent overheating of wiring or equipment, and to protect from ignition by electrical faults.

Fire codes regulate such requirements as the maximum occupancy for buildings such as theatres or restaurants, for example. Fire codes may require portable fire extinguishers within a building, or may require permanently installed fire detection and suppression equipment such as a fire sprinkler system and a fire alarm system. [5]

Local authorities charged with fire safety may conduct regular inspections for such items as usable fire exits and proper exit signage, functional fire extinguishers of the correct

type in accessible places, and proper storage and handling of flammable materials. Depending on local regulations, a fire inspection may result in a notice of required action, or closing of a building until it can be put into compliance with fire code requirements.

Owners and managers of a building may implement additional fire policies. For example, an industrial site may designate and train particular employees as a fire fighting force. Managers must ensure buildings comply with fire evacuation regulations, and that building features such as spray fireproofing remains undamaged. Fire policies may be in place to dictate training and awareness of occupants and users of the building to avoid obvious mistakes, such as the propping open of fire doors. Buildings, especially institutions such as schools, may conduct fire drills at regular intervals throughout the year.

2.4 Fire Evacuation Emergency Plan (FEEP)

A fire emergency evacuation plan (FEEP) is a written document which includes the action to be taken by all staff in the event of fire and the arrangements for calling the fire brigade. It can include any relevant information in relation to the FEEP.

General Fire Notice For small premises this could take the form of a simple fire action sign posted in positions where staff and relevant persons can read it and become familiar with its contents. [5]

Staff Fire Notice High fire risks or large premises will need more detailed emergency evacuation plan which takes account of the findings of the fire risk assessment, e.g. the staff significantly at risk and their location. In addition notices giving clear and concise instructions of the routine to be followed in case of fire should be prominently displayed. [6]

In certain cases you should nominate persons to implement the fire action plan and give them adequate training in fire fighting and evacuation procedures. The following items should be considered where appropriate:

- Fire evacuation strategy
- Action on discovering a fire
- Action on hearing the fire alarm
- Calling the fire brigade
- Power/process isolation
- Identification of key escape routes
- Fire wardens/marshals
- Places of assembly and roll call
- Fire fighting equipment provided
- Training required
- Personal Emergence Evacuation Plan
- Liaison with emergency services

2.5 Personal Emergency Evacuation Plan (PEEP)

In order to assist disabled or sensory-impaired people to escape from fire it may be necessary for staff to be trained in the correct procedures to cope with this eventuality. Advice on the specific needs of disabled and sensory-impaired people can be obtained from organizations representing the various groups. The address and telephone number of these organizations can be found in the telephone directory, listed under the appropriate disability. [6] You must take account not only of the people in user premises (employed or otherwise) who may be able to make their own escape, but also those who may need assistance to escape, e.g. by having adequate staffing levels, especially in premises providing treatment or care.

2.6 Common fire hazards

Some common fire hazards are:

- Kitchen fires from unattended cooking, grease fires/chip pan fires
- Electrical systems that are overloaded, poorly maintained or defective
- Combustible storage areas with insufficient protection
- Combustibles near equipment that generates heat, flame, or sparks
- Candles and other open flames
- Smoking (Cigarettes, cigars, pipes, lighters, etc.)
- Equipment that generates heat and utilizes combustible materials
- Flammable liquids and aerosols
- Flammable solvents (and rags soaked with solvent) placed in enclosed trash cans
- Fireplace chimneys not properly or regularly cleaned
- Cooking appliances - stoves, ovens
- Heating appliances - fireplaces, wood-burning stoves, furnaces, boilers, portable heaters, solid fuels
- Household appliances - clothes dryers, curling irons, hair dryers, refrigerators, freezers, boilers
- Chimneys that concentrate creosote
- Electrical wiring in poor condition
- Leaking/ defective batteries
- Personal ignition sources - matches, lighters
- Electronic and electrical equipment
- Exterior cooking equipment – barbecue

2.7 Hearing Loss

Hearing loss, also known as hearing impairment, is a partial or total inability to hear. A deaf person has little to no hearing. Hearing loss may occur in one or both ears. In children, hearing problems can affect the ability to learn spoken language and in adults it can create difficulties with social interaction and at work. In some people, particularly older people, hearing loss can result in loneliness. Hearing loss can be temporary or permanent.

Hearing loss may be caused by a number of factors, including:

- Genetics.
- Ageing.
- Exposure to noise.
- Infections.
- Birth complications.
- Trauma to the ear.
- Certain medications or toxins.
- A common condition that results in hearing loss is chronic ear infections.
- Certain infections during pregnancy, such as cytomegalovirus, syphilis and rubella, may also cause hearing loss in the child.

Hearing loss is diagnosed when hearing testing finds that a person is unable to hear 25 decibels in at least one ear. Testing for poor hearing is recommended for all newborns. Hearing loss can be categorized as mild (25 to 40 dB), moderate (41 to 55 dB), moderate-severe (56 to 70 dB), severe (71 to 90 dB), or profound (greater than 90 dB).

There are three main types of hearing loss:

- Conductive hearing loss.
- Sensorineural hearing loss.
- Mixed hearing loss.

About half of hearing loss globally is preventable through public health measures. Such practices include immunization, proper care around pregnancy, avoiding loud noise, and avoiding certain medications. The World Health Organization recommends that young people limit the use of personal audio players to an hour a day in an effort to limit exposure to noise. Early identification and support are particularly important in children. For many hearing aids, sign language, cochlear implants and subtitles are useful. Lip reading is another useful skill some develop. Access to hearing aids, however, is limited in many areas of the world. [6]

As of 2013 hearing loss affects about 1.1 billion people to some degree. It causes disability in 5% (360 to 538 million) and moderate to severe disability in 124 million people. Of those with moderate to severe disability 108 million live in low and middle income countries. Of those with hearing loss, it began during childhood for 65 million. Those who use sign language and are members of Deaf culture see themselves as having a difference rather than an illness. Most members of Deaf culture oppose attempts to cure deafness and some within this community view cochlear implants with concern as they have the potential to eliminate their culture. The term hearing impairment is often viewed negatively as it emphasizes what people cannot do.

2.8 Touch Sensory On Deaf People

The research, funded by the National Institutes of Health, described how the early loss of a sense affects brain development and demonstrates that the brain is "capable of rewiring in dramatic ways".

According to the study, when the auditory cortex of profoundly deaf people is not exposed to sounds, it takes on additional processing tasks - which may explain why many people who are born deaf develop better peripheral vision and ability to sense motion. It is believed that the findings may support new ways to teach deaf students mathematics and

reading using touch-sensitive tools, as well as helping doctors to improve the quality of hearing after cochlear implantation. [6]

"We designed this study because we thought that touch and vision might have stronger interactions in the auditory cortices of deaf people," said Dr. Christina M. Karnes of the University of Oregon." As it turns out, the primary auditory cortex in people who are profoundly deaf focuses on touch, even more than vision, in our experiment."

"This research shows how the brain is capable of rewiring in dramatic ways," said James F. Battey, director of the National Institute on Deafness and Other Communication Disorders, reported Live Science. "This will be of great interest to other researchers who are studying multisensory processing in the brain. "The researchers noted that past studies have shown that deaf people are better at processing peripheral vision and motion and have heightened senses compared to others.

