ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

RENEWABLE ENERGY RESOURCES: CURRENT STATUS AND FUTURE PROSPECTS

KAUSHIK. S[1] , HARISH. V[2], KAUSHEK .S [3], SRIHARI MANIKANDAN[4],
Final year EEE, Saranathan College of Engineering, Trichy, Tamilnadu -620012

Abstract :

Renewable energy is energy from sources that are naturally replenishing but flow-limited; renewable resources are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time. This paper overviews the current trends of renewable energy globally and particularly in India as well as their growth and environmental issues. The role of new and renewable energy has been assuming increasing significance in recent times with the growing concern for the country's energy security.

Keywords: Renewable Energy, Wind Energy, Solar Energy

1. INTRODUCTION

Renewable resources include solar energy, wind, falling water, the heat of the earth (geothermal), plant materials (biomass), waves, ocean currents, temperature differences in the oceans and the energy of the tides [1]. Renewable energy technologies produce power, heat or mechanical energy by converting those resources either to electricity or to motive power. Renewable energies are also often referred to as "green energies" or "clean energies" [2]. Still, this doesn't mean that these energies aren't harmful to the environment and have zero impact. In fact, these renewables' power consumption has beengrowing over the last year [3-5]. They have provided 8% of the world's electricity in 2017 and they now cover 1/3 of the power mix in Europe. At the same time, the energy grid gets 1/4 of the total energy in China and 1/6 in the United States, India, and Japan [6].

Land, energy and water are among our most precious resources, but the manner and extent to which they are exploited contributes to climate change [7-9]. Meanwhile, the systems that provide

these resources are themselves highly vulnerable to changes in climate [10]. This energy transition will be enabled by technological innovation, notably in the field of renewable energy. In view of energy transition's central role to climate change mitigation that builds on the two pillars of energy efficiency and renewable energy [11].

2. SOLAR ENERGY

Solar power is generated in two main ways: Photovoltaics (PV), also called solar cells, are electronic devices that convert sunlight directly into electricity. Today, PV is one of the fastest-growing renewable
energy technologies, and is ready to play a major role in the future global electricity generation mix.

FUTURE SCOPE

In China the use of solar is more. And they have separate road which consists of solar panels where it is used to charge the e- vehicle (electric vehicle) this system can be developed in India which may reduce the use of petrol (or) diesel.

3 WIND ENERGY

Wind is a renewable energy source. Overall, using wind to produce energy has fewer effects on the environment than many other energy sources. Wind turbines do not release emissions that can pollute the air or water (with rare exceptions), and they do not require water for cooling.

FUTURE SCOPE

India plans to add 60 GW of wind power installed capacity by the year 2022. With the right steps, India's wind industry is poised to meet the government's revised target of 67 GW ahead of 2022. In India wind energy can be used for 24hour supply in village side and for small scale industries.

4 TIDAL ENERGY

Tidal energy is a renewable energy powered by the natural rise and fall of ocean tides and currents. Some of these technologies include turbines and paddles. Tidal energy is produced by the surge of ocean waters during the rise and fall of tides. Tidal energy is a renewable source of energy.

FUTURE SCOPE

The potential energy that could be harvested from tidal movements on a global scale is enormous. It is estimated that around 1 terawatt of exploitable power is stored in the world's oceans. This would be enough to power 10 billion 100-watt lightbulbs at once.

4 GEOTHERMAL ENERGY

Geothermal energy is heat derived within the sub-surface of the earth. Water and/or steam carry the geothermal energy to the Earth's surface. Depending on its characteristics, geothermal energy can be used for heating and cooling purposes or be harnessed to generate clean electricity.

FUTURE SCOPE

Geothermal Energy in India like other places in the world is moving at a snail's pace due to project development and financing problems. India is capable of generating 10 GW which is the entire world's generating geothermal capacity. India proposes to harness 10,000 MW (10 GW) of geothermal energy by 2030 through active international collaboration with countries such as the US, Philippines, Mexico and New Zealand. Howeverit needs strong government support and incentives along with financing to develop its potential.

5 BIOMASS ENERGY

Biomass is an energy source derived from organic material such as animal or plant matter and it is growing in popularity. Proponents increasingly favour biomass use over fossil fuels due to the low levels of carbon emitted when the material is burned, and see it as the answer to fighting climate change.

FUTURE SCOPE

India produces about 450-500 million tonnes of biomass per year. Biomass provides 32% of all the primary energy use in the country at present. There are about 63 million ha waste land in the country, out of which about 40 million ha area can be developed by undertaking plantations of Jatropha. India uses several incentive schemes to induce villagers to rehabilitate waste lands through the cultivation of Jatropha.

6 HYDRO ENERGY

Hydro power generates power by utilizing the energy of water falling from a higher position to a lower position. One of these hydro power generation systems is a "pumped-storage system", which pumps up water from a lower reservoir to a higher reservoir during off-peak hours and generates power by dropping water from the higher reservoir to the lower reservoir during peak hours. We manufacture an entire generation system for these power plants.

FUTURE SCOPE

The Hydropower Vision report defines the societal, environmental and economic benefits of hydropower in a scenario where U.S. hydropower could grow from 101 gigawatts (GW) of combined generating and storage capacity in 2015 to nearly 150 GW by 2050, with more than 50 percent of this growth by 2030.

CONCLUSION

Fossil fuels are getting depleted, so we need to adapt an alternative, which is renewable resources. Wind energy can be used to supply enormous amount of power to village and Small scale industries. By maximum utilisation of renewable resources, overall pollution of the world gets minimised. Our country's economic growth will immensely get developed.

REFERENCE

1. Keppler F, Hamilton JG, Brass M, Rockmann T. Methane emissions from terrestrial plants under aerobic conditions. Nature 2006;439:187–91.

2. Kavangh E, editor. Looking at biofuels and bioenergy. Science 2006;312:1743–8. US DOE. Office of Fossil Energy Vision 21 program /http://www.fossil.energy.gov/coal_power/vision21/S (moved to /http://www.fossil.energy.gov/programs/powersystems/vision21/index.htmlS.

3. Majumdar A, Tien CL. Micro power devices. Microscale Thermophys Eng 1998;2:67–9.

4. Peterson RB. Size limits for regenerative heat engines. Microscale Thermophys Eng 1998.

5. Ohadi MM, Buckley SG. High temperature heat exchangers and microscale combustion systems: applications to thermal system miniaturization. Exp Therm Fluid Sci 001;25(5):207–17.

6. Lee DH, Park DE, Yoon JB, Kwon S, Yoon E. Fabrication and test of a

MEMS combustor and reciprocating device. J Micromech Microeng 2002;12(1):26–34.

7. Holladay JD, Jones EO, Phelps M, Hu J. Microfuel processor for use in a miniature power supply. J Power Sources 2002;108(1–2): 21–7.

8. Steimer PK. Power electronics, a key technology for energy efficiency and renewables. In: IEEE Energy 2030 conference; 2008. ENERGY 2008.

9. Blaabjerg F, Iov F, Kerekes T, Teodorescu R. Trends in power electronics and control of renewable energy systems. In: 14th International power electronics and motion control conference; EPE-PEMC 2010.

10. Blaabjerg F, Chen Z, Kjaer SB. Power electronics as efficient interface of renewable energy sources. In: Fourth international power electronics and motion control conference, IPEMC 2004; 14–16 Aug. 2004. p. 1731–1739.

11. Choi UM, Lee KB, Blaabjerg F. Power electronics for renewable energy systems: wind turbine and photovoltaic systems. In: 2012 International conference on renewable energy research and applications (ICRERA); 11–14 Nov. 2012

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

FUTURE EMERGING BATTERIES

P.SRI DEVI Second year *EEE, Saranathan College of Engineering, Trichy, Tamilnadu -620012*

Abstract:

The principal use of batteries in the telecommunications industry is to provide standby or emergency dc power to telephone exchanges in the event of a failure or breakdown in the utility supply. Batteries are also used for standby power in microwave relay stations, for emergency lighting and a variety of other minor uses. Due to its low cost, long life and reliability the lead-acid battery dominates standby applications. Substantial developments are, however, in progress throughout the world to develop secondary batteries for use in electric vehicles and utility load-leveling. In addition, substantial improvements are being made in the development of compact, low-cost primary batteries such as those based on zinc-air and lithium technology. The characteristics of the lead-acid and nickel-cadmium systems are reviewed and the systems under development are then described together with their predicted characteristics and costs. The possible impact in the telecommunications industry of these new developments in battery technology is discussed.

Key words: Batteries, Telephony, industry, Communication Costs, Electric breakdown, Relays, Emergency lighting, Electric vehicles, Lithium.

1. INTRODUCTION

Batteries are the most common power source for basic handheld devices to large scale industrial applications. A battery can be defined as; it is a combination of one or more electrochemical cells that are capable of converting stored chemical energy into electrical energy.

A battery is a device, which consists of a various voltaic cells. Each voltaic cell consists of two half cells connected in series by a conductive electrolyte holding anions and cat ions. One half-cell includes electrolyte and the Electrode to which anions move, i.e. the anode or negative electrode; the other half-cell includes electrolyte and the electrode to which cat ions move, i.e. the cathode or positive electrode.

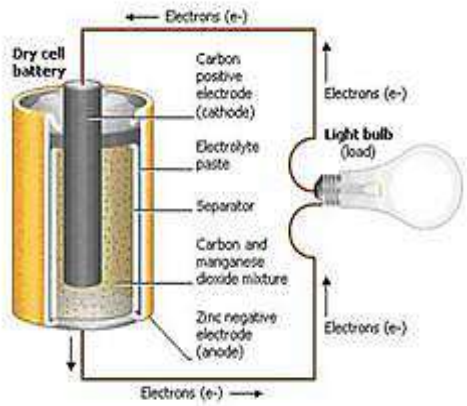


Fig. 1. Working of a battery

Equalization can be done by marginally over charging the battery to allow the weaker cells also to charge completely. The terminal voltage of a completely charged battery is12V, automobile battery shows 13.8V in its terminals while a 12 volt tubular battery will show 14.8V. Automobile battery should be firmly fixed in the vehicle to avoid shake. Inverter battery should be placed on a wooden plank if possible.

2. HISTORY OF BATTERIES

Batteries are so ubiquitous today that they're almost invisible to us. Yet they are a remarkable invention with a long and storied history, and an equally exciting future. A battery is essentially a device that stores chemical energy that is converted into electricity. Basically, batteries are small chemical reactors, with the reaction producing energetic electrons, ready to flow through the external device.

Batteries have been with us for a long time. In 1938 the Director of the Baghdad Museum found what is now referred to as the "Baghdad Battery" in the basement of the museum. Analysis dated it at around 250BC and of Mesopotamian origin.

Controversy surrounds this earliest example of a battery but suggested uses include electroplating, pain relief or a religious tingle. American scientist and inventor Benjamin Franklin first used the term "battery" in 1749 when he was doing experiments with electricity using a set of linked capacitors.

The first true battery was invented by the Italian physicist Alessandro Volta in 1800. Volta stacked discs of copper (Cu) and zinc (Zn) separated by cloth soaked in salty water.Wires connected to either end of the stack produced a continuous stable current. Each cell (a set of a Cu and a Zn disc and the brine) produces 0.76 Volts (V). A multiple of this value is obtained given by the number of cells that are stacked together.

Fig. 2 History and development of Batteries

One of the most enduring batteries, the lead-acid battery, was invented in 1859 and is still the technology used to start most internal combustion engine cars today. It is the oldest example of rechargeable battery. Today batteries come in a range of sizes from large Megawatt sizes, which store the power from solar farms or substations to guarantee stable supply in entire villages or islands, down to tiny batteries like those used in electronic watches.

Batteries are based on different chemistries, which generate basic cell voltages typically in the 1.0 to 3.6 V range. The stacking of the cells in series increases the voltage, while their connection in parallel enhances the supply of current. This principle is used to add up to the required voltages and currents, all the way to the Megawatt sizes.

3. DISADVANTAGE OF BATTERIES

The main benefit of batteries is that they increase convenience for users since they enable portability of devices. Their biggest disadvantage is that they can only be used for a limited time. Even rechargeable batteries eventually die. Batteries come in various types including general purpose, alkaline, mercury and lithium, the newest and most advanced type. Most batteries do not need to be connected to an external electrical system, and this is a practical advantage in specific cases such as in cars, aircraft and many other portable devices that require power. Batteries can be used in places with no electrical supply such as remote rural areas. In such cases, batteries play a critical role in sustaining livelihoods. Another major advantage is that batteries are easy to replace once they go beyond their useful lifespan. On the downside, some batteries require maintenance and need to be checked periodically. Certain batteries are highly dangerous as they can

explode, cause fire and lead to chemical pollution.

Rechargeable batteries take time to recharge, and this can be a big hindrance in case of an emergency. In case of larger equipment, batteries can increase their weight, and this is a disadvantage when there is need to transport the equipment.

4. APPLICATIONS OF BATTERY

Batteries are small essential components to operate many devices. It is one of the key components in our day-to-day life. Some batteries are rechargeable batteries and are used in each and every sector. Below are some of the applications of batteries.

Fig. 3. Applications of Battery

4.1 IBM SEA WATER BATTERIES

IBM is developing what it's calling a more environmentally friendly battery that uses unique materials derived from seawater. Using three new proprietary materials extracted from seawater that haven't been previously used in a battery the company is hoping to develop more sustainable batteries that perform better.

