

Design Of Acoustic Soundwave System For Fire Prevention

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1 ABSTRACT

Apart from loss of living things and huge natural and private properties including large forest and houses and create a big threaten to environment. Here we use flame sensor to detect the fire that exists in the forest. If the flame sensor detects the fire, then it will give input to the micro controller. After the prediction of fire or smoke, should put-off the fire. For that here a new technology is used. That is fire is extinguished with the help of Sound waves. In general, fire is put off with the help of water or other chemical substance. As compared with other chemicals and classical extinguishers, this technique pays the way to put-off flames in cleanest way. Once we predict the fire by flame sensor. With the microcontroller ARDUINO UNO, a SD card is connected and which is storing the sound files. A speaker and amplifier circuit is connected with micro-controller. Once the micro- controller receives the data for fire detection from the flame sensor, the controller will read the sound files from SD card and generate the high frequency sound waves to put-off the fire.

2 INTRODUCTIONS

Forests protect the earth's ecological balance. Unfortunately, fires are often seen only when they have occupies over a wide range, make with their control to install is difficult and sometimes not possible. It results harmful and irreversible destruction to the nature and the atmosphere. At present, 30% of carbon dioxide comes from forest fires and release heavy smoke and carbon dioxide on the Earth surface. Prompt and effective recovery is an important factor in combating forest fires. To prevent uncontrolled wildfires, it is important to predict and detect fires at the first stage and to stop the unfurl of fire. It is necessary to transport adequate firefighting equipment trained personnel soon to the area of fire source. Different risk levels, size and location of a person define the methods used to feel. Small areas of big risk was identified by particular persons and people around the areas. At the highest and lowest danger satellite and aerial monitors can be able to done. If fire is clearly visible, the fire extinguisher starts with an alarm that goes directly to the fire department. Nowadays, WSN are common in IOT systems. This programs are highly efficient. The use of the IoT systems is to exhibits the daily electronic devices, home appliances, etc., into intelligently connected and can be use at any remote place. By keeping the client educated regarding the situation with the items and giving clients command over the articles, better worldwide human-gadget and human correspondence can be accomplished.

3 LITERATURE REVIEW

T. Saikumar, P. Sriramy introduced this program to monitor and undermine tree security from woodland fires. In this undertaking we assembled a fire locator utilizing an Arduino UNO associated with a warmth sensor, a smoke sensor and a signal. At whatever point a fire breaks out, the framework naturally identifies and advises the client by sending a notice to the application introduced on the cell phone or the client's site page open on the web [1]. Alina-Elena Marcu designed a forest climate observing arrangement dependent on the Raspberry Pi Model 3, computerized comparable sensors and sign examination frameworks. Client admittance to information gathered is confirmed by means of the Internet and versatile applications that permit the client to get notices, at whatever point fire, contamination sources, or unlawful logging are recognized [3]. Aditi Kansal states Discovery of these calamities ought to be brisk and precise as they can cause genuine harm and annihilation. In this paper, look at different AI techniques like SVM, retransmission, choice trees, neural organizations. Quick location of timberland fires is done in this paper by taking less time contrasted with other AI strategies [4]. A legally regulated segregation law model is proposed in this paper to determine whether its location is highly active, moderate (MA) or low-level (LA) in the wild. All the metal nodes in the HA group transmit their packet through the head of the collection to the base station continuously using the transfer greedy process. The authors consider a energy-saving strategy during group head selection and data transfer in the HA area [5]. On the other hand, sensors in the MA area transmit the packet periodically

and the LA location avoids transmitting sensitive information. In this way the proposed process transfers sound information from the HA area efficiently and quickly to the forest fire protection office in the forest and saves the energy of all the nerve endings in the forest [6].