2.9 Conductive Hearing Loss

Conductive hearing loss (CHL) occurs when there is a problem transferring sound waves anywhere along the pathway through the outer ear, tympanic membrane (eardrum), or middle ear (ossicles). If a conductive hearing loss occurs in conjunction with a sensorineural hearing loss, it is referred to as a mixed hearing loss. Depending upon the severity and nature of the conductive loss, this type of hearing impairment can often be treated with surgical intervention or pharmaceuticals to partially or, in some cases, fully restore hearing acuity to within normal range. However, cases of permanent or chronic conductive hearing loss may require other treatment modalities such as hearing aid devices to improve detection of sound and speech perception. [7]

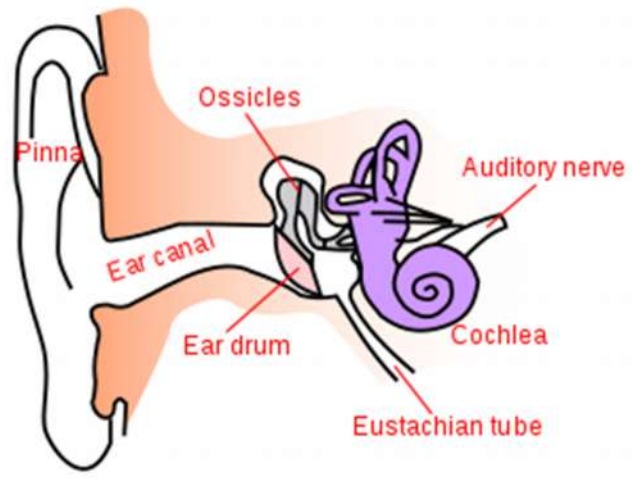


Figure 2.1 : Anatomy of the human ear

2.10 Sensorineural hearing loss

Sudden Sensorineural Hearing Loss (SSHL) or Sensorineural Hearing Loss (SNHL) is a type of hearing loss in which the root cause lies in the inner ear or sensory organ (cochlea and associated structures) or the vestibulocochlear nerve (cranial nerve VIII). SNHL accounts for about 90% of reported hearing loss. SNHL is generally permanent and can be mild, moderate, severe, profound, or total. Various other descriptors can be used depending on the shape of the audiogram, such as high frequency, low frequency, U-shaped, notched, peaked, or flat. [7]

Sensory hearing loss often occurs as a consequence of damaged or deficient cochlear hair cells. Hair cells may be abnormal at birth, or damaged during the lifetime of an individual. There are both external causes of damage, including infection, and ototoxic

drugs, as well as intrinsic causes, including genetic mutations. A common cause or exacerbating factor in SNHL is prolonged exposure to environmental noise, or noise-induced hearing loss. Exposure to a single very loud noise such as a gunshot or bomb blast can cause noise-induced hearing loss. Using headphones at high volume over time, or being in loud environments regularly, such as a loud workplace, sporting events, concerts, and using lawn equipment can also be a risk for noise-induced hearing loss.

2.11 Mixed hearing loss

Mixed hearing loss is a combination of conductive and sensorineural hearing loss. There may be a problem in the outer or middle ear and in the inner ear or auditory nerve. It can happen after a head injury, long-term infection, or because of a disorder that runs in your family. [5]

Hearing loss can affect one or both ears. It can happen suddenly or gradually get worse over time. If you notice sudden hearing loss, you should see an ear, nose, and throat specialist as soon as possible.

2.12 Novelty

Nowadays, for the safety of those who are deaf, they will be advised to buy a strobe (flashing) lights or alternatively, they can install a personal fire alarm with strobe light that

have special high intensity that could wake a sleeping person. Our project is a less costly alternative than the other two mentioned. The transmitter unit is not as expensive as the fire alarm. Although it is slightly more expensive than the strobe light, it's signal can be shared to multiple users who installed the android app with the requirement that the android phone is connected to the internet. This project shortens evacuation time in the case of a building fire for people with hearing deficiencies thus improving the chances of them able to get to safety quickly. It is also can be shared to multiple devices for users who live in a residential building.

2.13 Statistics

**STATISTIK KEBAKARAN STRUKTUR YANG DIASASAT MENGIKUT SUMBER NYALAAAN
BAGI BULAN FEBRUARI 2018**
Statistic of Investigated Structural Fire by Source of Ignition for the month of February 2018

Jenis Premis (Premises)	Sumber Nyalaaan (Source of Ignition)													Jumlah (Total)	
	Kilat (Lightning)	Kebakaran Spontan (Spontaneous Combustion)	Matches/Lighter	Pelta/Litih/Obor (Open Flames)	Objek Permkakaan Panas/Kirpulan (Hot Surfaces)	Geseran/Hentaman (Friction)	Tindakbalas Kimia (Chemical Reaction)	Peralatan Gas (Gas Equipment)	Elektrik (Electric)	Api Berbara (Cloving Fire)	Bunga Api/Merem (Firework / Firecracker)	Letupan (Explosion)	Lain-Lain (Others)		Tidak Dapat Dipastikan (Undetermined)
Kediaman (Residental)	0	2	37	12	4	0	1	78	189	30	1	1	0	1	356
Hotel(Hotel)	0	0	0	0	1	0	0	0	3	0	0	0	0	0	4
Asrama/Hostel (Boarding/Hostel)	0	0	1	0	0	0	0	1	3	3	0	0	0	0	8
Sekolah (School)	0	0	2	0	0	0	0	0	7	2	0	0	0	0	11
Institusi Pengajian Tinggi (Higher Learning Inst.)	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Hospital/Klinik (Hospital/Clinic)	0	0	0	0	1	0	0	0	6	0	0	0	0	0	7
Pejabat (office)	0	0	0	1	2	0	0	0	15	0	0	0	0	0	18
Kedai (shop)	0	0	8	3	1	0	0	15	24	4	1	0	1	1	58
Pusat Membeli Belah (Shopping Complex)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deewan Perhimpunan (Place of Assembly)	0	0	1	0	1	0	0	0	1	0	0	0	0	0	3
Stor/Gudang (Stor/Warehouse)	0	0	10	0	1	1	0	2	6	6	0	0	1	0	27
Kilang/ Bengkel (Factory/ workshop)	1	1	5	0	11	1	0	3	28	6	0	2	0	0	58
Stesen Minyak (Petrol Station)	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Struktur Khas (Special structure)	0	0	0	0	0	0	1	1	1	0	0	0	0	0	3
Lain-lain Bangunan (Others)	0	0	8	1	0	0	0	1	5	1	0	0	0	0	16
JUMLAH (Total)	1	3	73	19	22	2	2	101	288	52	2	3	2	2	572

Table 2.1 : Fire Statistics for February 2018

This is a table for Fire Statistics for February 2018. It shows a significant increase in fire rate across the country in just one month. This statistics shows how worrying it is that how many fire can happen in just one month. Although it is not disclosed about how many of the 355 residential buildings that fire happened in that month is actually lived by deaf people, we can safely assume that a portion of it could be inhabited by deaf person. Thus what inspired us in doing this project.

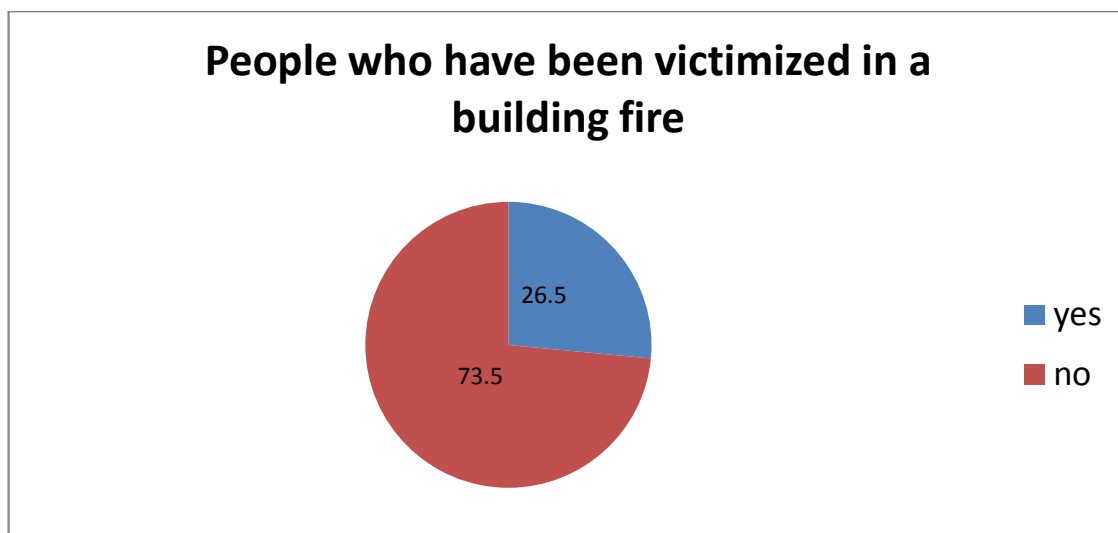


Figure 2.2 : People who have victimized in the fire building

From the statistics we gathered above from our google form questions, we can conclude that a majority of our subjected target audience of this questioner is that they never have been in a fire building thus makes them less knowing of the dangers of a fire building. This also correlates to the fact that they are in high danger of becoming a victim of a fire incident and not able to help to those who in need.