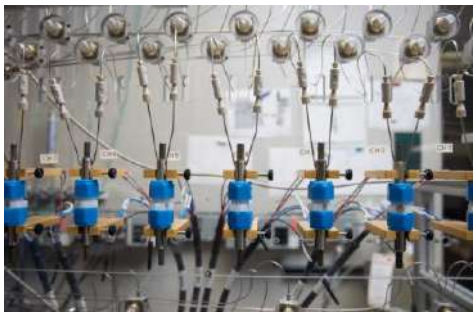


Fig. 4 Sea Water Batteries

Right now, heavy metals like cobalt and nickel are commonly used in the design of current battery technologies, such as the rechargeable lithium-ion batteries in your smart phone, laptop or electric vehicle.

4.2 CAPTURING ENERGY FROM WIFI

Devices that convert AC electromagnetic waves into DC electricity are known as "rectennas". Rectenna captures Wi-Fi waves carrying the Wi-Fi and converts them into wireless energy using semi-conductor. Rectenna uses radio frequency to capture electromagnetic waves

AC Wi-Fi signal →semiconductor →DC voltage→ used to power electronic circuits or recharge batteries

FIG. 5 ENERGY FROM WIFI

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

4.3 URINE POWERED BATTERIES

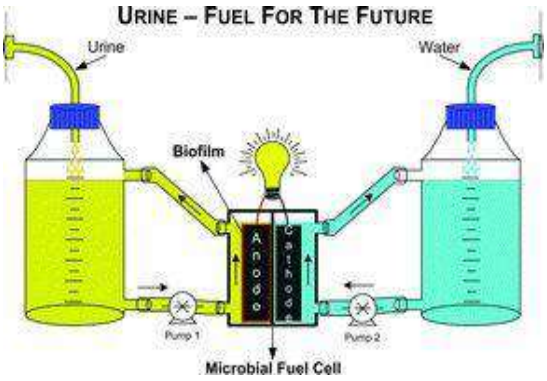


FIG. 6 URINE POWEWRED BATTERIES

Battery made with urea commonly found in fertilizer and mammal urine .To activate a battery ,a drop of urine is added and soaks through the sandwiched filter paper. The chemicals dissolve and react to produce electricity. The magnesium layer acts as the anode, losing its electrons. the copper chloride acts as the cathode, mopping up the electrons.

4.4 FOAM BATTERIES

The foam is the raw material for the batteries, onto which the anode made of copper antimonite is electroplated. Rise in demand for renewable energy storage system and electric vehicles has fueled the demands for batteries globally

Fig. 7 FOAM BATTERIES

4.5 LITHIUM – SULPHUR BATTERIES

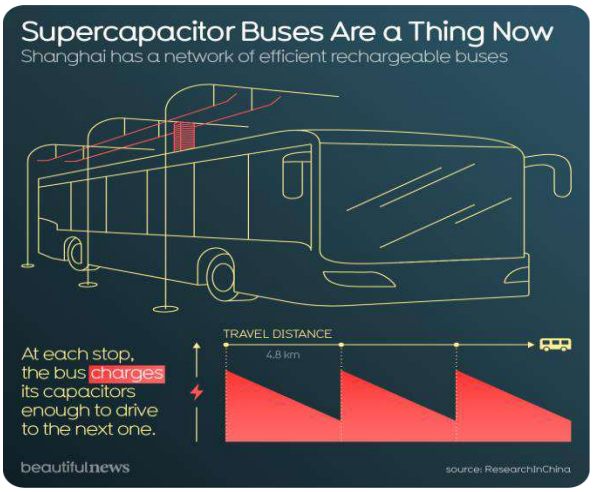


FIG. 8. LITHIUM SULPHUR BATTERIES

Lithium - sulphur battery that can power a Smartphone for 5 days, outperforming lithium-ion. Lithium-sulfur batteries can enable efficient electric transportation such as in unmanned aircrafts, electric buses, trucks, and locomotives.

- Specific energy : 450[Wh/kg]
- Energy density : 550[Wh/L

4.6 FOLDABLE BATTERIES

Not only mobile phones, but computers and tablets are getting screens that can be folded or rolled up. until now, lithium-ion batteries have generally provided the necessary energy for all these devices and applications. Nevertheless, they have a decisive disadvantage: they are heavy and inflexible now developed a prototype of a stretchable thin-film battery. This can be bent, stretched and even twisted without any loss in performance.

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

Fig. 9 Foldable Batteries

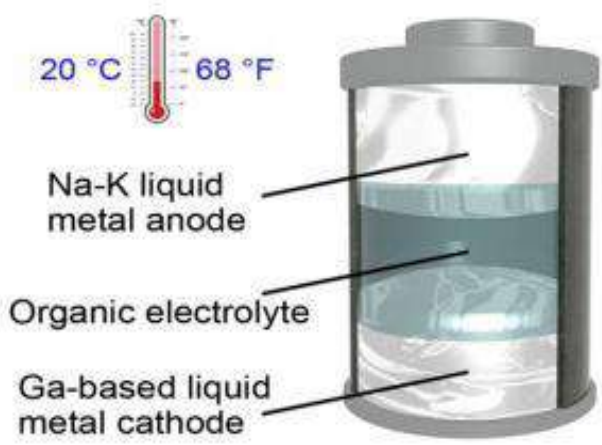
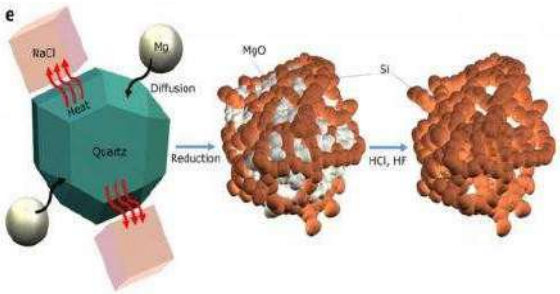


FIG. 10. Cobalt free batteries

4.6 SAND BATTERIES

These Batteries are powered by "Silicon Extracted from Sand" which last three times longer than current lithium-ion batteries. The Process is quartz sand is heated and ground with salt and magnesium to remove any oxygen, resulting in pure silicon Pure Silicon is in a porous state which is used at the anode



4.7 COBALT FREE BATTERIES

Researchers at the University of Texas have developed a lithium-ion battery that doesn't use cobalt for its cathode. It switched to a high percentage of nickel (89 per cent) using manganese and aluminum for the other ingredients. Cobalt is the least abundant and most expensive component in battery cathodes as per Researchers

4.8 SILICON ANODE BATTERIES

To overcome the problem of n stable silicon in lithium-ion batteries, researchers at University of Eastern Finland have developed a method to produce a hybrid anode, using mesoporous silicon micro particles and carbon nanotubes.

The aim is to replace graphite as the anode in batteries and use silicon, which has ten times the capacity. Also it improves the performance of the battery.

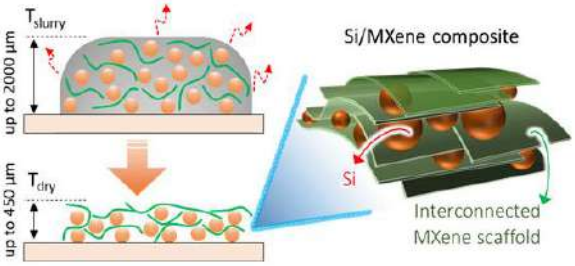


FIG. 11. Silicon anode batteries

4.9 GOLD NANO WIRE BATTERIES

A nanowire battery uses nanowires to increase the surface area of one or both of its electrodes. Some designs variations of the lithium-ion battery have been announced, although none are commercially available. All of the concepts replace the traditional graphite anode and could improve battery

performance

Fig. 12 Gold nano wire battery

CONCLUSION

Future world depends upon the battery. I am extremely happy that these emerging batteries. Will help in communicating around the world

REFERENCES

- Https://www.futurebridge.com/blog/solid-state-batteries/
- Https://www.pocketlint.com/gadgets/news/130380-future-batteries-coming-soon-charge-in-seconds-last-months-and-power-over-the-air.

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

IOT BASED SMOKE AND FLAME DETECTOR

K.PRATHABAN , A.PRASANNA KUMAR , R.PAUL ROJER , L.HARIHARAN
Second Year EEE , Saranathan college of Engineering, Panchapur,Trichy-12
eee233052@saranathan.ac.in

ABSTRACT:

Internet of things is an interconnection of physical devices embedded with electronics, software, sensor which is capable of collecting data from the surrounding and sending data over internet is called IOT. The fire detection gathers all of the techniques and processes that contribute to early detection of a fire. We identify three main categories: Smoke detection, Flame detection and Temperature detection.

Automatic fire alarm system provides real-time surveillance, monitoring and automatic alarm. An automatic fire alarm system based on wireless sensor networks is developed, which is designed for high-rise buildings.

To provide early extinguishing of a fire disaster, large numbers of detectors which periodically measure smoke concentration or temperature are deployed in buildings. In this paper will we present the different techniques we had been already used to detect fire.

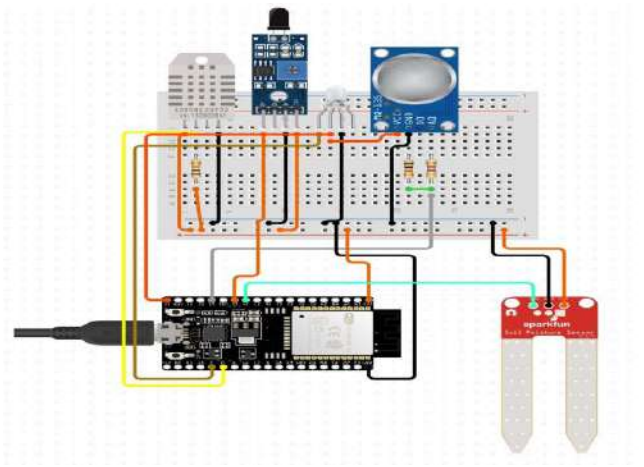
1. INTRODUCTION

In this project, we will build an IoT based fire detection project using an Infrared flame sensor, Smoke detector, temperature and humidity sensor and ESP32 with an email alert feature. Our fire detection project will be linked with the IFTTT web service to generate an email alert to notify users whenever a fire is detected. The user will get an update whenever a fire or flame will be detected, specifying the exact date and time of the detection. Additionally, we will configure a digital pin of the ESP32 board as output and connect an LED with it. The LED will turn ON when the fire is detected. You can also use a buzzer or bell instead of an LED as an indicator as well.

The flame sensor is used to detect the fire or other light sources which are in the range of wavelength from 760nm to 1100nm. The module consists of an IR sensor, potentiometer, OP-Amp circuitry, and a led indicator. When a flame will be detected, the module will turn on its red led. This module is sensitive to flame but it can also detect ordinary light. The detection point is 60 degrees. The sensitivity of this sensor is adjustable and it also has stable performance.

We can use the flame sensor to make an alarm when detecting the fire, for safety purposes in many projects and in many more ways.

CIRCUIT DIAGRAM:



COMPONENTS:

1. MQ135 - Smoke Detector
2 . DHT11 - Temperature & Humidity sensor
3 . ESP32 - Controller
4 . JUMPER WIRES

5 . INFRARED FLAME DETECTOR
6 . SERVO MOTOR
7 . LED
8 . BREADBOARD

2. WORKING

2.1 FLAME

Whenever, a flame emits or a fire burns in the surrounding, it emits small amounts of infrared lights, these infrared light are used to detect flame or fire by this IR based flame sensor. Flame sensor IR receiver collects these IR waves which are emitted due to the fire burning. This IR receiver is connected with operation amplifier which provides the output in the form of voltage at the output of this sensor. We will simply connect this output with our ESP32 and process this information to turn on an LED which we will connect with our board as a output. So whenever fire or flame is detected around the flame sensor, the digital output pin DO goes high and when no fire is detected the output pin D0 will give logic low or zero volt.

2.2 ESP32:

The chip supports 4 x 16 MBytes of external
QSPI flash and SRAM with hardware encryption based on AES. ESP32 accesses the external QSPI flash and SRAM through high-speed caches. Up to 16 MBytes of external flash are memory-mapped onto the CPU code space, supporting 8, 16 and 32-bit access. Code execution is supported.

2.3 MQ-135:

The MQ-135 gas sensor senses gases like ammonia nitrogen, oxygen, alcohols, aromatic compounds, sulfide, and smoke. The boost converter of the chip MQ-3 gas sensor is PT1301. The operating voltage of this gas sensor is from 2.5V to 5.0V. ... It has the potential to detect different harmful gases.

2.4. DHT11

The humidity sensing capacitor has two electrodes with a moisture holding substrate as a dielectric between them. Change in the capacitance value occurs with the change in humidity levels. The IC measure, process this changed resistance values and change them into digital form.

2.5 JUMPER WIRES

Jumper wires are simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering. Jumper wires are typically used with breadboards and other prototyping tools in order to make it easy to change a circuit as needed. Fairly simple.

2.6. BREAD BOARD

Breadboards are designed to work with through-hole electronic components. These components have long metal leads that are designed to be inserted through holes in a printed circuit board (PCB) that are plated with a thin copper coating, which allows the components' leads to be soldered to the board.

2.7. SERVO MOTOR

A servo motor is an electromechanical device that produces torque and velocity based on the supplied current and voltage. A servo motor works as part of a closed loop system providing torque and velocity as commanded from a servo controller utilizing a feedback device to close the loop.