4 SYSTEM DESIGN

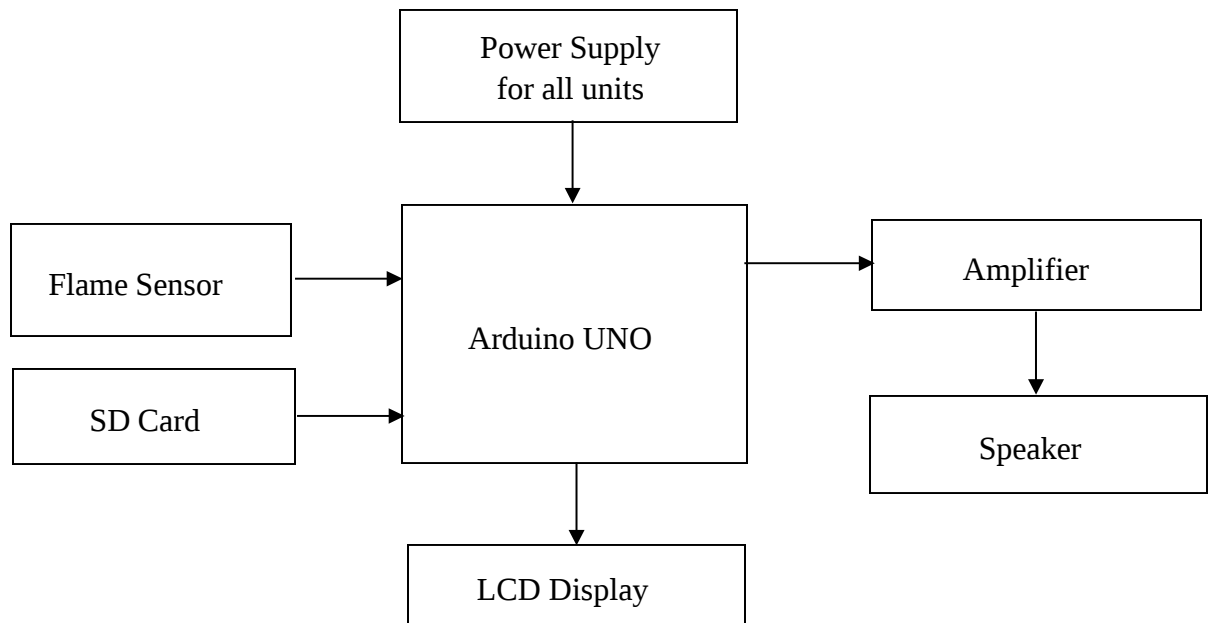


Figure 1. System Design Diagram

Fire is a self-contained, chemical reaction with varying degrees of light and heat. Fires are made up of some of the elements such as gasoline, oxygen, heat and chemical reactions. In this project we use a flame sensor to detect a fire. The flame is a visible part of the fire. If the flame sensor receives a fire, then it will provide input to the small controller. After predicting a fire or smoke, you should extinguish the fire. Sound waves are often reversed in detail regarding sinusoidal aircraft waves, which are characterized by the following common structures: frequency, wavelength, wave number, altitude, sound pressure, sound intensity, sound speed and direction. In this case new technology is used. That is Sonic Fire Extinguisher Extinguish Fire with Save Waves. Normally, a fire is stifled with the assistance of water or carbon dioxide. Stifling fire utilizing bass seems like insane. Compared with other chemical compounds of ancient fire extinguishers, this provides the cleanest way to extinguish flames. As soon as we guess the fire with a flame sensor, the micro-controller ARDUINO UNO, the SD card is connected and saves audio files. The speaker and amplifier are connected to a micro-controller.

When a small controller receives fire detection data from a sounding flame, the controller will read the audio file from the SD card and produce a specific range of frequency waves. The audio file stored on the SD card has a frequency range of 40Hz to 60Hz Sound waves are generated by the audio source, such as the diagram of the speaker suggestion. The sound source creates a vibration in the surrounding area to extinguish the fire.

4.1 PROBLEM FORMULATION

Fire location and stifling. It is a perilous action that puts the existence of a fireman in danger. There are many fire risks where firemen need to lose their lives hands on consistently around the planet. Innovative work in the field of Artificial Intelligence has developed Robotics. The reason here is to plan a putting out fires robot dependent on a ZigBee association.

5 PROPOSED SYSTEM

5.1 POWER SUPPLY

Power supply is an electrically powered device. This electrical appliance provides an electrical charge from an electrical energy. All powered devices hold an energy input relation, that energy formed a current when from a source and output relations distribute the current, it's move to the load. Compatible provision is a simple design that is starting to get bigger and heavier on current high-end devices, Electrical control in line supply can lead to lower performance. The power supplies can be split up within direct along flexible station.

5.2 LINEAR POWER SUPPLY

The linear power supply does not have any digital elementals or switches. The linear power supply has better characteristics analogize to electrically powered device like as too short noise, very easy to design, easy to repair and it look very simple size, another slight deviation from time to time from the current to the smoothness will remain, it is the ripple, this methods is also called as linear regulator. The linear regulator distributes the direct current moving through the main alternative current by a passive electrical device and finally take off the AC integrals. The linear power supply mainly used in medical, lab and transmission.