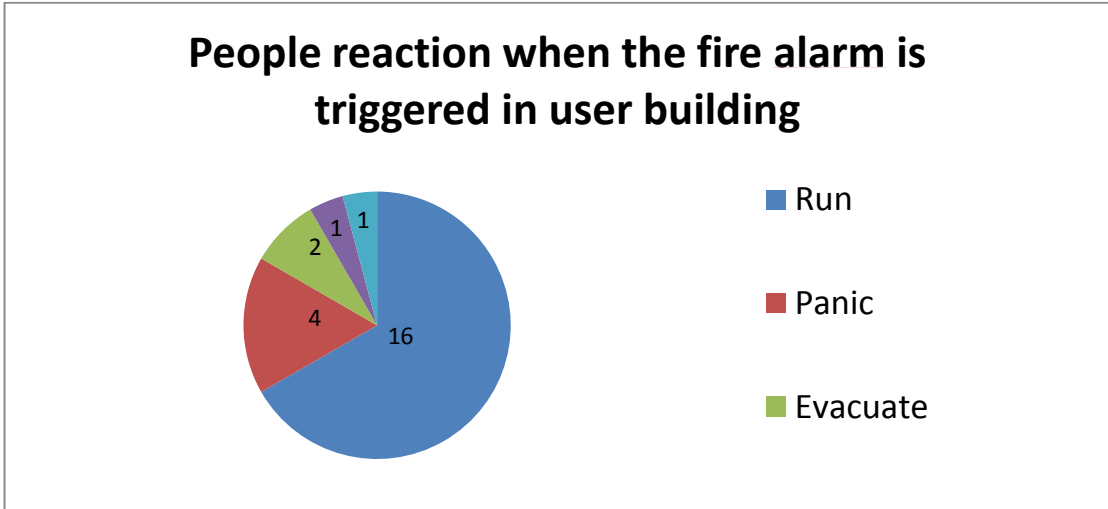


Figure 2.3 : People reaction when the fire alarm is triggered in user building

This is the continuation of the previous question, it states that our targeted audience is not prepared enough to face a fire. This threatens their survival in these types of incident. Thus we are ready to educate them because, how would they save themselves in this type of situation.

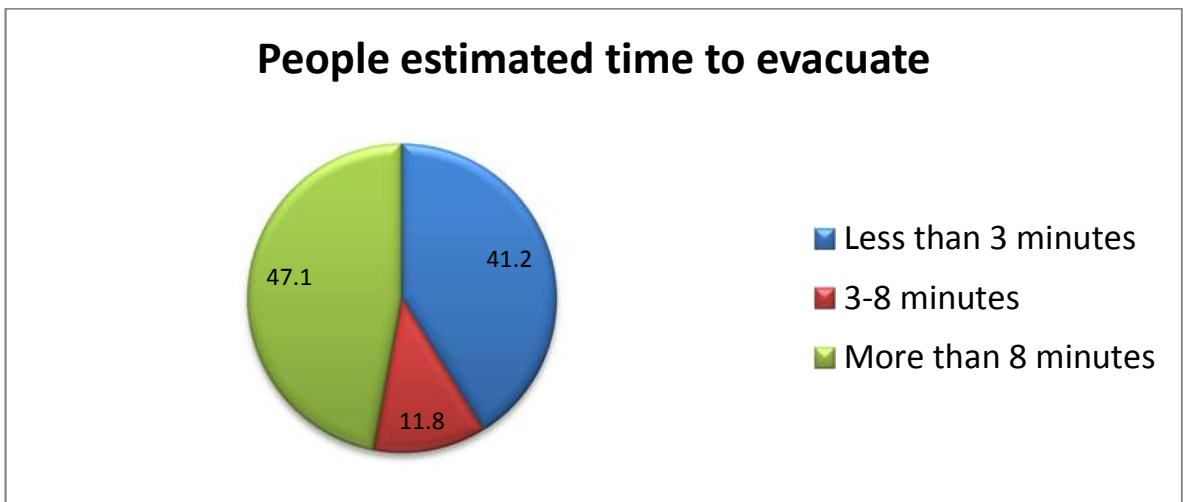


Figure 2.4 : People estimated time to evacuate

This pie chart shows that the estimated time for our targeted audience to evacuate is rather improbable as it takes longer for them to evacuate. It also decreases the chance for them to help those who are needing the help to evacuate like deaf people for example.

2.14 Articles

Three burn to death at North West school for the deaf

2015-08-24 11:41

Genevieve Quintal, News24

news24



Johannesburg - Three teenage girls were burnt to death and 23 injured when they jumped from a building at the North West School for the Deaf in Leeudoringstad which caught fire in the early hours of Monday morning.

The fire broke out at around 01:00 at the school's girls' hostel, North West police spokesperson Major Pelonomi Makau said.

"Three girls, aged 16, 17 and 18 burnt to death," he said.

"Twenty-three were injured due to jumping from the first floor of the building to the ground floor when they were trying to escape the fire."

The injured were taken to hospital and were being treated for smoke inhalation and injuries sustained when they jumped from the building, said Makau.

A computer room was also damaged by the fire.

Twenty-two computers and an unknown number of laptops were damaged.

Makau said the cause of the fire was not known and was being investigated.



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Related Links

• [Durban shack fire victims given temporary](#)

Figure 2.5 : Article about the fire happening in a school for deaf in South Africa

This is an article from News24 which is a reputable source of news from South Africa. This article is about three teenage girls that were burnt to death and 23 others injured in a building fire for those who are deaf. The school these students attend is a school

for the deaf. Thus explains why they didn't heard the fire alarm when it's triggered. From the report, we see that the investigation team still doesn't know what causes the fire to happened.



A fire in a boarding school for the deaf in southern Russia killed 28 children and seriously injured 17 Thursday, as rescuers had to race from bed to bed to individually awake students who could not hear alarms.

Firefighters saved 138 people in the two-story Republican School for Deaf Children. Many survived only after being thrown from second-story windows onto mattresses and other bedding used to break their fall, teacher Marzhanat Aliyeva said.

Some of the school's older children also helped to lead younger students to safety, emergency officials said. The school was home to students between the ages of 6 and 14.

All of those rescued were hospitalized, many with burns, smoke inhalation, fractures and shock, said Ramazan Magomedov, deputy chief doctor at the main hospital in Makhachkala, 1,000 miles south of Moscow. Seventeen were listed in serious condition.

Figure 2.6 : Article about fire happened in a school for deaf in Russia

This is an old article from MoscowCosmo which explains the tragedy where in a boarding school for the deaf, a fire happened and kills 28 and injured 17. It is a known worry for even in urban areas, this could be a problematic situation thus this project helps in helping these childrens to evacuate easier.

CHAPTER 3

METHODOLOGY

3.1 Method Introduction

We aim to create a system to alleviate the trouble for the people who are deaf to notice a fire alarm being triggered. We can see that the fire alarm could not trigger the hearing senses of the deaf people. The way we do it is by firstly, find a way to gather signal from fire alarm to the desired destination. After that, the signal gathered must be converted from analog to digital. And then, the data is analysed by our microcontroller and set to specific instructions. After that is done, we also must find a route to connect our microcontroller to our phone application. Thus why we decided on using the NodeMCU for its ability to connect to the internet via wifi and the using of an online database and server is justified because we are needing a way to store data temporarily for the app to used. Lastly, we need a way to make an app that able to vibrate the phone in the case of a fire happened to notify those who are deaf.

3.2 Flowchart

From the figure below, we start the process by defining the password and the SSID of the wifi connection to connect to the wifi. Continue from that, we also read the analog pin on which the sensor is being set. The value from the sensor is then calculated, converted and then evaluated to see if there is considered a fire happening. Either if it happened or not, the server will be notified of the current condition of the fire alarm. It is after that is the app gathers the data from the server to the app. On the serial monitor of the ArduinoIDE, we can see the server response and the server code after which the link is set.