CONCLUSION

From this paper we conclude that the Fire is detected by the IR sensor, Temperature and humidity is detected by the DHT11, and gas is detected by MQ135, and all are under the control of ESP32. Hence if fire is detected, immediately the LED will start glowing and the fire alert is sent to the database and then the fire extinguishers starts working.

REFERENCE

https://www.engineeringchoice.com/servo-motor/
https://components101.com/sensors/dht11-temperature-sensor
https://quartzcomponents.com/products/mq-135-air-quality-gas-sensor-module
https://microcontrollerslab.com/iot-fire-detection-esp32-flame-sensor-email-alert/
http://blog.sparkfuneducation.com/what-is-jumper-wire
https://firesafety.tips/fire-detectors-infrared-flame-detectors/

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

THE MANTA-SEA CLEANER

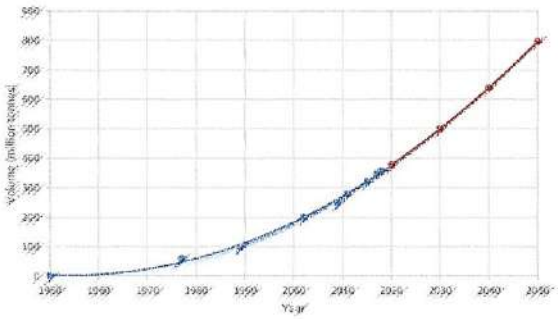
S.Priyadhashini,N.Sheikha Naseema
Second year Electrical and Electronics Engineering, Saranathan College of Engineering, Panjappur, Trichy- 620012, Tamilnadu

ABSTRACT:

Every year, millions of tons of plastic enter the oceans, of which the majority spills out from river. A portion of this plastic travels to ocean garbage patches, getting caught in a vortex of circulating currents. If no actions is taken, the plastic will increasingly impact our ecosystem , health and economics. This is about reducing marine plastic pollution through innovative technology. This innovative project suggests creating a cleaning boat for the ocean. This is the Sea Cleaners technical departments project. It will be called "MANTA". The boat will be running on renewable energy created by the waste it initially picked up. The engineering of the project is focussed on the production of electrical energy from waste.

1. INTRODUCTION

Our beloved home is known as the "Blue Planet". Oceans and seas covered two third of the earth surface. Habitat of large amount of living organisms. Human activities are the major threat such as Discharging of garbage, Dumbing of industrial wastes, Construction, Higher greenhouse gas emission. Pollution of the oceans and seas increase day by day. Higher percentage of pollutants in the oceans is "PLASTIC". With the increase of the population, amount of plastic usage has been increased. Every year, between 8 to 10 million tons of plastic is discharged in ocean.one bottle in the ocean can take up to 450 years to deteriorate. One part of the plastic waste is transformed into micro waste (less than 5 cm) and the other into nano waste. The problem lies initially with nano waste. Nano waste is consumed by marine organisation. This cycle impacts the entire food chain including the final link HUMANS.If this continues, in 2050 there will be more waste than fishes in seas and oceans.



2. CONCRETE SOLUTION AGAINST THIS POLLUTION

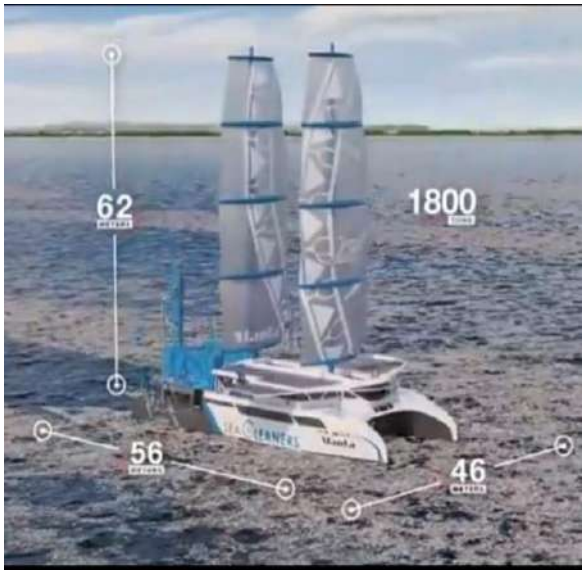
The best way to decrease the ocean pollution is to decrease the amount of pollution put in the ocean beforehand. To reduce this marine pollution, the innovative technology called "THE MANTA" is initiated by sea cleaner's technical department. This is the first-of-a -kind processing ship designed to collect, treat and converts large volumes floating plastic debris into electrical energy.

3. DIMENSION OF MANTA

•Height: 62 m

•Width: 26 m (46 m with outriggers)
•Length: 56.5 m

•Weight: 1,800 tons



4. MANTA'S MECHANISM

The Manta is the first self-sufficient workboat capable of processing 90 to 95% of the collected plastic waste at seas. The waste-collecting conveyors brings the waste on board. A waste-to-energy conversion unit then converts the collected waste into electricity through the process of pyrolysis (which involves the thermal decomposition of materials at elevated temperature in an inert atmosphere),which in turn ,powers all of the Manta's electrical equipment. This eco-friendly method emits hardly any CO2 or pollutants into the air.

The manta extracts both floating macro-waste and smaller debris from 10 milli meters upwards and up to one metre deep. Depending on the density and closeness of the layers of waste, the Manta can collect between 1 to 3 tonnes of waste per hour, with the objective of collecting 5 to 10,000 tonnes per year. It can operate for up to 20 hours a day,7 days a week. The manta is equipped with four complementary collections:

•Waste collecting conveyors which bring the waste on board.

•Three floatable collection system, which can have a collection span of 46 metres, and pickup surface waste.

•Two small, multi purpose collection boats ,or "Mobulas",which can pick both micro and macro plastic waste from the shallowest and narrowest parts of the ocean that the Manta cant't get to.

•Two lateral cranes, which pull out the largest pieces of floating debris from the water.

The floatables collection systems, which are nets hung on the back of the boat, will not go deeper than one metre. These systems will be equipped with on-board cameras that will allow us to observe whether fish are entering or leaving the nets, and escape hatches will also be installed so that they can be released without any problem.

5.WASTE RECYCLING

The debris from the sea is collected through the semi permeable conveyor belt. The conveyor belt fetches and transfer the debris to the waste sorting unit. These wastes are separated manually in the unit. Two units are occupied inside the boat to waste recycling,

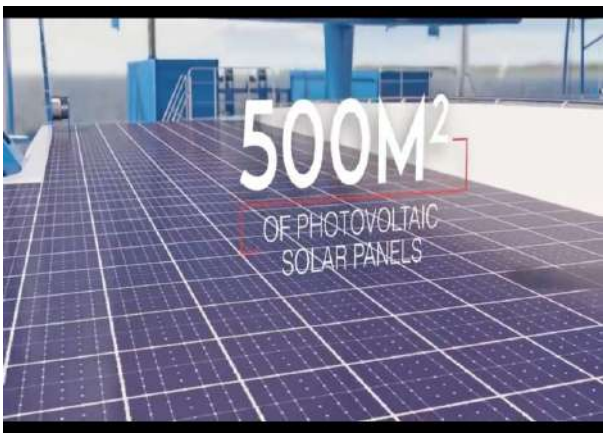
•A waste sorting unit: This manually separates the waste, according to its type, and packages it in a way that boosts its energy efficiency.

• A waste-to-energy conversion unit: This converts the collected waste into electricity through the process of pyrolysis which, in turn, powers all of the manta's electrical equipment. This eco-friendly method does not emit any CO2 or pollutants.

All the collected waste is converted into electrical energy. The storage capacity for the plastic waste is 140 m^3 (around 50 tonnes). In addition to this, there are two 33 m^3 containers: one for drift nets and one for dangerous waste.

6. ENERGY UNITS

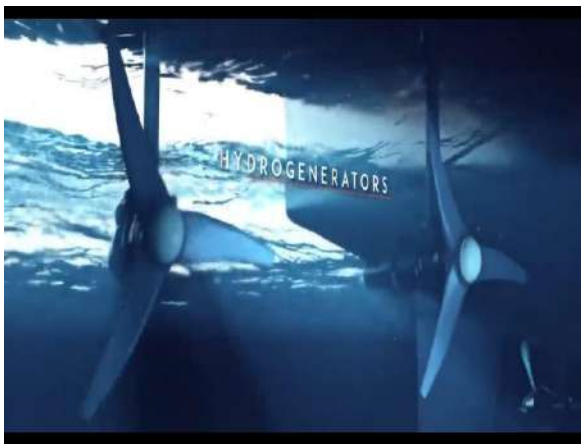
•SOLAR ENERGY: This common renewable, green energy source is usually produced using photovoltaic cells that capture sunlight and turn it into electricity. When sunlight strikes a solar cell, an electron is freed by the photoelectric effect. The two dissimilar semiconductors possess a natural difference in electric potential (voltage), which causes the electrons to flow through the external circuit, supplying power to the load. The flow of electricity results from the characteristics of the semiconductors and is powered entirely by light striking the cell.



•WIND ENERGY: Particularly suited to offshore and higher altitude sites, wind energy uses the power of the flow of air around the world to push turbines that then generate electricity. Wind turbines use blades to collect the wind's kinetic energy. Wind flows over the blades creating lift (similar to the effect on airplane wings), which causes the blades to turn. The blades are connected to a drive shaft that turns an electric generator, which produces (generates) electricity.

• HYDROELECTRIC ENERGY: Hydroelectric power, this type of green energy uses the flow of water in rivers, streams, dams or elsewhere to produce energy. The rotor is attached to the turbine shaft, and rotates at a fixed speed. When the rotor turns, it causes the field poles (the electromagnets) to move past the

conductors mounted in the stator. This, in turn, causes electricity to flow.



7.WASTE TO ELECTRICAL ENERGY

Once the waste are manually separated, only the plastic wastes are shredded and transformed into pellets before being sent to waste to energy conversion unit. The real master piece of on-board plant is ,it melts the plastic pellets at high or elevated temperature and transforms them into synthetic gas. This synthetic gas passed through the turbines and spins the turbine. This action produces electrical energy. That electricity **in turn** powers all the equipment's of the manta like on board units, propulsion unity, batteries. During this process heat in the missions, waste gases are removed by manta's principle trending in eco-friendly solution.

CONCLUSION

The waterbodies are cleaned up to the maximum without harming any other living species. This boat powers itself with the plastic wastes it collects from seas as it sails which runs as a cyclic process. This technology is fully equipped with different sources of renewable electrical energy. "THE MANTA's goal is to collect debris in sea between 5,000 and 10,000 metric tons per year".

REFERENCES:

https://www.theseacleaners.org/themanta-innovation/

https://robbreportcom.cdn.ampproject.org/v/s/robbreport.com/motors/marine/manta-super-sailing-vessel-eats-ocean-garbage

https://www-greenqueen-com-hk.cdn.ampproject.org/v/s/www.greenqueen.com.hk/amp/manta-boat-giant-plastic-eating-renewable-powered-vessel-inspired-by-ray-set-to-clean-up-ocean-debris

https://www-inceptivemind-com.cdn.ampproject

https://youtu.be/v6w_niPEClU

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

RAIN DETECTOR ALARM

M.S.IRSHATH AHMED[1], B. JOE JASPER RAJA[2], R.SUBHASAN[3], K.P. SARAVANAKUMAR[4]

Second year Instrumentation and Control engineering, Saranathan college of Engineering, Panjappur, Trichy, Tamil Nadu

Abstract:

Farmers are pillars of our nation. They have experienced losses due to intense rainfall which damage crops, root growth to overcome this, we have created this project. When the rain detector senses rain, it sounds an alarm. As a result, various aspect has been achieved using Rain detectors to stop irrigation, home automation, electronics.

Keywords : Rain Sensor,5V relay, Alarm

1. INTRODUCTION

Water Management and proper water usage has to be maintained in the recent years. So maintain proper usage of water we need to save the water in every aspect. In agriculture field rain is a basic need but intense rain can affect the crops root growth. Irrigation is enough cover the water need of crop but if intense rainfall occurs it may damage the crops, growth of the crops. when Rain detector detects rain it trigger the alarm. Rain detector alarm efficient way to stop irrigation whenever rain occurs. It is also used in home automation by users to reclaim their belongings, cover windows. In some situations, we can Collect some rain water. When rain falls, it will cause a setback to all the reasons for sun-drying enumerated above, especially when the materials being sun dried are not retrieved quickly. Thus, designing and constructing a device which gives one a heads-up the instant it starts to rain hopefully giving you time to retrieve the materials being sun dried, close your windows, and bring in possession is not only apropos but also absolutely imperative. Also, since it can rain at any time without any warning, clothes in a clothes line outside the house that are almost dry may get wet if we do not realize it is raining on time. Thus, this project will also help house wives and other users to be quickly alerted to avoid rain from wetting shirts/ dresses being sun dried at the clothes line outside the house. Collect some rain water.

2. LITERATURE REVIEW

For a number year up till date, some works on Rain water detection have been done by electronic designers/hobbyist. These works range from the application of rain detector circuit/device in irrigation, collecting rain water for domestic and industrial use a process known as rain water harvesting to using rain detector/Sensor in automobiles to control the power windows and roof whenever it senses moisture a design known as automatic rain sensing windows.