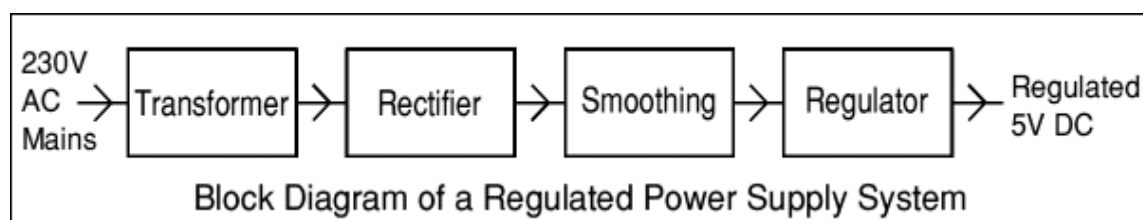


Figure 2. Block Diagram of a Regulated Power Supply System

5.3 TRANSFORMER

Transformer is known as passive device. It converts AC power, one to another source. The passive electrical device used for rising minimum AC voltage power at maximum current, it is also known as step-up or else reducing maximum AC voltage power at minimum current, it is also known as step-down. The passive electrical device is not change alternating current to direct current or direct current to alternating current. In this device iron core, primary and secondary coil are available, this coil is called as input and output.

5.4 RECTIFIER

A rectifier is an instrument panel. The electrical device holds some diodes, it passes the current in exclusive direction. A panel action a minimum resistance to current in one point of direction and a maximum resistance in opposite point of direction. These methods are work in forward and reverse biased. In this project we used the rectifier for changing the alternating current into direct current voltage.

5.5 REGULATOR

Regulators are controller ICs are accessible in fixed (commonly 5, 12 and 15V) or different yield rates. They are likewise evaluated at the most noteworthy rate conceivable. Negative force controls are accessible, particularly for use on two gadgets. Most regulators incorporate programmed security from exorbitant current. The LM78XX arrangement of three terminal controllers is accessible with a few consistent yield voltages that make it valuable for different frameworks. One of which is nearby card control, taking out circulation issues related with one-point guideline. Most voltage controller ICs are with 3 bearings and look like force converters, similar to the 7805 + 5V 1A Regulator.

5.6 SPEAKER

The electro-acoustic{transducer} is an electro acoustic transducer. A tool that converts an audio signal

into a sound. The powerful speaker works on an equivalent bedrock as a robust electro-acoustic transducer, however with in background, manufacturing sound from an electrical signal. Once a variable electrical signal is employed in its voice coil, a wire coil decorated in an exceedingly speaker cupboard that's typically an oblong box manufactured from many varieties of wood, or typically little plastic loudspeakers are on the market on devices like radios, televisions, moveable audio players, computers, and electronic instruments. Larger electro-acoustic transducer system are used for music, audio booths in theaters and concert halls.

5.7 AMPLIFIER

An Amplifier is an electronic device that increment signal strength. It is an electronic circuit with two force ports from the power supply to expand the sign tallness utilized in its information terminals, creating a lot bigger sign in relation with its impact. The measure of speaker provided to an intensifier is estimated by its benefit: medium yield power, current force, or info. Speaker is a locale with a more powerful increase than some other. Decrease is the premise of present day hardware, and speakers are generally utilized in practically all electrical gadgets. Enhancers can be grouped in an assortment of ways. One is comprised of the recurrence of the amplified electron signal. For instance, sound speakers intensify signals at a recurrence of under 20 kHz, RF enhancers enhance frequencies in frequencies between 20 kHz and 300 GHz, and servo intensifiers and instrumentation speakers can work at frequencies low.

5.8 ARDUINO UNO

Arduino / Genuino Uno have a microcontroller board ATmega328P. It is fourteen digital input and output pins, cardinal simple information, sixteen rate quartz, USB alliance, jack, ICSP header and catch for reset. 'Uno' implies that one in Italian and was picked to stamp the release of Arduino code. The Uno Board and form one.0 of Arduino code were the principal solid variants of Arduino. Arduino is Associate in Nursing open inventory, segment and code organization, venture, and client local area that forms and makes microcontroller packs to make computerized gadgets and intelligent gadgets that may see and the executives objects inside the actual world. Sheets region unit furnished with sets of advanced anchors and simple (I/O) which will hindered on fluctuated broadening sheets (shields) and entirely unexpected circuits. Boards that embeds multimedia system connectors, as well as Universal Serial Bus (USB) in some models, area unit accustomed load programs from your computers. Microcontrollers area unit sometimes programmed victimization multiple languages from the C and C ++ programming languages.