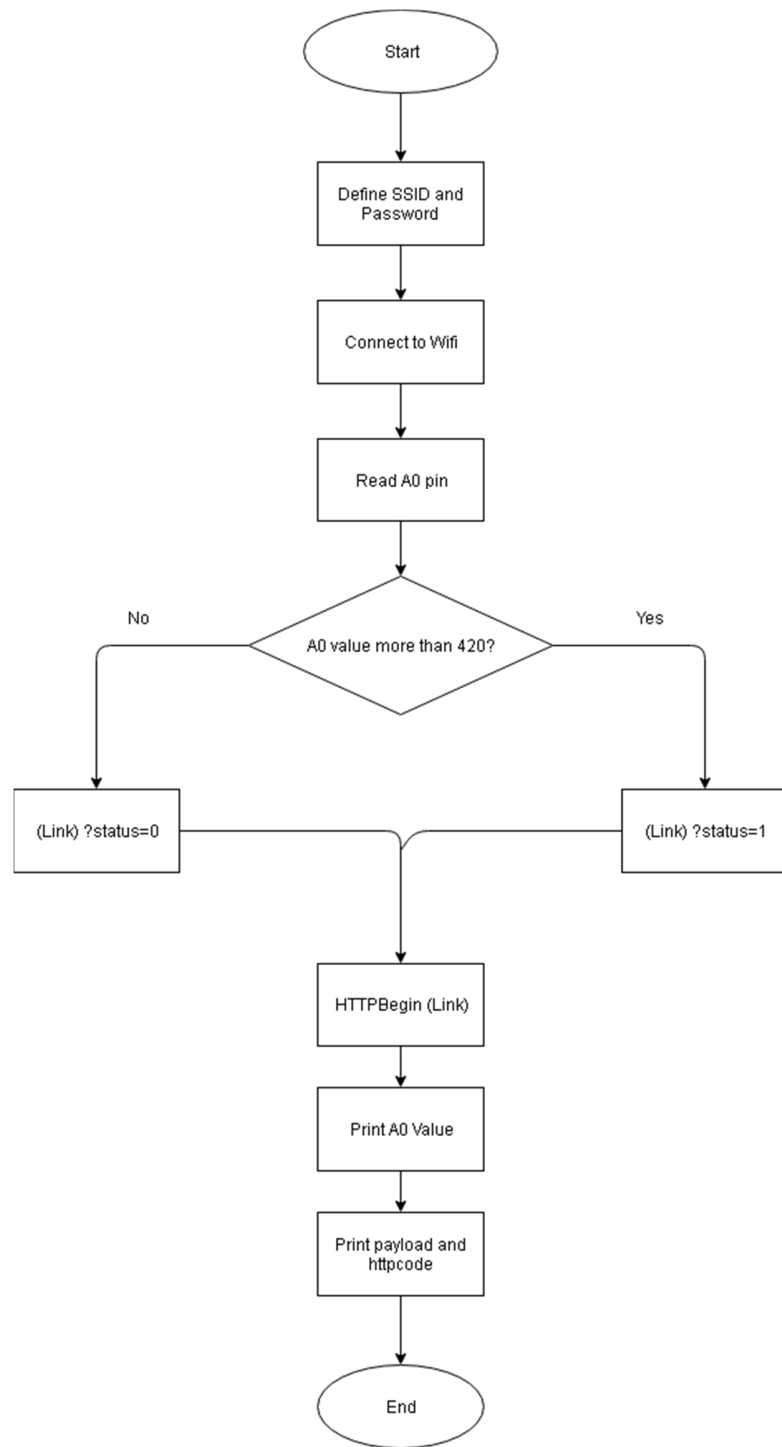


Figure 3.1 : Operational Flowchart

3.3 Block Figure

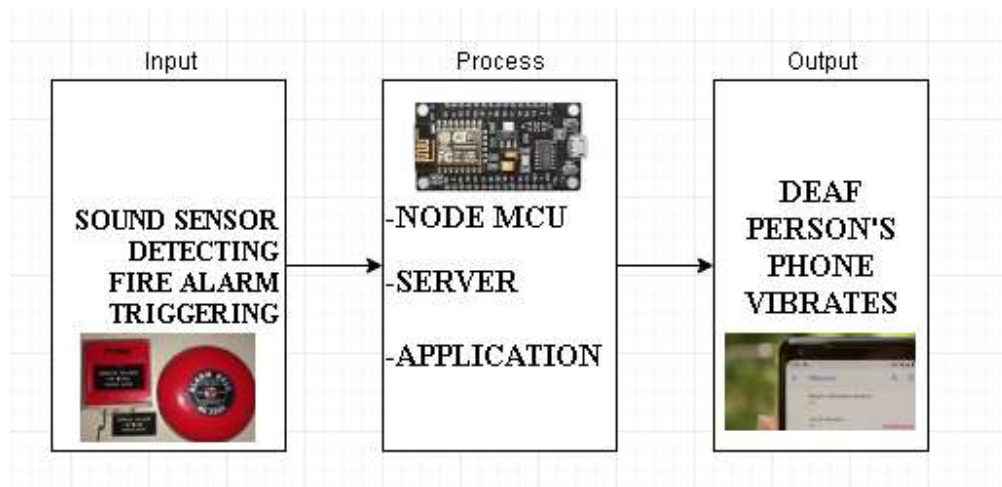


Figure 3.2 : Block Diagram

From the Block Diagram above, we first start at the input which is the Sound Sensor itself. After the sound sensor detected the fire alarm triggered, The NodeMCU sends to the server and then sends to the application the data. After which if the fire alarm is triggered, the app vibrates the phone. Otherwise, the phone does nothing and works like usual.

3.4 Arduino IDE

The Arduino integrated development environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards.

The source code for the IDE is released under the GNU General Public License, version 2. The Arduino IDE supports the languages C and C++ using special rules of code structuring.

The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub `main()` into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution. The Arduino IDE employs the program `avrdude` to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.



Figure 3.3 : UI for Arduino IDE



Figure 3.4 : The Arduino IDE logo

The Arduino IDE is incredibly minimalistic, yet it provides a near-complete environment for most Arduino-based projects. The top menu bar has the standard options, including “File” (new, load save, etc.), “Edit” (font, copy, paste, etc.), “Sketch” (for compiling and programming), “Tools” (useful options for testing projects), and “Help”. The middle section of the IDE is a simple text editor that where you can enter the program code. The bottom section of the IDE is dedicated to an output window that is used to see the status of the compilation, how much memory has been used, any errors that were found in the program, and various other useful messages.

Projects made using the Arduino are called sketches, and such sketches are usually written in a cut-down version of C++ (a number of C++ features are not included). Because programming a microcontroller is somewhat different from programming a computer, there are a number of device-specific libraries (e.g., changing pin modes, output data on pins, reading analog values, and timers). This sometimes confuses users who think Arduino is programmed in an “Arduino language.” However, the Arduino is, in fact, programmed in C++. It just uses unique libraries for the device.

3.5 MIT App Inventor



Figure 3.2 : The MIT App Inventor logo

App Inventor for Android is an open-source web application originally provided by Google, and now maintained by the Massachusetts Institute of Technology (MIT). It allows newcomers to computer programming to create software applications for the Android operating system (OS). It uses a graphical interface, very similar to Scratch and the StarLogo TNG user interface, which allows users to drag-and-drop visual objects to create

an application that can run on Android devices. In creating App Inventor, Google drew upon significant prior research in educational computing, as well as work done within Google on online development environments.

Nowadays, there is a common tendency to seek simpler and faster solutions that could be used in a process of software development. At the same time two other trends can be observed - rapid increase of mobile applications popularity and introducing IT concepts to non-IT specialists. This is why App Inventor 2 is one of the tools that software development community is interested in. The goal of this prospect is to verify the possibility of using App Inventor as a tool for creating personal applications and compare it with possibilities given by Java, which is a native environment for Android platform. Comparison was based on application for managing personal text notes which was created in both solutions. The application had the same layout as well as analogical code, and it was the subject of performance tests followed by a survey. Performance test revealed that both implementations provided efficiency which is good enough for everyday use and small size personal applications. Survey participants preferred application built in Java due to its better responsiveness and visual appearance. Concluding, current shape of App Inventor, makes it useless for professionals, but useful for non-IT specialists for creating personal applications.