P. Campbell, et al, [1] in their work, Automatic Rain sensing windows worked to create a device that will allow car windows to roll up automatically when it rains thereby preventing the interior from getting destroyed. The design was essentially used with automobiles. In [2] Campbell scientific built a rain detector which functions to detect whether it is raining or snowing, and the output used to control another circuit. In [3] Mohammed Hadi Ismail incorporated a rain detector in his work designed to harvest rain water automatically and store same in reservoir for domestic use. Other electronic hobbyists have designed one form of rain detector/sensor in the past but the main objective of this work which is detecting

rain and alerting the user was never considered.

Work :

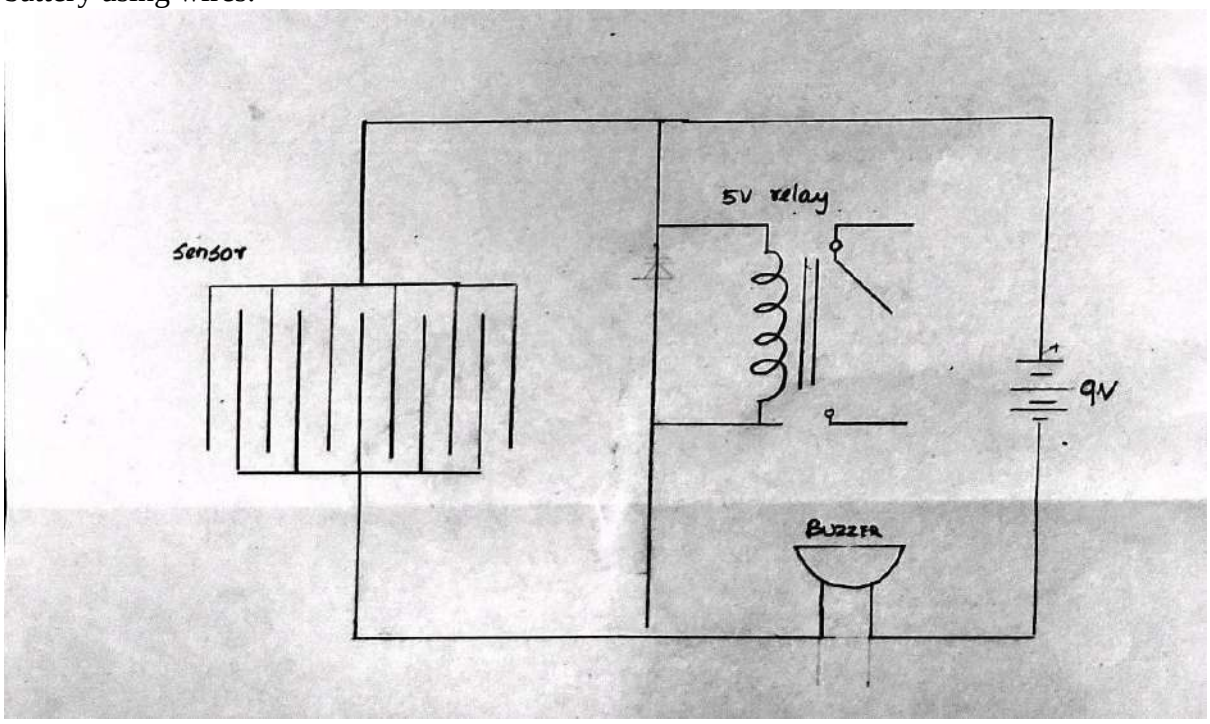
At First, we have connected Resistive rain sensor kit with 5V Relay Module Using Jumper Wires by Soldering. Then We connected Buzzer with Rain sensor and 5V Relay Module Since buzzer used to alert. At last we connected 9V battery using wires.

Design :

The design is quite simple. It consists of 5V relay module, Resistive rain sensor kit, Buzzer, 9V battery.

Circuit Diagram:

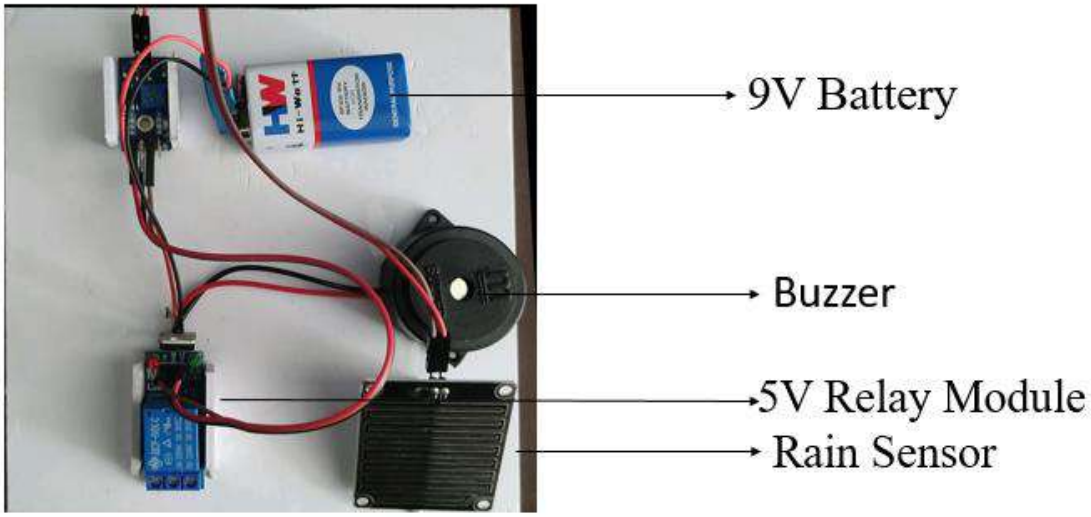
It consists of Rain Sensor, 9V Buzzer,5V relay Module, 9V battery.



Block Diagram :

Block Diagram Explains the working of Rain detector alarm

Photography: Photography of Rain Detector Alarm



Research(AJER), Vo 03, Issue 04, Page 24-34.

CONCLUSION:

Concluding that rain sensor detect and trigger the alarm so that an action taken at a moment. It is activated even at thinnest water drop. Since it is used to stops irrigation, home automation

References:

1. M.D. Singh, K.B. Khanchandani, Power Electronics, Second Edition, Tata McGraw-Hill
2. Fundamentals Of Sensors For Engineering And Science Author : DUNN PATRICK F
3. P. Campbell et al 2005. Automatic rain sensing windows Campbell Scientific, 2005
4. Snow and rain detector Mohammed Hadi Ismail, 2008.Harvesting rain water. Ci Lindsay. A (2005)
5. Embeddronics. http//www.embeddronics.com Circuits
6. ELECTRONIC DEVICES: Thomas L. Floyd
7. MODERN DIGITAL ELECTRONICS: R.P. Jain
8. Ashik K.P, A.N. Basana raju" Automatic wipers with mist control", American Journal of Engineering

ISSN : 2456-1762

Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

SIMPLE CLAP SWITCH

BARANI DARAN R[1], KAVIN G[2], SUDHARSHAN B[3], CHANDHRU V[4]

Second year Instrumentation and Control engineering, Saranathan college of Engineering, Panjappur, Trichy, Tamil Nadu

Abstract*:*

This is a simple clap switch circuit with high sensitivity. It switches ON/OFF electrical appliances through claps. clap operated circuit is operated by clapping from a particular distance (Depends upon the microphone used). Then that leads to the first output of the circuit which is to be turned on, then when another clap is given to the circuit it will show us the next output & that continues with the clap. The main component of this circuit is the Electric Condenser Microphone, This Microphone used as a sound sensor and converts sound energy into electrical energy, and that continues with another two Ic's and then with the Transistor. Primarily it is a Sound operating switch. For example, real life application based on this device include fan, fluorescent light, tv and other appliances which can be switched on off by clapping. This clap switch circuit can be changed based on situation.

Key words:
Integrated circuit, Transistor, Resistors, Decade Counter, Operational Amplifier.

1. INTRODUCTION

An electronic device that can control appliances by users clap action is a clap switch. It was invented by R. Carlie Stevens, and E Dale Reamer on 20th February 1996. The main advantage of this technology is that it is mainly helpful for a mobility-impaired person. The condenser mic is one of the main components in the circuit that tracks the input clap sound based on the clap and transduces the sound energy into some electric pulses. These electric pulses are the desired input to the clap switch circuit. This circuit is mainly based on the two ICs i.e., Operational Amplifier IC741 and CD4017. Clapping hands basically produce about 2200 to 2800hz range and the total time taken for outcome from the circuit will be up to 3 seconds in maximum.

2. GENERAL DESCRIPTION OF THE COMPONENT USED

CONDENSER MICROPHONE: A microphone is an acoustic-to-electric transducer or sensor that converts sound into an electrical signal. The **condenser microphone**, invented at Bell Labs in 1916 by E. C. Wente is also called a **capacitor microphone** or **electrostatic microphone**. Here, the diaphragm acts as one plate of a capacitor, and the vibrations produce changes in the distance between the plates. The voltage maintained across the capacitor plates changes with the vibrations in the air, according to the capacitance equation (C = Q / V), where Q = charge in coulombs, C = capacitance in farads and V = potential difference in volts. The capacitance of the plates is inversely proportional to the distance between them for a parallel-plate capacitor.

Resistor (R): A component is used for its resistance. In the past, most resistors were manufactured from carbon composition, a baked mixture of graphite and clay. These have been almost completely superseded by carbon or metal film resistor. Wire-wound resistors are used for comparatively low values of resistance where precise value is important, or for high dissipation. They are unsuitable for RF use because of their reactance.

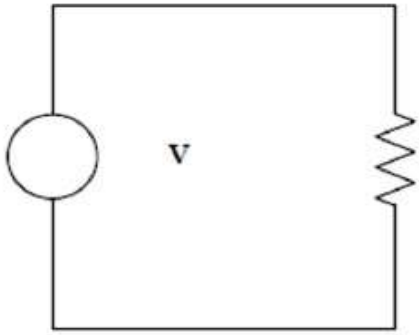


Figure 1

Diode (D): Diode can be made of either two of semiconductor materials, silicon and germanium. Power diodes are usually constructed using silicon and germanium. Silicon diode can operate at higher current and at higher junction temperature, and they have greater reverse resistance. The structure of a semiconductor diode and it symbol are shown in Figure. The diode has two terminals, an anode, A terminal (P junction) and a cathode K terminal (N junction).

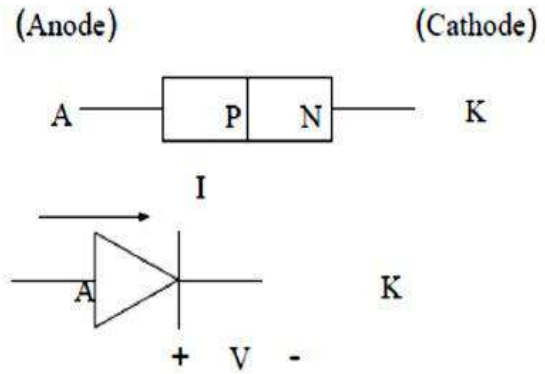


Figure 2

When the anode voltage is more positive than the cathode, the diode is said to be forward biased and it conducts current readily with a relatively low voltage drop. When the cathode voltage is more positive than the anode, the diode is said to be reverse biased, and it blocks current flow. The arrow on the diode symbol shows the direction of convection current flow when the diode conducts.

Transistor BC 547: As a representative of the large family of bipolar transistors the BC547 provides a "stepping off point" to the use of more esoteric, higher voltage, current or frequency devices for beginners' theTO-92package is held in front of one's face with the flat side facing toward you and the leads downward, (see picture) the order of the leads, from left to right is collector, base, emitter.

The BC547 transistor is an NPN Epitaxial Silicon Transistor. The BC547transistor is a general-purpose transistor in a small plastic package. It is used in general-purpose switching and amplification BC547 series 45 V, 100 mA NPN general-purpose transistors.

The BC547 transistor is an NPN bipolar transistor, in which the letters "N" and "P" refer to the majority charge carriers inside the different regions of the transistor. Most bipolar transistors used today are NPN, because electron mobility is higher than hole mobility in semiconductors, allowing greater currents and faster operation. NPN transistors consist of a layer of P-doped semiconductor (the "base") between two N-doped layers.

A small current entering the base in common-emitter mode is amplified in the collector output. In other terms, an NPN transistor is "on" when its base is pulled high relative to the emitter. The arrow in the NPN transistor symbol is on the emitter leg and points in the direction of the conventional current flow when the device is in forward active mode. An NPN transistor can be considered as two diodes with a shared anode region. In typical operation, the emitter base junction is forward biased and the base collector junction is reverse biased. In an NPN transistor, for example, when a positive voltage is applied to the base emitter

junction, the equilibrium between thermally generated carriers and the repelling electric field of the depletion region becomes unbalanced, allowing thermally excited electrons to inject into the base region. These electrons wander (or "diffuse") through the base from the region of high concentration near the emitter towards the region of low concentration near the collector. The electrons in the base are called minority carriers because the base is doped p-type which would make holes the majority carrier in the base.