5.9 FLAME DETECTORS

Most fire recognition strategies are center around identifying heat, smoke (particles) or flares (light) - the three fundamental segments of a fire. These components contain unsafe sources other than fire, like warmth from steam pipes, particles from vaporizers, and light from the sun. A few components keep on confounding the way toward finding a fire by concealing a component of interest, for example, air temperature, and air development. What's more, the smoke and warmth from a fire can scatter rapidly or gather next to no for great. Alternately, since fire retardants are optical gadgets, they can react to flares in under a second. This optical quality likewise restricts the fire identifier in light of the fact that not all flames have blazes.

5.10 SD CARD MODULE

Frames micro SD card is a data storage device and removable memory device, it is used for storing the digital information. The frames SD card technology is a flash memory technology and this micro SD card will transmit data from the standard SD card. Basically, the SD card module have two different points, first point is Communication Interface. The SD card supports Serial Peripheral Interface Communication. Second point is Operating Voltage. In this operating voltage, all SD cards work in a voltage range of (2.7 – 3.6) v. To use these types of protocol with Arduino, we need the SD library. The library automatically installed on the Arduino. In this project we used the SD card module for storing the sound files. Here the working model of acoustic sound wave system for fire prevention in which the can detected and extinguished in the way we explained in earlier. This fire prevention system has different way to eliminate the fire and create environment free sound prevention.

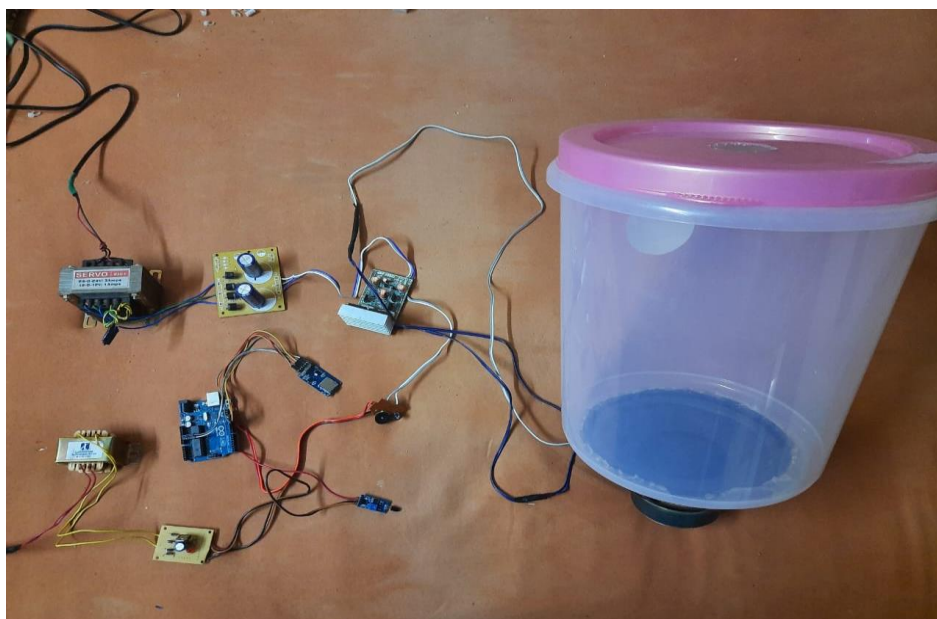


Figure 3. Implemented model

6 CONCLUSIONS

The concept of a fire extinguisher can be quite new, and it has many applications in today's world. For example, installed on all electrical control panels, a subwoofer can be installed in a dedicated circuit, designed for lighting whenever a fire is detected. Arrangements can be made to change the frequency based on the width of the flame. The operation of a specific frequency requires a proportional to the width of the flame. We split up our work into two phase like testing of amplifier to extinguish fire and to implement the complete working process of fire extinguisher. Finally a prototype of fire extinguisher was designed at end. This prototype is further developed by including the machine learning technology in real time and also set up in drones to extinguish forest fire.

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