3.6 000webhost

Web hosting is a service that allows organizations and individuals to post a website or web page onto the Internet. A web host, or web hosting service provider, is a business that provides the technologies and services needed for the website or webpage to be viewed in the Internet. Websites are hosted, or stored, on special computers called servers. When Internet users want to view user website, all they need to do is type user website address or domain into their browser. Their computer will then connect to user server and user webpages will be delivered to them through the browser.

There are two main ways of uploading files to the free web hosting service:

- The first option - using the browser-based file manager. This tool allows you to navigate, upload and delete files on the web server. User can access this feature through user control panel.
- The second option is using FTP. FTP stands for File Transfer Protocol. These services allow you to conveniently manage the files in a similar way to a file manager.

All free hosting package users are eligible to receive a free subdomain, which comes in the form of example.000webhostapp.com.

However, if the user wishes to use a top-level domain, the option is available. You may use an existing domain from another registrar and park it on top of user free web hosting account. Alternatively, users may register a top-level domain with them and use it as well.

All 000webhost servers use advanced firewalls and include DDoS protection. A dedicated admin team also monitors the server around the clock. This ensures that user's website is up and running with the least amount of possible interferences or issues.

However, the security of a website usually depends on the software that it uses and the vulnerabilities that exist within it. That being said, it's important to keep everything updated and to use tools from trusted providers only.



Figure 3.3 : The 000webhost logo

3.7 MySQL



Figure 3.4 : The MySQL logo

MySQL is an open-source relational database management system. Its name is a combination of “My”, the name of co-founders Michael Widenius's daughter, and "SQL", the abbreviation for Structured Query Language. Many of the world's largest and fastest-growing organizations including Facebook, Google, Adobe, Alcatel Lucent and Zappos rely on MySQL to save time and money powering their high-volume Web sites, business-critical systems and packaged software. MySQL is a component of the LAMP web application software stack (and others), which is an acronym for Linux, Apache, MySQL, Perl/PHP/Python.

The MySQL server software itself and the client libraries use dual-licensing distribution. They are offered under GPL version 2, or a proprietary license.

Support can be obtained from the official manual. Free support additionally is available in different IRC channels and forums. Oracle offers paid support via its MySQL Enterprise products. They differ in the scope of services and in price. Additionally, a number of third party organisations exist to provide support and services, including MariaDB and Percona.

MySQL has received positive reviews, and reviewers noticed it "performs extremely well in the average case" and that the "developer interfaces are there, and the documentation (not to mention feedback in the real world via Web sites and the like) is

very, very good".It has also been tested to be a "fast, stable and true multi-user, multi-threaded sql database server".

3.8 PHP MySQL Database

The data in a MySQL database are stored in tables. A table is a collection of related data, and it consists of columns and rows.

Databases are useful for storing information categorically. A company may have a database with the following tables:

- Employees
- Products
- Customers
- Orders

In the case of this project, the database consists of:

- The number of data in storage
- The time and date of the data
- The status of the fire alarm
- Location

					id	status	location	time		
<input type="checkbox"/>		Edit		Copy		Delete	4326	0	2019-07-09 10:48:29	
<input type="checkbox"/>		Edit		Copy		Delete	4327	0	2019-07-09 10:48:32	
<input type="checkbox"/>		Edit		Copy		Delete	4328	0	2019-07-09 10:48:36	
<input type="checkbox"/>		Edit		Copy		Delete	4329	0	2019-07-09 10:48:40	
<input type="checkbox"/>		Edit		Copy		Delete	4330	0	2019-07-09 10:48:44	
<input type="checkbox"/>		Edit		Copy		Delete	4331	1	2019-07-14 03:21:09	
<input type="checkbox"/>		Edit		Copy		Delete	4332	1	A	2019-07-14 03:25:38
<input type="checkbox"/>		Edit		Copy		Delete	4333	1	A	2019-07-15 11:58:36
<input type="checkbox"/>		Edit		Copy		Delete	4334	0	A	2019-07-15 11:58:46
<input type="checkbox"/>		Edit		Copy		Delete	4335	1	A	2019-07-16 12:02:00
<input type="checkbox"/>		Edit		Copy		Delete	4336	1	B	2019-07-16 12:02:09
<input type="checkbox"/>		Edit		Copy		Delete	4337	1	A	2019-07-16 12:03:41
<input type="checkbox"/>		Edit		Copy		Delete	4338	1	B	2019-07-16 12:03:53
<input type="checkbox"/>		Edit		Copy		Delete	4339	1	B	2019-07-16 12:08:45
<input type="checkbox"/>		Edit		Copy		Delete	4340	1	A	2019-07-16 12:09:26
<input type="checkbox"/>		Edit		Copy		Delete	4341	0	A	2019-07-16 12:14:42
<input type="checkbox"/>		Edit		Copy		Delete	4342	1	A	2019-07-16 12:15:18
<input type="checkbox"/>		Edit		Copy		Delete	4343	0	A	2019-07-16 12:21:02
<input type="checkbox"/>		Edit		Copy		Delete	4344	1	A	2019-07-16 12:21:39

Table 3.1 : Data in database for fire alarm system

The location tab represents A and B which is the two locations tested. The “1” and “0” in the status tab represents the status which is “1” for on and “0” for off.

3.9 Communicating with the Web

Mobile technology and the ubiquitous nature of the Web have changed the world we live in. Users can now sit in the park and do user banking, and check Twitter to see what people in every other park in the world are thinking about. Mobile phones have moved well past

just calling and texting—now, you have instant access to the world’s data, too. You can use user phone’s browser to reach the Web, but often the small screen and limited speed of a mobile device can make this problematic. Custom apps, specially designed to pull in small chunks of particularly suitable information from the Web, can provide a more attractive alternative to the mobile browser.

The WebView component lets people show a web page within user app. It can show a Google Maps page showing the user’s current location, a twitter page showing the most recent trending topics related to users app, or a page from nba.com showing the statistics for favorite players. WebView is like the Canvas component in that it defines a subpanel of the screen. But whereas Canvas is used for drawings and animations, WebView shows a web page.

Whereas WebView displays a web page, the Web component, a relatively new component in App Inventor, facilitates an app communicating with a web service via the standard Hypertext Transfer Protocol (HTTP). That protocol provides Get, Put, and Post methods for bringing information into user app. The information arrives not as a displayable page, but as data that you can display or process as users like. The component is fairly low level, and using it requires some programming expertise. You typically set the Web.URL property to specify which web service you will communicate with, and then you call one of the HTTP methods to request some action. It’s complicated because you need to understand the API of the web service (the protocol for communication), and you need to understand how to process the information that the web service returns to user app. This processing is known as parsing, and it is an advanced programming technique.

3.10 TinyWebDB

This demonstration Web service is designed to work with App Inventor for Android and the TinyWebDB component. The site is designed for use by applications running on the

phone (via JSON requests). Users can also invoke the get and store operations by hand from this Web page to test the API, and also delete individual entries.

This service is only a demo. The database will store at most 2000 entries, adding entries beyond that will cause the oldest entries to be deleted. Also, individual data values are limited to at most 500 characters.

The source code for this service, designed to run on Google AppEngine, is included in the App Inventor documentation. Users can use this implementation as a model for deploying their own services with larger capacity and additional features, and build applications that use the TinyWebDB component to talk to their service.

3.11 HTTP Request Methods

The Hypertext Transfer Protocol (HTTP) is designed to enable communications between clients and servers. HTTP works as a request-response protocol between a client and server. A web browser may be the client, and an application on a computer that hosts a web site may be the server.

Example: A client (browser) submits an HTTP request to the server; then the server returns a response to the client. The response contains status information about the request and may also contain the requested content.

Examples of the methods are:

- GET
- POST
- PUT
- HEAD

- DELETE
- PATCH
- OPTIONS

The methods that is easier to be used in this situation are GET and POST in which it will be discussed further.

3.12 POST method

In computing, POST is a request method supported by HTTP used by the World Wide Web. By design, the POST request method requests that a web server accepts the data enclosed in the body of the request message, most likely for storing it. It is often used when uploading a file or when submitting a completed web form.

In contrast, the HTTP GET request method retrieves information from the server. As part of a GET request, some data can be passed within the URL's query string, specifying (for example) search terms, date ranges, or other information that defines the query.

As part of a POST request, an arbitrary amount of data of any type can be sent to the server in the body of the request message. A header field in the POST request usually indicates the message body's Internet media type.