Figure 3

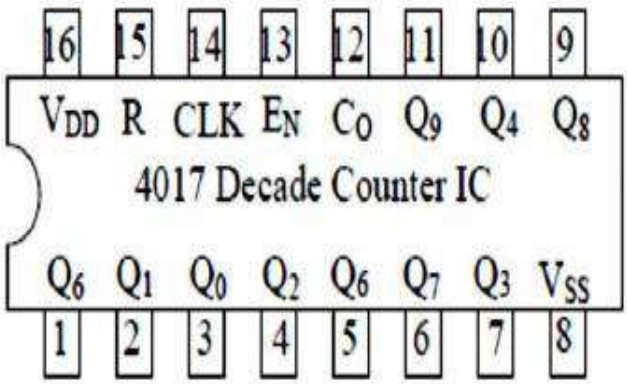


Figure 4

IC 741 Op Amp can provide high voltage gain and can be operated over a wide range of voltages, which makes it the best choice for use in integrators, summing amplifiers and general feedback applications. It also features short circuit protection and internal frequency compensation circuits built in it. This Op-amp IC comes in the following form factors:

- 8 Pin DIP Package
- TO5-8 Metal can package
- 8 Pin SOIC

Decade Counter (CD4017IC): 4017 IC is a common useful digital IC. [From input pin (14 nodes)]. This is called divided by10 counter because it produces one tenth of square wave frequency provided from input pin (pin 14) to output pin (on pin 12). Counter circuit is a digital circuit. Generally, counter is the circuit that counts the number of the square wave entered to the circuit. In CD 4017 IC means the symbol of the company that produces the IC. There are IC, with other letters, this IC is called 4017 IC is the form of 14 pin DIP which includes 16 pins.

IC 741 Op Amp (Operational Amplifier): The 741 Op Amp IC is a monolithic integrated circuit, comprising of a general-purpose Operational Amplifier. It was first manufactured by Fairchild semiconductors in the year 1963. The number 741 indicates that this operational amplifier IC has 7 functional pins, 4 pins capable of taking input and 1 output pin.

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

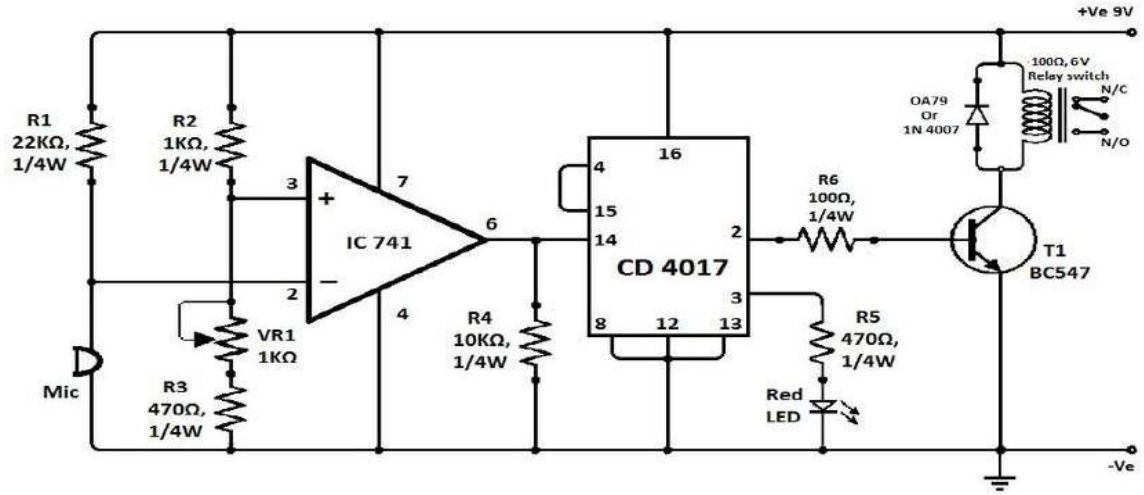


Figure 5

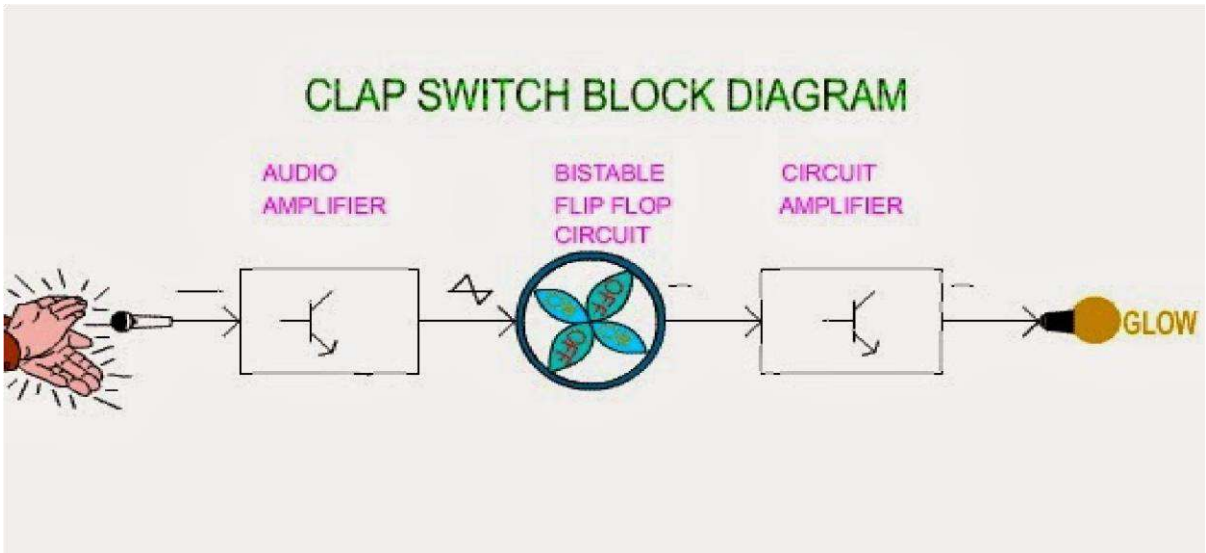


Figure 6

3. DESCRIPTION OF BLOCK DIAGRAM AUDIO AMPLIFIER

When we clap our hands, the sound is received by audio amplifier. Here the given sound signal is converted into electrical signal and then amplified by using transistors

3.1 FLIP FLOP CIRCUIT

After amplifying the given input signal (sound of a clap), it is fed to flip flop circuit. It consists of two transistors, one for the on position and the other for the off position. For this reason, it is also known as bi-stable multi vibrator.

3.2 CIRCUIT AMPLIFIER

The signal after this process the outcome electric signal becomes very weak. So, it is amplified using another transistor and given to relay, it acts as a mechanical switch.

3.3 METHODOLOGY

When you clap your hands near the microphone. The sound signal is converted into the electrical signal by the condenser microphone. These sound vibrations are given to the inverting input of IC 741 as op-amp (amplifier) merged with IC 4017 as a flip flop to get on and off. Then connected to the T1 as the driving force of the Relay. The Relay is connected to other electronic or electrical devices. Resistors R2, R3 and the variable resistor VR1 adjusts the sensitivity of the amplifier. Resistor R1 sets the sensitivity of the Mic. The Output pulses are amplified from IC1 passes to the input (CD 4017). Resistor R4 make input of IC2 to low so as to prevent false triggering.IC2 is a decade counter IC Which receives a clock signal through the clock input and it turns ON all the 10 outputs one by one, every time it gets the clock input pulse. When you clap once, the relay is activated and the LED (or any load) is turned ON. When you clap for the second time, the relay is deactivated and the LED is turned OFF. Red LED indicates OFF position.

From CD 4017(Approx.) - Supplied voltage 3V–15V, Max: out current 10mA.

3.4 ADVANTAGE

1. Energy efficient
2. Low cost and reliable circuit
3. It provides good output efficiency
4. High Accuracy

5.This is helpful technology for Person with broken leg or physically disabled.

3.5 APPLICATION AND FUTURE SCOPE

Clap activated switch device will serve well in different phono-controlled applications. Clap switch is generally used for a light, television, radio or similar electronic device that the person will want to turn on/off from bed. The primary application involves elderly or physically disabled person. The major advantage of a clap switch is that you can turn something (e.g., a lamp) on and off from any location in the room (e.g., while lying in bed) simply by clapping your hands.

Here we Have done a simple home-based simple clap switch with commonly used electrical components.

This circuit can be made further as more accurate and more sensible. By increasing the sensitivity, the amplification from the circuit may be increased and used in some modified circuits.

4. RESULT AND CONCLUSION

During the practical implementation of the project, some of the values or components had to be changed in order to get more accurate result. The circuit was successfully performed on bread board (PCB). A red LED is used to indicate the first clap. When the first IC471 generates the output, the LED glows. The relay can drive any common home electrical appliance like fan, light, etc.

The practical value of T in this circuit is 2 seconds, which will be having some variation in theoretical output. That is due to the tolerance of the components used in the circuit.

The clap activated switching device function properly by responding to both hand claps at about one metre and finger tap sound at very close range, since both are low frequency sounds and produce the same pulse wave features. The resulting device is realizable, has good reliability and it’s relatively inexpensive. This circuit is very useful in the field of electronic circuits. By using some modification, we can use this in various fields.

REFERENCES:

www.ijser.com
www.efu.com
www.electronics.com
www.eeweb.com
www.mycircuitvision.com

[1] Robert L. Boylestad and Louis Nashelsky, Electronics devices and circuit theory, ninth edition.

[2] Millman and Halkias, Electronics devices and circuit theory.

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

AUTOMATIC STREET LIGHT CONTROL WITH SOLAR

K. KEERTHIVASAN[1], A. SIVASUBRAMANIAN[2], S. SUDURSAN[3], M. VINOTH[4]
Second year ICE, Saranathan College of Engineering, Trichy, Tamilnadu -620012

ABSTRACT

Automatic Street Light Control System is a simple yet powerful concept, which uses transistor as a switch. By using this system manual works are 100% rem oved. It automatically switches ON lights when the sunlight goes below the visible region of our eyes. This is done by a sensor called Light Dependant Resistor (LDR). (LDR) which senses the light actually like our eyes. It automatically switches OFF lights whenever the sunlight comes, visible to our eyes. By using this system energy consumption is also reduced because nowadays the manually operated street lights are not switched off even the sunlight comes and also switched on earlier before sunset. In this project, no need of manual operation like ON time and OFF time setting. This project clearly demonstrates the working of transistor in saturation region and cut-off region. The working of relay is also known.

Keywords

Street light, solar panel, solar energy is converted into electrical energy, zener diode, solar battery, amplifier, switch, resistors, LDR sensor, LED are connected.

1. LITERACTURE VIEW

Street light controllers are smarter versions of the mechanical or electronic timers previously used for street light ON-OFF operation. They come with energy conservation options like twilight saving, staggering or dimmin. Also many street light controllers come with an astronomical clock for a particular location or a Global Positioning System (GPS) connection to give the best ON-OFF time and energy saving.

Automatic Street Light Control System is a simple and powerful concept, which uses transistor as a switch to switch ON and OFF the street light automatically. By using this system manual works are removed. It automatically switches ON lights when the sunlight goes below the visible region of our eyes.

It automatically switches OFF lights under illumination by sunlight. This is done by a sensor called Light Dependant Resistor (LDR) which senses the light actually like our eyes By using this system energy consumption is also reduced because now-a-days the manually operated street lights are not switched off properly even the sunlight comes and also not switched on earlier before sunset.

In sunny and rainy days, ON time and OFF time differ significantly which is one of the major disadvantage of using timer circuits or manual .

This project exploits the working of a transistor in saturation region and cut-off region to switch ON and switch OFF the lights at appropriate time with the help of an electromagnetically operated switch.

A street light, lamppost, street lamp, light standard, or lamp standard is a raised source of light on the edge of a road or walkway, which is turned on or lit at a certain time every night.

Modern lamps may also have light-sensitive photocells to turn them on at dusk, off at dawn, or activate automatically in dark weather. In older lighting this function would have been performed with the aid of a solar dial.

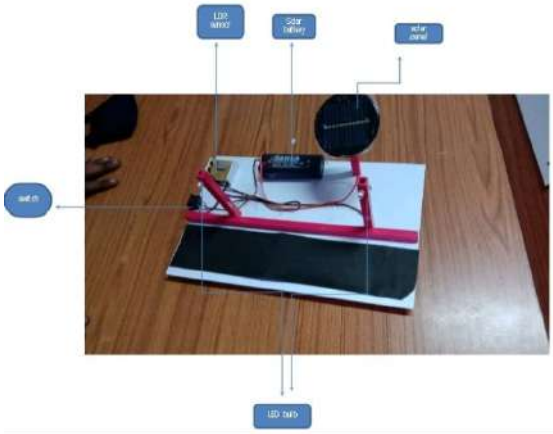
It is not uncommon for street lights to be on poles which have wires strung between them, or mounted on utility poles.

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

This project exploits the working of a transistor in saturation region and cut-off region to switch ON and switch OFF the lights at appropriate time with the help of an electromagnetically operated switch Automatic Streetlight needs no manual operation of switching ON and OFF.

The system itself detects whether there is need for light or not. When darkness rises to a certain value

Photography



2. WORKING PRINCIPLE

The automatic streetlight control system operates on 12 V DC supply. The automatic streetlight controller has a photoconductive device whose resistance changes proportional to the extent of illumination, which switches ON or OFF the LED with the use of transistor as a switch.

Light dependent resistor, a photoconductive device has been used as the transducer to convert light energy into electrical energy. The central dogma of the circuit is that the change in voltage drop across the light dependent resistor on illumination or darkness switches the transistor between cut-off region or saturation region and switches OFF or ON the LEDAs we know property of LDR that during the time of day resistance is low therefore voltage at the inverting input (IE pin 2) is higher than the voltage at the non-inverting input (pin3) hence the output at the pin6 is low so the transistor goes into the cut off state which means LED or bulb will not glow.