3.13 GET method

The GET method is used to retrieve information from the given server using a given URI. Requests using GET should only retrieve data and should have no other effect on the data. A GET request retrieves data from a web server by specifying parameters in the URL portion of the request.

This is the main method used for document retrieval. Its simple endeavor is the reason we choose this method. A data can be retrieved by typing the html that shows the data and in Arduino IDE. The data can be used in whatever the reason to code. It is also possible to alter the data in any way thus why we need to secure the information of the html of the database to save the project from destruction.

Below shows an example on the GET method to reach a data from hello.htm:

```
GET /hello.htm HTTP/1.1
User-Agent: Mozilla/4.0 (compatible; MSIE5.01; Windows NT)
Host: www.tutorialspoint.com
Accept-Language: en-us
Accept-Encoding: gzip, deflate
Connection: Keep-Alive
```

Figure 3.5 : Example of GET method

And this is the server response from the request:

```
HTTP/1.1 200 OK
Date: Mon, 27 Jul 2009 12:28:53 GMT
Server: Apache/2.2.14 (Win32)
Last-Modified: Wed, 22 Jul 2009 19:15:56 GMT
ETag: "34aa387-d-1568eb00"
Vary: Authorization,Accept
Accept-Ranges: bytes
Content-Length: 88
Content-Type: text/html
Connection: Closed
```

Figure 3.6 : Server Response from request

```
<html>
<body>
<h1>Hello, World!</h1>
</body>
</html>
```

Figure 3.7 : Server Response from request

3.14 Android SDK

The Android software development kit (SDK) includes a comprehensive set of development tools. These include a debugger, libraries, a handset emulator based on QEMU, documentation, sample code, and tutorials. Currently supported development platforms include computers running Linux (any modern desktop Linux distribution), Mac OS X 10.5.8 or later, and Windows 7 or later. As of March 2015, the SDK is not available on Android itself, but software development is possible by using specialized Android applications.

Until around the end of 2014, the officially-supported integrated development environment (IDE) was Eclipse using the Android Development Tools (ADT) Plugin, though IntelliJ IDEA IDE (all editions) fully supports Android development out of the box, and NetBeans IDE also supports Android development via a plugin. As of 2015, Android Studio, made by Google and powered by IntelliJ, is the official IDE; however, developers are free to use others, but Google made it clear that ADT was officially deprecated since the end of 2015 to focus on Android Studio as the official Android IDE. Additionally, developers may use any text editor to edit Java and XML files, then use command line tools (Java Development Kit and Apache Ant are required) to create, build and debug Android applications as well as control attached Android devices (e.g., triggering a reboot, installing software package(s) remotely).

Enhancements to Android's SDK go hand-in-hand with the overall Android platform development. The SDK also supports older versions of the Android platform in case developers wish to target their applications at older devices. Development tools are downloadable components, so after one has downloaded the latest version and platform, older platforms and tools can also be downloaded for compatibility testing.

Android applications are packaged in .apk format and stored under /data/app folder on the Android OS (the folder is accessible only to the root user for security reasons). APK package contains .dex files (compiled byte code files called Dalvik executables), resource files, etc.

3.15 MIT App Inventor 2 Block Chart

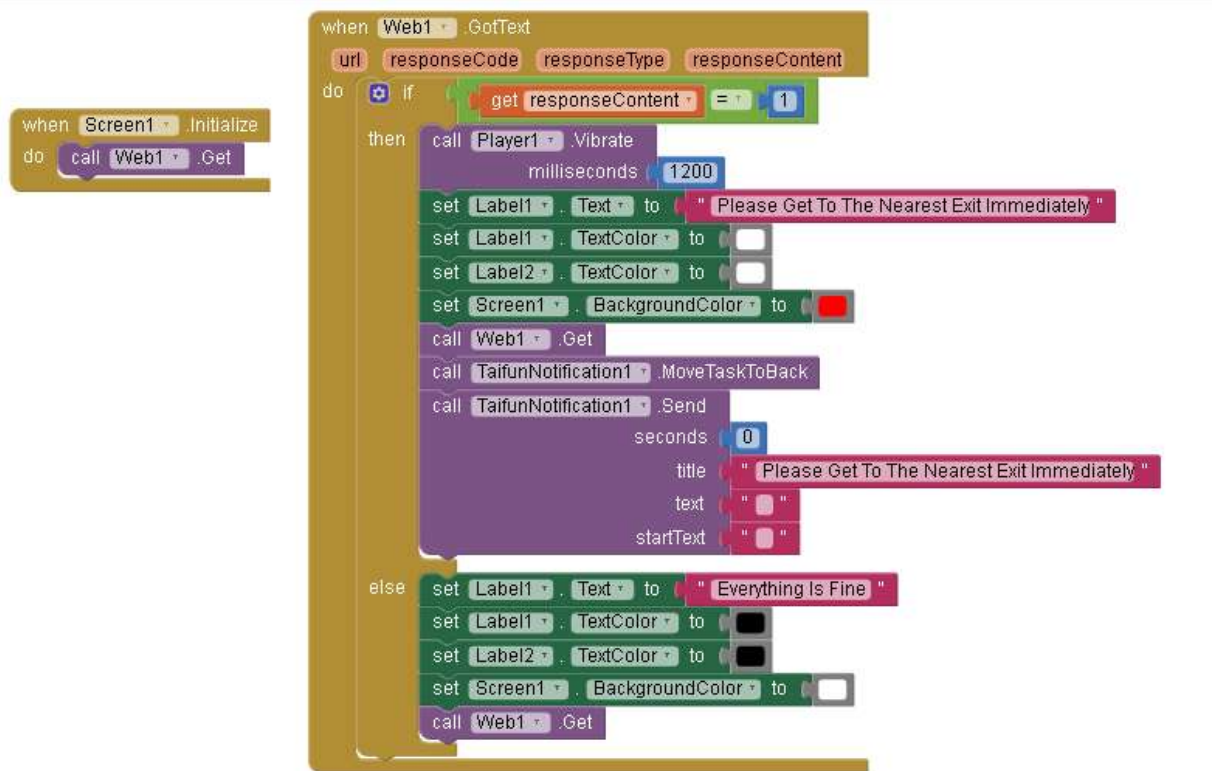


Figure 3.8 : Block Programming of the app

This is the block programming for the app. The block programming method is an easy way to code a program without typing. It is also beginner friendly to learn as the drag and drop way is easy enough to learn even for those who are very inexperienced in coding. The MIT APP Inventor also give tutorials for users to learn every command and its meaning. For example, the command call web is used to issue a GET command to get data from our server. Other than that, we can see examples like vibrate that like the name suggest, vibrates the phone when a certain conditions is met.

3.16 Costing

Myinvent Technologies Sdn Bhd (1269907W) No. 7A, Jalan Badminton 13/29, Section 13, Tadisma Business Park, 40100 Shah Alam, Selangor, Malaysia. Tel/Fax: 03-5523 5321 Website: www.myduino.com		INVOICE INV#: S1900115 Date: 20/02/2019 By: adibahazmi Status: PAID	
Customer: Walk-In Customer Selangor, Malaysia			
No	Description	Unit	Price Amount
1	NodeMCU - Arduino IOT Platform with Silicon Labs USB Serial Chip (MYP-CHN-021)	1	45.00 45.00
2	Dupont Jumper Wire M/M (MYP-KEY-034)	1	5.70 5.70
3	Analog Sound Sensor for Arduino (MYP-KEY-016)	1	25.00 25.00
4	Breadboard (MYP-CHN-087)	1	18.00 18.00
		4	Subtotal: 93.70
			Total (MYR): 93.70
			Payment: 93.70
			Balance: 0.00
Direct Deposit Company Bank Account: Bank Name : CIMB BANK BERHAD Beneficiary Name : MYINVENT TECHNOLOGIES SDN BHD Beneficiary Acc. No. : 8603236982 Paypal Payment Link : azmi@myduino.com			
Issued by:		Accepted by:	

Figure 3.9 : Purchasing Receipt from first time purchase items

Components	Number of unit/s	Price for each item (RM)	Total (RM)
NodeMCU	1	RM 45	RM 45
Jumper Wire M/M	1	RM 5.70	RM 5.70
Jumper Wire F/M	1	RM 5.70	RM 5.70
Analog Sound Sensor	1	RM 25	RM 25
PCB board	1	RM 45	RM 45
Alarm Bell	1	RM 24	RM 24
Capacitors	2	RM 0.60	RM 1.20
Adapter 12V	1	RM 15	RM 15
Power Adapter Jack	1	RM 1	RM 1
Volt Regulator IC	1	RM 2	RM 2
Casing	1	RM 55	RM 55
Model	1	RM 50	RM 50

Table 3.2 : Estimated Cost until week 15

CHAPTER 4

RESULTS

4.1 How the App integrates with the System



Figure 4.1 : App when there is no fire

This is a screenshot of the screen when the fire alarm is not triggered. It shows the message “everything is fine” as if to indicate the user is safe condition. This message shows the user to continue routine uninterrupted. Also the white background can leave an assuring feeling for the user using as to not alert them of anything.