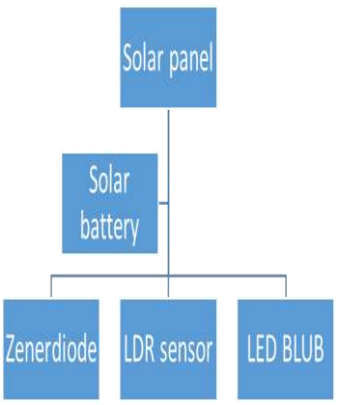
3. PROCEDURE

1. Insert first transistor Q1-BC547 (NPN) on PCB board shown in the circuit diagram
2. Connect another transistor Q2-BC547 (NPN) on PCB board shown in the circuit diagram.
3. Connect wires across emitter pin of both transistor and negative terminal of battery on the PCB board.
4. Connect a wire across collector pin of transistor Q1 and base pin of transistor Q2.
5. Connect a resistor 1k across positive terminal of battery on the PCB board and collector pin transistor Q1.
6. Connect LDR (Light Dependent Resistor) across positive terminal of the battery and base terminal of transistor Q1
7. Insert a transistor 330 ohm across base pin of transistor Q1 and negative terminal of battery.

APPLICATION

- These solar street lights are able to automatically sense
- outdoor light with the help of a sensor. They can this way
- smartly save power & give light on successive nights even when sunlight is unavailable for a couple of days.

Block diagram



ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

LDR (LIGHT DEPENDENT RESISTOR)

- LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits.
- Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically.
- When the light level is low the resistance of the LDR is high. This prevents current from flowing to the base of the transistors. Consequently the LED does not light.

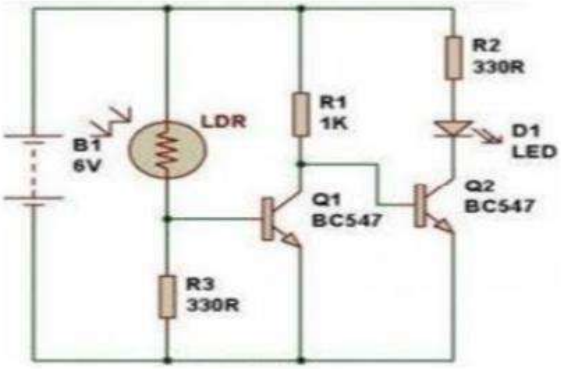
RESISTORS

- Resistor is an electrical component that reduces the electric current. The resistor's ability to reduce the current is called resistance and is measured in units of ohms (symbol: Ω). If we make an analogy

  to A light-emitting diode (LED) is a two-lead semiconductor light source that resembles a basic pn junction diode, except that an LED also emits light. When an LED's anode lead has a voltage that is more positive than its cathode lead by at least the LED's forward voltage drop, current flows. Electrons are able to recombine with holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the colour of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor.

Circuits diagram

- water flow through pipes, the resistor is a thin pipe that reduces the water flow.



LED (LIGHT EMITTING DIODE)

List of components

- 1. LDR sensor (1)
- 2. RESISTOR (2)
- 3. LED (1)
- 4. PCB (2)
- 5. solar panel (1)
- 6. solar battery (1)
- 7. diode(1)
- 8. switch (1)

EXPLANATION

Circuit of a compact and true solid-state automatic lawn light is described here. The circuit can be used to switch on incandescent garden light bulbs at desk and switch off them at dawn. A 10 mm encapsulated light dependent resistor (LDR) here works as the twilight detector.

The whole circuit can be housed in a very small plastic cabinet. For powering the circuit AC household supply is needed. With a little skill and patience, you can easily modify this circuit to drive a number of white LED strings, instead of the incandescent bulb load at the output. When ambient light is normal, transistor T1 is reverse biased by the low resistance of LDR. Multi turn plastic trimpotP1 sets the detection sensitivity. If ambient light dims, transistor T1 turns on to drive the triac T2. Now the lamp load at the output of T2 energizes.

When the ambient light level restores, circuit returns to its idle state and light(s) switched off by the circuit. Working voltage for the circuit is derived directly from the AC supply input through

components R1, R2 and R3.This obviates the requirement of a bulky.

If you wish to operate the, light bulb(s) on a little reduced power, just replace the triac T2 with a suitable silicon controlled rectifier (SCR). This may give a long life to the incandescent load. Finally, the LDR should not be mounted to receive direct sunlight. It may be mounted at the top of the enclosure, pointing to the sky say southwards.

LDR offers Very high Resistance in darkness. In this case the voltage drop across the LDR is more than 0.7V.This voltage is more sufficient to drive the transistor into saturation region. In saturation region, IC (Collector current) is very high. Because of this IC. The relay gets energized, and switches on the lamp. LDR offers Very low Resistance in brightness. In this case the voltage drop across the LDR is less than 0.7V. This Hence, the transistor will be in cut-off region. In cut-off region, IC (Collector current) is zero. Because of this IC, The relay will not be energized, and the lamp will be in ON state only. Diode is connected across the relay to neutralize the reverse EMF generated

Advantages

- There are lower chances of the automatic street light system overheating & risk of accidents is also minimized.
- Cost of operating automatic solar street lights is far less when compared to the conventional street lights.

The automatic street light system is eco-friendly & hence helps in reducing the carbon footprint

Disadvantages

- Rechargeable batteries of the automatic street light system are required to be replaced a few times.
- Snow, dust or moisture can accumulate of PV panels which can hinder energy production.

Conclusion

Light is one of the most important need in human life. This project is a booming concept, which is the future of this young generation. New Innovations are done to make this project an advanced one. (Eagle company.

Reference

- www.google.com
- www.wikipedia.com
- http://www.ijasret.com/VolumeArticles/FullTextPDF/225_7.Automatic_Street_Light_Control_System.pdf
- http://logixproject.weebly.com
- https://qdoc.tips
- https://www.academia.edu
- http://centrallibrary.cit.ac.in
- https://studymafia.org
- https://www.slideshare.net
- https://www.electricaltechnology.org

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

LASER BASED COMMUNICATION

HARI PRAKASH. R[1], ROHAN.S[2], SANTHOSH.R[3], SHARAN.R[4]

Second year Instrumentation and Control engineering, Saranathan college of Engineering, Panjappur, Trichy, Tamil Nadu

Abstract:

This work presents a point-to-point transmission of voice signal wirelessly through the atmosphere with a LASER diode or infra-red device. Optical communication is gaining popularity because of its high bandwidth, low loss power, high security, low cost, and most importantly no electromagnetic interferences. Laser communication is one of the key areas in Wireless Communications. They are inexpensive, small, low power, and do not require any radio interference studies. The carrier used for the transmission signal is typically generated by a laser diode. Two parallel beams are needed, one for transmission and one for the reception. Wi-Fi is the wireless technology used to connect computers, tablets, smartphones, and other devices to the internet. Wi-Fi is the radio signal sent from a wireless router to a nearby device, which translates the signal into data you can see and use. LiFi is a wireless optical networking technology that uses LEDs for data transmission. In simpler terms, LiFi is considered to be a light-based WiFi that uses light instead of radio waves to transmit information. Using light to transmit data allows LiFi to deliver a couple of advantages such as working in areas susceptible to electromagnetic interference like hospitals and aircraft cabins and working across higher bandwidth while offering higher transmission speeds.

Keywords:

Wireless Communication System, Laser Communication, Audio Amplifier, Transmitter, Receiver and Working

1. INTRODUCTION

A Laser communications system is a wireless network through the atmosphere which carries the information in the light domain rather than the electrical domain in RF communication. Laser communications systems can be implemented in point-to-point communication easily because of their low cost, small hardware, low power, and absence of electromagnetic interference. For two-way communication two parallel beams are required, one for transmission and another one for the reception of a signal. The input which is in the form of voice is initially amplified with a pre-amplifier circuit before further amplified by the second stage amplifier which provides the overall gain of the transmitter. The signal is then fed to a Laser diode through a driver circuit. Laser will convert the electrical signal into light signal and send the signal into free space.

3. WORKING PRINCIPLE

Laser: The acronym LASER (Light amplification by stimulated emission of radiation) is a device that emits a beam of coherent light through an optical amplification process. There are two types of emission as spontaneous emission and stimulated emission. If the atom is in the ground state, with energy E1, the photon may be absorbed so that it is exciting to the upper energy level E2. Subsequently, de-excitation will occur

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

randomly producing the emission of radiation. This process is spontaneous emission. On the other hand, if the atom is already in the excited state, then the incident photon may stimulate a downward transition with the emission of radiation. Photons emitted in this process are coherent with the stimulating photon i.e both the stimulating and stimulated photons have the same energy, same momentum, and same state of polarization .The input can be in the form of audio from jack input or voice from the condenser mic at the transmitter.

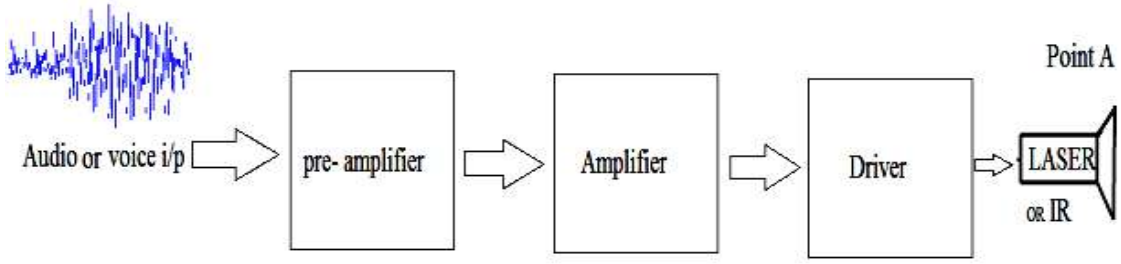


Figure 1. Transmitter section of LASER Communication

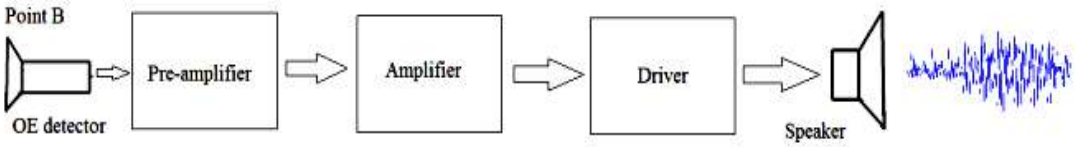


Figure 2. Receiver section of LASER Communication

LASER COMMUNICATION:

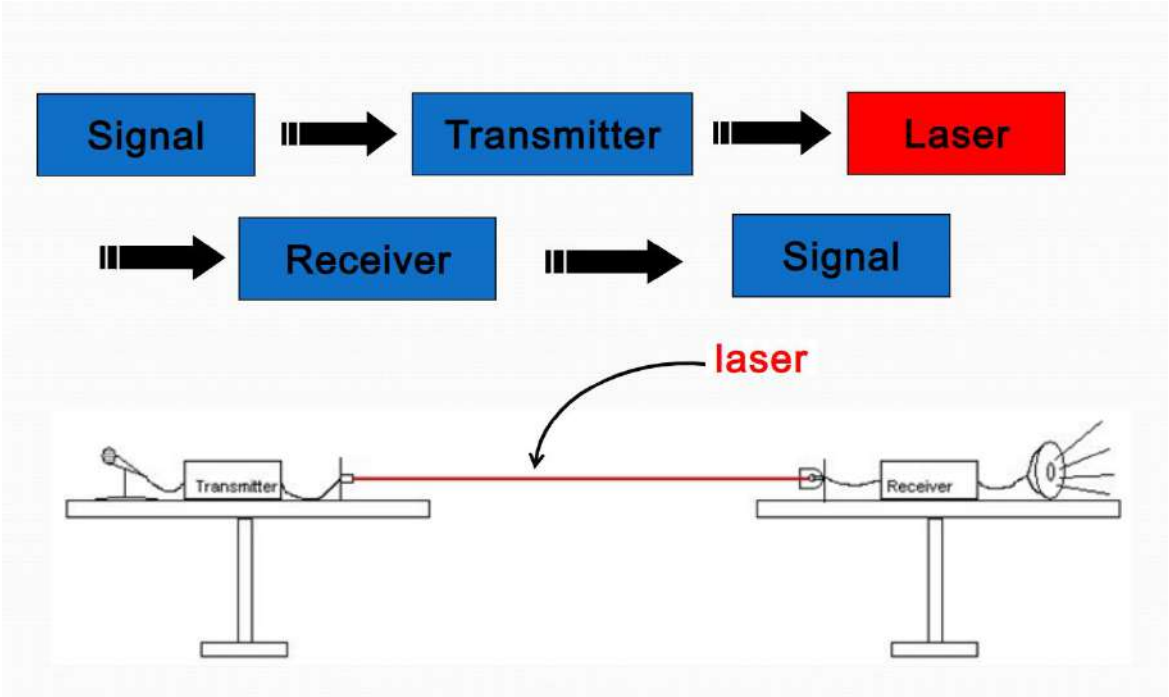


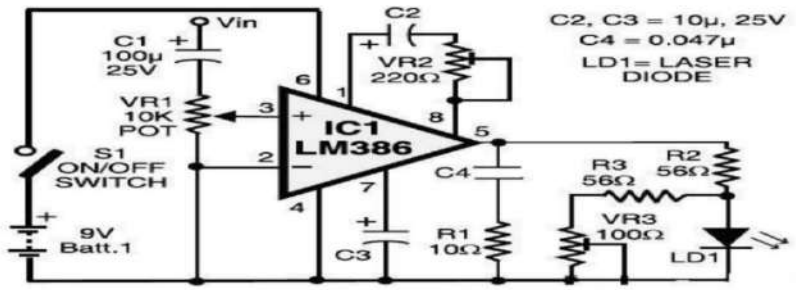
Figure 3. BLOCK DIAGRAM

The low audio signal is initially amplified with a one-stage transistor pre-amplifier circuit before passing through the second stage amplifier which is built with LM 386 providing the overall gain of the transmitter. The amplified signal is then fed to a Laser diode which converts the electrical signal into a light signal and transmits it into free space. The transmitter attains modulation of the Laser signal which acts as a carrier by the modulating signal from condenser mic or audio jack input.

3.1 TRANSMITTER:

Sound or different mode of a signal is amplified and transmitted through laser. By giving the output as sound energy to the input of a laser, which can help to carry the signal from one place to another, the signal travels along with lasers to the receiver end... For example, we can tack a radio station as an example we can transmitter itself generates a radio frequency alternating current, which is applied to the antenna to transmitted signal similar to this we can transmit the signal with laser because lasers have high frequency and high speed is 186000 miles (ca. 299,338 km) per second..

CIRCUIT DIAGRAM - Transmitter:



Transmitter Circuit

3.2 RECEIVER

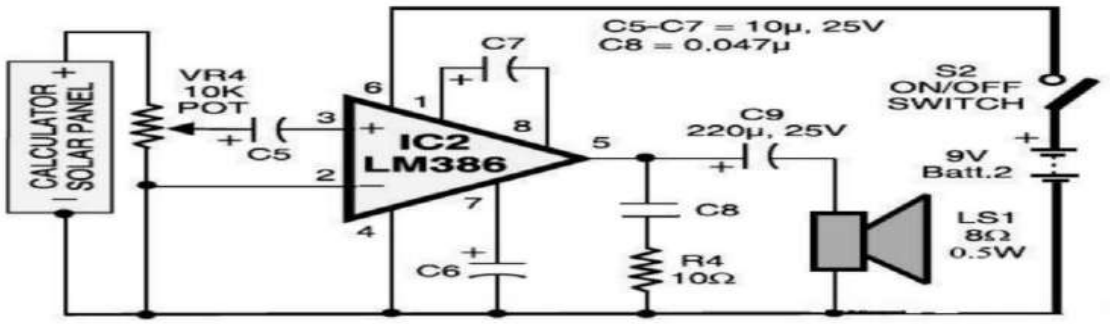
In the receiver end, the transmitted laser reaches the LDR (light dependent resistor) that can again amplify the signal to the audible range in case we are using that transmitting the audio signal we can receive audio signals. For example, we can tack a household radio receiving system as an example Radio wave are received by another antenna attached to a radio receiver. When radio waves strike the receiving antenna they push the electrons in the metal back and forth, creating tiny oscillating currents which are detected by the receiver. Here we are using LDR as the antenna to receive the signal or light from the laser. We are preferring laser for its can travel at high speed and it can travel vacuum so it is used to share information in outer space in minimum delay...even we can use any computer data, ah sharing in same speed using this method.

APPLICATIONS:

- In the Laser communications systems, bandwidth could be distributed in neighbourhoods by putting laser communication systems on top of homes and pointing them towards a common transceiver with a fast link to the Internet.
- With the powerful laser, it would even be possible to communicate using satellites to reflect the signals.

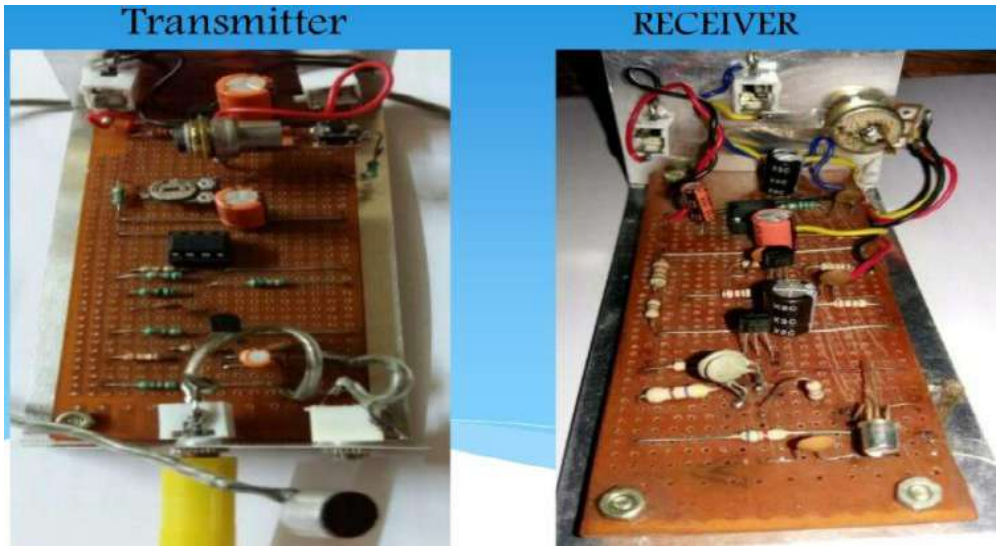
ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

CIRCUIT DIAGRAM – Receiver:



Receiver Circuit

PHOTOGRAPH:



ADVANTAGES:

- ✓ It can provide speed more than 1GBps.So it overtakes the LAN or wireless LAN comprehensively.
- ✓ Laser communications systems can be easily deployed since they are inexpensive, small, low power and do not require any radio interference studies. The carrier used for the transmission signal is typically generated by a laser diode. Two parallel beams are needed, one for transmission and one for reception.
- ✓ Even by a minute fraction of a degree, the laser will miss by thousands of miles. Instead of better and faster pictures, there could be no pictures.

CONCLUSION:

This is new wireless technology to transmit the data or sound signal from one section to another section through the laser beam of the system. This system is safe and without radiation. So it is no harm to living beings. The system can likely transmit data and sound much faster than the other system

(like 1GB/s) because this laser communication system became a more popular system than the other system. The paper firstly analysed the components of maritime laser communication systems, the paper made some explanations on the components and functions of the servo system.

RESULT:

Although we could not pin point the exact reason why the reliability of our audio transmission fell drastically at bauds higher than 27.7 kbps, we do suspect that is has something to do with a timing problem involving the time required by the ADC to complete a conversion since the biggest difference between the audio code and the text code is that the audio utilizes the ADC and transmits continuously. So ultimately the baud limitation did not degrade the quality of the transmitted audio.

REFERENCES:

[1] Laser communication.com Gizem, Aksahya & Ayese, Ozcan (2009) *Coomunications &Networks*, Network Books, ABC Publishers.

[2] Solar cell & Laser, http://en.wikipedia.org/wiki/Solar-pumped_laser from Wikipedia, & encyclopedia.

[3] The Japanese's Laser Communication Experiment (LCE), http://www.seminarprojects.com

[4] Rupali Dagade & Samadhan Lavate "Laser Communication System" International Journal of Electronics, Communication & Instrumentation Engineering Research and Development, Vol. 4, Issue 2, page 19-24 Apr 2014.

[5] A. J. Lawrance. and G. Ohama, "Exact calculation of bit error rates in communication systems with chaotic modulation", IEEE Transactions on Circuits and Systems I: Fundamental Theory and Applications, 2003, 50, pp.1391-1400.

[6] H. Kantz and T. Schreiber, Nonlinear time series analysis, 20003, Cambridge Cambridge University Press: Cambridge.

[7] J. C. Sprott, Chaos and time-Series analysis, 2003, Oxford University Press: New York.

[8] R Development Core Team, "R: A language and environment for statistical computing", 2010, R Foundation for Statistical Computing: Vienna.

[9] William Constantine (a) and Donald Percival (b), "fractal: Insightful fractal time series modelling and analysis", (a)REvolution Computing and (b) Applied Physics Laboratory andUniversity of Washington, 2010. R package version 1.0-3.

[10] F. J. M. de Pison Ascacibar., J. O. Mere., M. C. Limas., and F. J. deCos Juez., "fdim: Functions for calculating fractal dimension",2008, R package version 1.0-6.

[11] A. and F. D. Narzo, "tseriesChaos: analysis of nonlinear time series" 2010. R package version 0.1-10.

[12] W. Liebert, K. Pawelzik, and H. G. Schuster, "Optimal embedding's of chaotic attractors from topological considerations", Europhysics Letters, 1992, 14, 6, p.521.

[13] T. Sauer, J. A. Yorke, and M. Cardale, "Embed ology", Journal of Statistical Physics, 1991, 65, 3, pp. 579-616

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

AUTOMATIC SANITIZER DISPENSER MACHINE USING ARDUINO

VISHAL RAJ IP[1] , PRITHIV RAJ A[2], RAGUL P[3], BALAJI V[4]

Second *year ICE, Saranathan College of Engineering, Trichy, Tamilnadu -620012*

Abstract:

The COVID epidemic has made an impact on human existence in a variety of ways. Various attempts were made to prevent viral transmission via working from home, social separation, and hand cleanliness. Because COVID-19 is spread through touch and contact, WHO recommends that hands be washed or sanitized on a frequent basis to limit the risk of infection. Manual involvement would be required to dispense sanitizer from the bottle and store it. And, thus far, the majority of hand sanitizers on the market do not function automatically. The goal of this article is to create an automatic hand sanitizer that can be used in hospitals, work places, offices, schools, and other locations to reduce the risk of infection caused by contact. The device uses an ultrasonic sensor to detect proximity and delivers a signal to a microcontroller (Arduino Nano). The sensor data is processed by the controller, which then controls the servo motor.

1. INTRODUCTION

It is important to maintain good hygiene in order to stay healthy. The term "hygiene" encompasses a wide range of topics. One of them is a clean hand. Hands are frequently touched on a variety of surfaces and might be directly contaminated. Various health agencies, notably the World Health Organization, encourage hand washing at regular intervals. Hand hygiene is now widely recognised as one of the most critical aspects of infection prevention. As the burden of health-care-associated infections (HCAIs) grows, as does the severity of illness and treatment complexity, all of which are exacerbated by multidrug-resistant (MDR) pathogen infections, health-care practitioners (HCPs) are reverting back to the basics of infection prevention by simple measures such as hand hygiene. This is because there is enough scientific data to suggest that appropriate hand cleanliness can greatly lower the risk of infection cross-transmission in healthcare facilities (HCFs)1-5. Hand sanitization has been shown to minimize the spread of healthcare-associated microorganisms and the occurrence of HCAI (healthcare associated infections). Hand hygiene is defined as the washing of your hands with soap and water, antiseptic hand washes, alcohol-based hand sanitizers (ABHS), or surgical hand antiseptics, according to the Centers for Disease Control and Prevention (CDC). Alcohol-based hand sanitizers are increasingly being utilized in hospital settings instead of soap and water for hand cleansing. Hand washing and/or hand hygiene are recognized to be troublesome in hospital settings, and they are a primary source of infections caught while patients are hospitalized. While hand washing and hygiene regulations and training are important and can help reduce the transmission of diseases, the problem of illnesses caused by poor hygiene among employees, medical professionals, and even patients persists. Hand washing stations and hand sanitizer dispensers have been seen in examination rooms, corridors, lobbies, and even patient rooms at medical

institutions. Such systems, on the other hand, are solely mechanical and are unable to provide an automatic way of creating accountability for appropriate hygiene practises. So far, the majority of hand sanitizers on the market do not run automatically. The goal of this essay is to create an automatic hand sanitizer that will automatically dispense sanitizer liquid. An ultrasonic sensor is used in this circuit. The sensor detects the presence of human hands beneath the machine. The machine is meant to be mounted on a wall at a height of 4 feet so that everyone can reach it and acquire sanitizer. The sensor sends a signal to the microprocessor, which decides whether to engage the pump and valve at the same time to spray liquid sanitizer through a mist nozzle.

2. LITERATURE REVIEW

Guide to implementation of the WHO multimodal hand hygiene improvement strategy. Available from: http://www.who.int/patientsafety/en/ , accessed on August 24, 2010. WHO Guidelines on Hand Hygiene in Health Care. First Global Patient Safety Challenge. Clean Care is Safer Care. Available from: http://www.who.int/patientsafety/en/ , accessed on August 24, 2010.

Boyce JM, Pittet D. Guideline for Hand Hygiene in Health-Care Settings. Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. PubMed, Google Scholar, Morb Mortal Wkly Rep. 2002;51:1–44.

Kampf G, Kramer A. Epidemiologic background of Hand Hygiene and evaluation of the most important agents for scrubs and rubs. Clin Microbiol Rev. 2004;17:863–93. Daniels IR, Rees BI. Handwashing: simple, but effective. Ann R Coll Surg Engl. 1999;81:117–8.

1) MY WORK

In order to test the Automatic hand sanitizer container, many actions were taken. We examine the relevance of the environment required for automated hand sanitizer due to the spread of Covid illness. The second stage is to do a literature review of the associated article. We create the hardware, test it, and then report on the results.

The following is a flowchart of the events:

case study => research => design & modeling => algorithm creation => hardware connection => manufacturing => testing & debugging => final report

An Arduino Nano microcontroller is utilized since it is simple to programme and contains built-in ADC and DAC. An ultrasonic sensor is used to provide input to the Arduino. It detects distance by emitting ultrasonic frequency from one side and recording the time it takes for the sound wave to be reflected back. Hands are detected using an ultrasonic sensor at a distance of around 7 cm from the sensor. The sensor will provide input to the Arduino Nano as a microcontroller (central controller) if a human hand is detected. The Arduino Nano microcontroller serves as the control center, with software to access data from the ultrasonic sensor's input.