From the understanding of Bleicher, Steven (2012) research on the psychology of colours towards human reaction, the colour white can signify clarity as if saying to the user to stay calm.

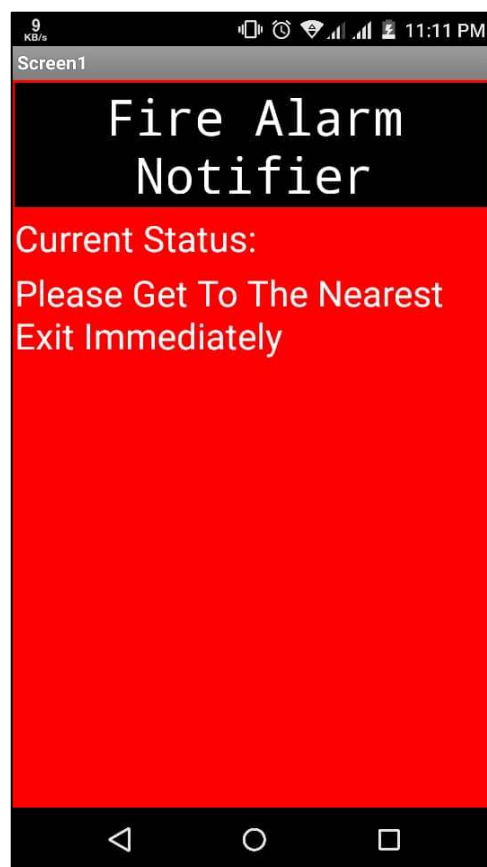


Figure 4.2 : App when there is fire

This is a screenshot of the screen when the fire alarm is triggered. It shows the message “Please Get To The Nearest Exit Immediately” urge the user to immediately evacuate the premise. This message shows the user to stop whatever he or she is doing

and proceed to save their self. Also the Bright Red background leaves an urgency for the user to react immediately.

From the understanding of Bleicher, Steven (2012) research on the phycology of colours towards human reaction, the colour Red especially Brighter hue of red can set our minds to be more aware of our surrounding. This theory is further backed by the fact that the colour red is always considered to be a sign of danger back even from the ages of ancient China. Thus, even from ages of innovation, our minds have been “hard coded” to accept the colour red as a sign of danger.

4.2 Overview of product

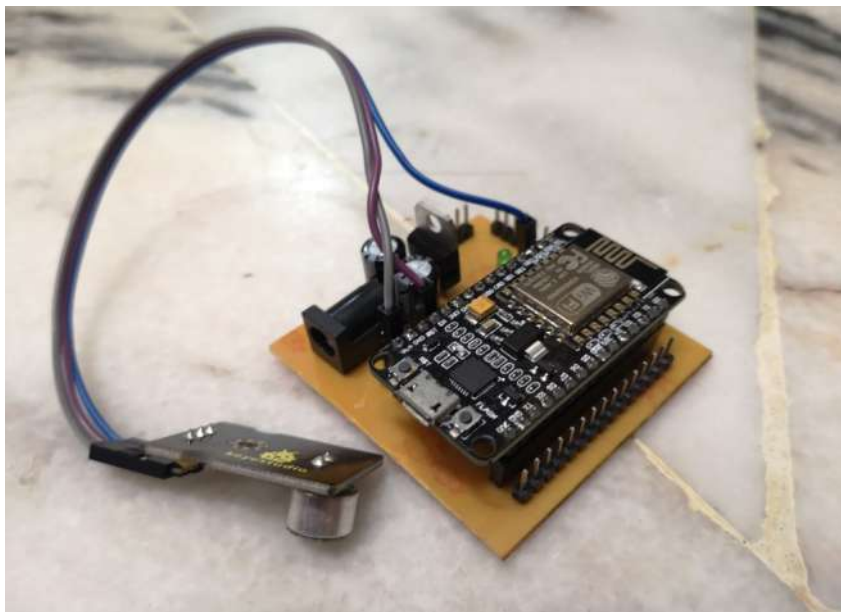


Figure 4.3 : The Circuit of the NodeMCU and the sound sensor



Figure 4.4 : The Model of the project



Figure 4.5 : The Model of the project without the decal

Chapter 5

ANALYSIS AND DISCUSSION

5.1 Project Progress

First of all our main objective to make this project is to help a people with less ability or for disabled people, especially for hearing problem and deaf people. We build this project to help them to notice the emergency situation. Because some of people like having a hearing problem will not know the current situation, such as building on fire. If fire in the buiding the first thing will detect by smoke detector and it will automatically make the water sprinkle in whole buiding also it triggered the alarm bell the problem is for normal people they will notice and hear the alarm because they can hear it but not for them, most of them will not notice the situation because they can't hear it. So we make this project to help them. Our project is using Node MCU ESP 8266, we using this because to make as our microcontroller in our project. Node MCU As Arduino.cc began developing new MCU boards based on non-AVR processors like the ARM/SAM MCU and used in the Arduino Due, they needed to modify the Arduino IDE so that it would be relatively easy to change the IDE to support alternate toolchains to allow Arduino C/C++ to be compiled for these new processors. They did this with the introduction of the Board Manager and the SAM Core. A "core" is the collection of software components required by the Board Manager and the Arduino IDE to compile an Arduino C/C++ source file for the target MCU's machine language. Some ESP8266 enthusiasts developed an Arduino core for the ESP8266 WiFi SoC, popularly called the "ESP8266 Core for the Arduino IDE".[16] This has become a leading software development platform for the various ESP8266-based modules and development boards, including NodeMCUs.

We also use a Keyestudio Ks0035 Analog Sound Sensor, its for our transmitter for sound detection. The sound sensor has a built-in capacitive electret microphone which is highly sensitive to sound. Sound waves cause the thin film of the electret to vibrate and then the capacitance changes, thus producing the corresponding changed voltage. Since the voltage change is extremely weak, it needs to be amplified. So it is converted into a voltage ranging from 0 to 5V, which is received by data acquisition unit after A/D adapter conversion and then sent to an MCU.

5.2 Suggestion

In future time, for those who interested to innovated or improve our project such as for example to adapt more than one location for a different place, this is to make easier which means the app will response depends on the current location for example if a person in the building A the app will detect in the building A and when the person go to the building B the app will automatically change the location to the building B. For now we just make for one location Beside that, for the app also can improve or if want to use another server to create the app and make the app can put another option such as put the emergency exit when the emergency happen in the current building this is to make them easy to know the exit or also can make the app pin the current location in the building if the person were stuck in the building they can sent the location to the fire fighter or to the people who have the app . Furthermore, if the alarm bell triggered and make the app automatically pop out to the screen and vibrate, this to make them notice quickly that they in dangerous.

5.3 Internet of Thing (IoT)

The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

The definition of the Internet of Things has evolved due to the convergence of multiple technologies, real-time analytics, machine learning, commodity sensors, and embedded systems. Traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others all contribute to enabling the Internet of Things. In the consumer market, IoT technology is most synonymous with products pertaining to the concept of the "smart home", covering devices and appliances (such as lighting fixtures, thermostats, home security systems and cameras, and other home appliances) that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smartphones and smart speakers.

There are a number of serious concerns about dangers in the growth of IoT, especially in the areas of privacy and security; and consequently industry and governmental moves to begin to address these

5.4 IoT Work

The devices that contribute to the Internet of Things span personal, household, public, business and industrial spaces, and any area that's not affected by them now likely will be in the future. The smart gadgets that many of us see and interact with daily are our Internet-connected smartphones, which have sensors including accelerometers,

gyroscopes, GPS and sometimes heart-rate monitors, but those are just the tip of the iceberg.

We're in the early stages of smart cities, where entire metros are being covered in sensors and other tech. Devices that can take sensor readings and transmit them are ideal for things like utility usage monitoring; in most areas this still requires workers taking meter readings from individual houses. Smart devices could enable monitoring for hazardous road conditions, pollution levels, and water and energy consumption. Roads will (and in some cases do) have sensors to detect potential headaches like traffic and road conditions. Smart cars or smartphones in the vicinity can be alerted to traffic delays. Other potential uses include adjusting traffic lights to suit real-time conditions, monitoring garbage cans to know when they need pickup and providing information on available parking. Scientists are working on tiny sensors to place in cement and other materials so the physical condition of the infrastructure itself can be detected before structural issues lead to disasters such as bridge collapses.

There are already a lot of connected devices in use in the healthcare industry, and many more are in the works. Doctors and other caregivers will be able to monitor patients' vital signs, activity and other important metrics remotely, saving lives and perhaps allowing elderly people to live independently longer. Embedded sensors in hospital beds and garments can also gather important data about patients, and researchers are working on things like carpets that can detect falls and tiny computing equipment that can be injected into the human body.

5.5 Importance of IoT

The Next Industrial Revolution which is going to change our lives in ways never imagined before, The last industrial revolution which is nothing but INTERNET the way we communicate and connect with people has changed like never before and also the Internet boom has improved our lives in many ways. Every time a Industrial Revolution

happens there will be huge changes in the economy create a whole new level of markets. Rapid changes in IOT technology makes it a challenging task for the most experienced experts to anticipate the future of standardization in the field. For humanity, which is moderately clutter by nature, the IoT is an extraordinary advancement. On the other hand, for individuals who esteem their security, the Man to Man helps in interconnecting different electronic gadgets. IOT has arrived with a highly believable promise of giving individuals few more free hours by automating few tasks and boosting productivity of businesses by making better use of data.

5.6 Advantages of IoT

- **Communication**

IoT encourages the communication between devices, also famously known as Machine-to-Machine (M2M) communication. Because of this, the physical devices are able to stay connected and hence the total transparency is available with lesser inefficiencies and greater quality.

- **Automation and Control**

Due to physical objects getting connected and controlled digitally and centrally with wireless infrastructure, there is a large amount of automation and control in the workings. Without human intervention, the machines are able to communicate with each other leading to faster and timely output.

- **Information**

It is obvious that having more information helps making better decisions. Whether it is mundane decisions as needing to know what to buy at the grocery store or if your company has enough widgets and supplies, knowledge is power and more knowledge is better.

- Monitor

The second most obvious advantage of IoT is monitoring. Knowing the exact quantity of supplies or the air quality in your home, can further provide more information that could not have previously been collected easily. For instance, knowing that you are low on milk or printer ink could save you another trip to the store in the near future. Furthermore, monitoring the expiration of products can and will improve safety.

- Time

As hinted in the previous examples, the amount of time saved because of IoT could be quite large. And in today's modern life, we all could use more time.

- Money

The biggest advantage of IoT is saving money. If the price of the tagging and monitoring equipment is less than the amount of money saved, then the Internet of Things will be very widely adopted. IoT fundamentally proves to be very helpful to people in their daily routines by making the appliances communicate to each other in an effective manner thereby saving and conserving energy and cost. Allowing the data to be communicated and shared between devices and then translating it into our required way, it makes our systems efficient. Automation of daily tasks leads to better monitoring of device. The IoT allows you to automate and control the tasks that are done on a daily basis, avoiding human intervention. Machine-to-machine communication helps to maintain transparency in the processes. It also leads to uniformity in the tasks. It can also maintain the quality of service. We can also take necessary action in case of emergencies.

- Efficient and Saves Time

The machine-to-machine interaction provides better efficiency, hence; accurate results can be obtained fast. This results in saving valuable time. Instead of repeating the same tasks every day, it enables people to do other creative jobs.

- Saves Money

Optimum utilization of energy and resources can be achieved by adopting this technology and keeping the devices under surveillance. We can be alerted in case of possible bottlenecks, breakdowns, and damages to the system. Hence, we can save money by using this technology.

- Better Quality of Life

All the applications of this technology culminate in increased comfort, convenience, and better management, thereby improving the quality of life.

5.7 IoT Security Issue

- Impersonation/Identity Spoofing:

This attack aims at communicating on behalf of a legitimate thing in an unauthorized way, by making use of its identity. An attacker could spoof the identity of some one's smart Meter, in-order to make it paying for its energy consumption.

- Eavesdropping:

Since objects/devices on the IoT-based SG communicate, often using public communication infrastructure, an attacker can easily have access to their exchanged data. An attacker can easily know the energy consumption of households

- Data tampering:

An attacker can modify exchanged data, such as dynamic prices sent prior to peak periods, making them lowest prices. As a consequence, this could make households increasing their consumption (charging e-cars, etc.) instead of reducing them, thus resulting in overloaded power network.

- Authorization and Control Access issues:

Since several devices could be monitored and configured remotely, such as smart meters, or field deployed sensors and actuators in distribution substations, an attacker or even an angry employee, could try to gain an unauthorized access rights, to manipulate them, thus damaging physical assets (ex, transformers) or leading to power outages.

- Privacy issue:

Smart meters and smart appliances in residential houses, could tell more than the energy consumption. Their generated fine-grained data could harm the privacy of the end-user, by divulging information about their habits (wake up, sleeping and dinner times, etc.), if they are in or away from house, if they are on vacation, etc.

- Compromising and Malicious code:

Since objects of the SG are computation and communication enabled, they are target to compromising physically or remotely. Moreover, since they run different kind of software, they could be target of different kind of software infection or malicious code infection in-order to control and

manipulate them (ex, targeting smart meters, or smart appliances in households). Moreover, massively deployed objects with constrained devices (sensors, etc.) are usually non-tamper-resistant devices, making physical compromising an easy task

- Availability and DoS issues:

In the classical power grid, it was difficult, if not impossible, to target the availability of assets (electricity meters, substations, etc.), especially at a large scale. In the SG, ICT will be integrated even in the vital assets of the power grid, thus making it possible to target them, making them partially or totally unavailable resulting on DoS attack. Moreover, assuming that most devices/things are IP-enabled and do not run proprietary protocols stacks, the task of a familiar Internet attacker will be easier.

- Cyber-attack:

The SG could be seen as the largest Cyber-Physical-System (CPS)⁶, involving Physical systems representing the physical assets of the SG (transformers, circuit breakers, smart meters, cables, etc.) and ICT systems, where ICT elements control/manage physical entities. Now, a Cyber-attack could harm the physical assets - as was the case with the Stuxnet attack ⁷-, which was difficult in the classical power grid.

5.8 Result

For the result, in this project we have tested and it work properly. This project will detect the sound of fire alarm by Ks 0035 Keystudio Analog Sound Sensor it will detect the sound and convert it into digital and sent it to the our microcontroller that is Node MCU esp8266, we use Node MCU because its ability to connect the wifi in use for our project. After that, the data will sent it to the server that we created, we use 000webhost to web hosting, it allow to post the web site onto internet, Websites are hosted, or stored, on special computers called servers, the data will save in the server then it will sent it to our

application that we created. For the app we use MIT App Inventor, app inventor for android is an open source web application provided by Google. It for the newcomers to computer programming to create software application. So the data will sent to the app from the server and the phone will pop out the emergency notification and vibrate. To make the phone vibrate and pop out the notification we make the coding by using Arduino IDE, Arduino IDE is a written in the programming language Java. It used to write and upload program to Arduino compatible boards. So from that we make a coding from the sensor to make the phone vibrate when the alarm is triggered.

5.9 Conclusion

In conclusion, Our purpose of this project is to create an alternative to alert deaf people in case of a fire emergency thus decreases the evacuation time and helps professionals to safely put out the fire. The system works as long as there as internet connection for the phone and the sensors are well maintained. We hope that this project would benefit both people with or without hearing loss accordingly