2) DEVICES FOR MEASURING THE ENTIRE SYSTEM:

Fig No. 1.1 -ARDUINO NANO: The Arduino Nano is a microcontroller board that is based on the ATmega328P microcontroller (datasheet). It features 14 digital input/output pins (six of which may be used as PWM(Pulse width Modulation) outputs, eight analogue inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB port, a power connector, an ICSP header, and a reset button.

Digital I/O Pins: 14 (of which 6 provide PWM)

Analog Input Pins: 8

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

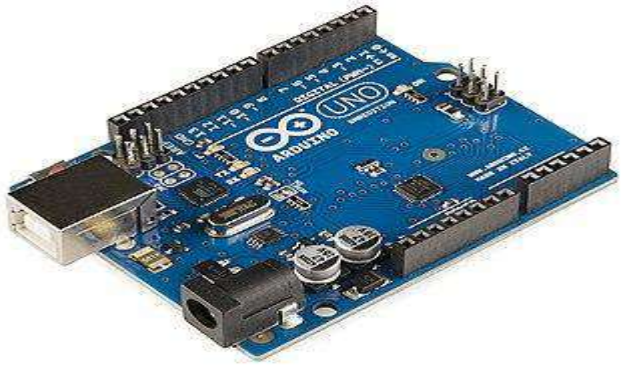


Fig No. 1.2

Fig No. 1.2 -ULTRASONIC SENSOR: An ultrasonic sensor is a device that uses ultrasonic sound waves to determine the distance to an object. A transducer is used in an ultrasonic sensor to emit and receive ultrasonic pulses that communicate information about the proximity of an item.

Power Supply: DC 5V
Working Current: 15mA
Working Frequency: 40Hz
Ranging Distance : 2cm – 400cm/4m
Resolution : 0.3 cm
Measuring Angle: 15 degree
Trigger Input Pulse width: 10uS
Dimension: 45mm x 20mm x 15mm

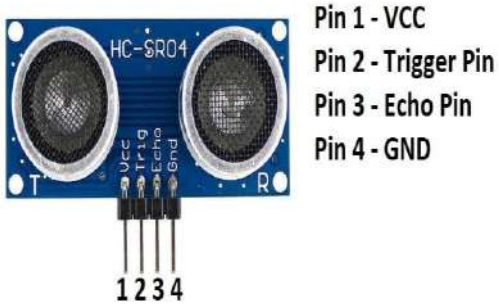


Fig No. 1.3 SERVO MOTOR

Servo motor : A Servo Motor is a small device that has an output shaft. This shaft can be positioned to specific angular positions by sending the servo a coded signal. As long as the coded signal exists on the input line, the servo will maintain the angular position of the shaft.

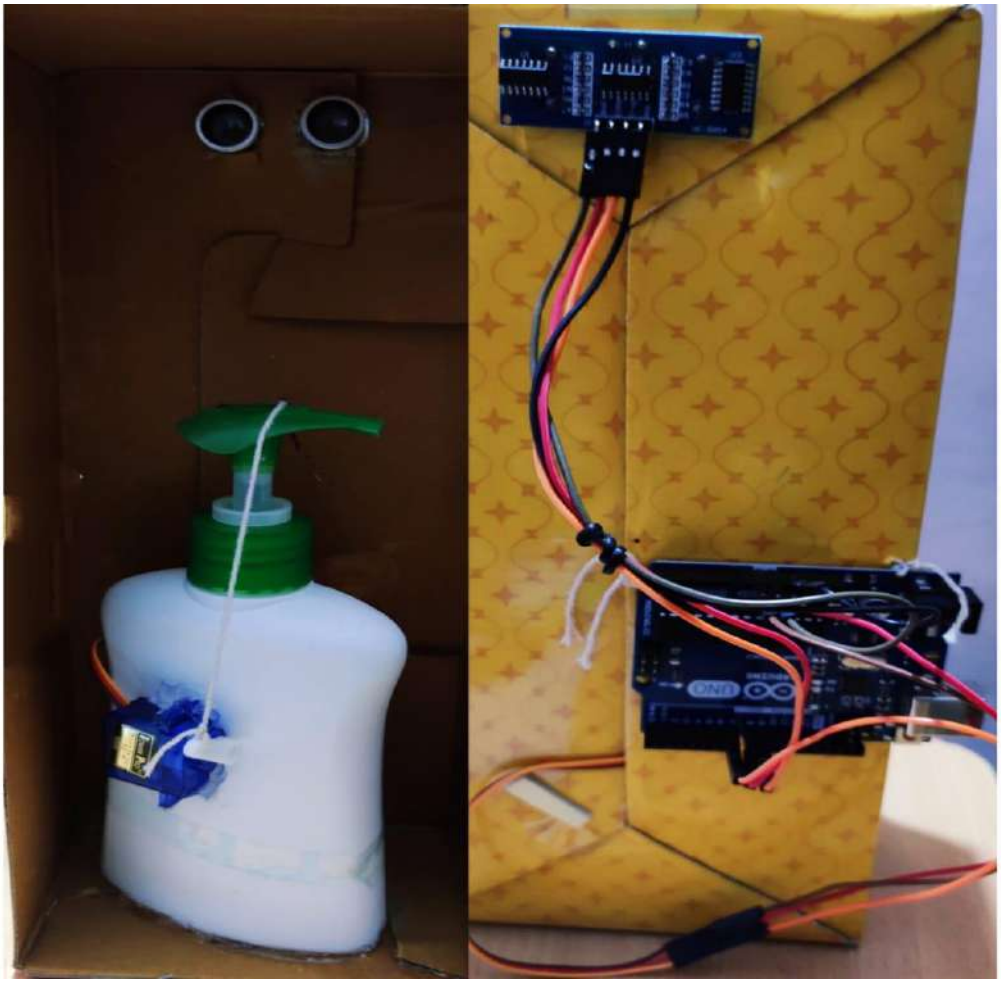
3) EXPERIMENTAL SETUP:

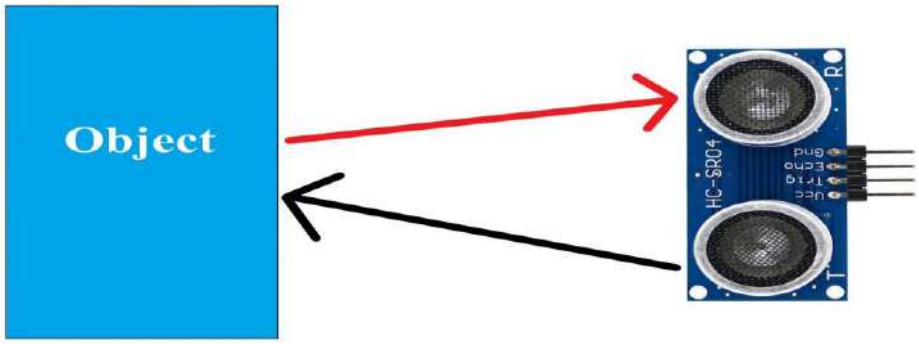
The sensor connected to the Arduino will start working when the device is activated. The ultrasonic sensor in this circuit is used to detect the distance to an object. The setup in Figure 1 works when the distance is less than 8 (<=7 cm) cm, the ultrasonic sensor will send data to the Arduino Nano so that it can activate the 5V pump.

1) SCHEMATIC DIAGRAM:

- The ultrasonic sensor is used to detect hands with a distance of approximately 10 cm from the sensor
- If a human hand has been detected, the sensor will send input to the Arduino UNO
- The Arduino UNO processes the Sensor data and actuates the Servo motor

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022



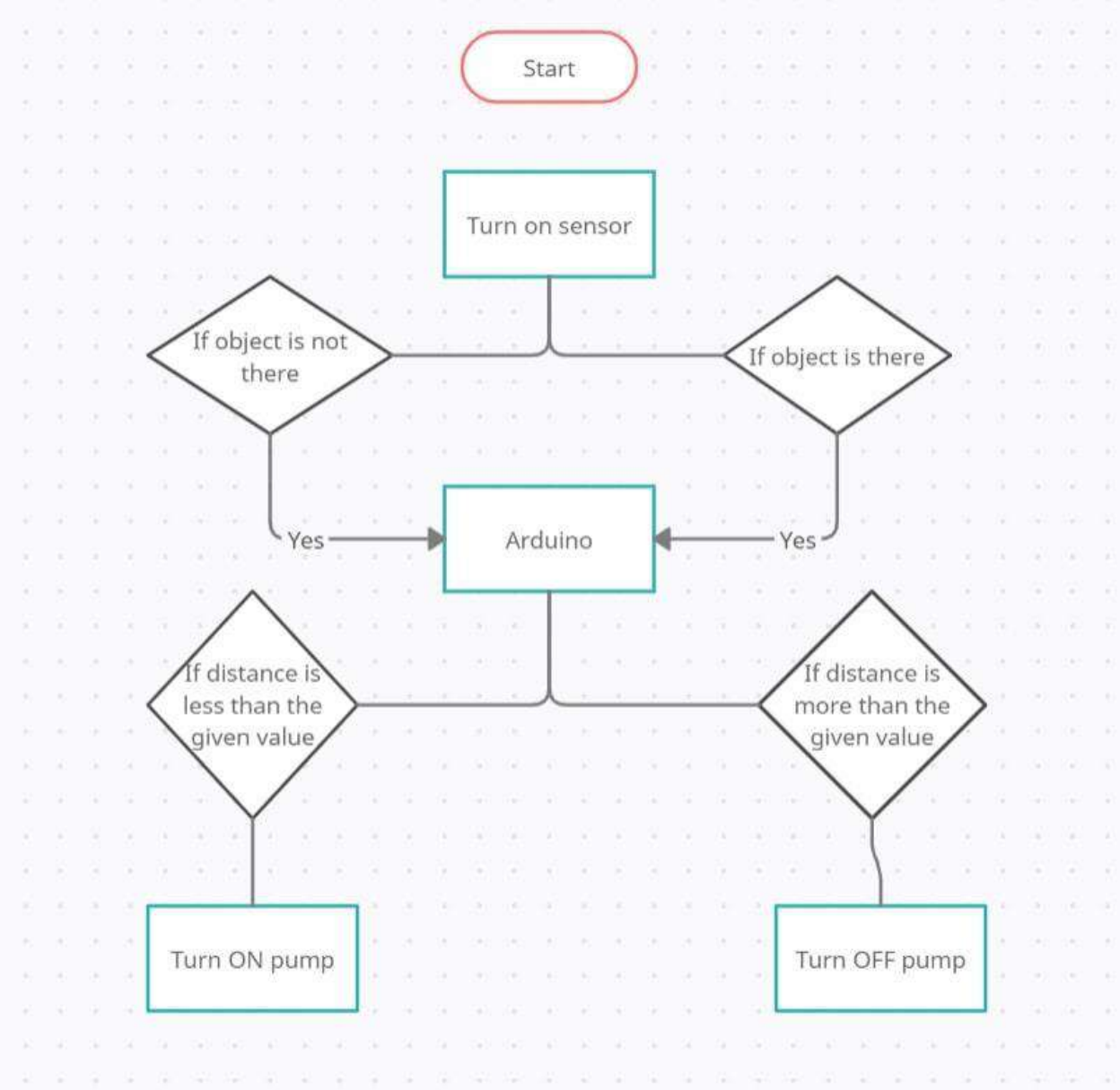


2) WORKING PRINCIPLE:

- The System sense the proximity with the Help of Ultrasonic sensor and sends signal to Arduino Uno(Micro-Controller)
- The Micro-Controller processes the Sensor data & actuates the servo motor
- As a result the sanitizer liquid dispenes through the nozzle

3) BLOCK DIAGRAM:

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022



4) CODE :

```
 #define echoPin 2
 #define trigPin 3
long duration;
 int distance;
void setup() {
 pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
pinMode(5, OUTPUT);
Serial.begin(9600);
}
void loop() {
 digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin, HIGH);
distance = duration * 0.034 / 2;
Serial.print("Distance: ");
Serial.print(distance);
Serial.println(" cm"); if (distance<=7)
 {
digitalWrite(5, HIGH);
Serial.print("Pump On");
 delay(150); digitalWrite(5, LOW);
Serial.print("Pump OFF");
delay(2000); }
else
```

```
{
digitalWrite(5, LOW);
Serial.print("Pump OFF");
}
delay(50);
 }
```

RESULTS AND DISCUSSION:

According to the article, non-contact dispensing is critical for preventing disease spread, and hand cleanliness is critical and must be practised on a daily basis. A revolutionary design of an automatic hand sanitizer dispenser was exhibited in this study. The components required for device construction were thoroughly discussed. The circuit schematic was explained, which clarifies the link between the microcontroller circuit and the components (Arduino Nano). The plumbing conditions were shown and explained in this manner. For a better understanding, the key schematics and components from the original device were given in a sequential manner.

- The presentation says that non contact dispensing is very important to prevent pathogen spreading and finally, hand hygiene is most important and must be part of our daily life.

- In this project, a novel design of an automated hand sanitizer dispenser was demonstrated. The components needed for the device fabrication were described in detail.

REFERENCES

[1]. Guide to implementation of the WHO multimodal hand hygiene improvement strategy. Available from: http://www.who.int/patientsafety/en/ , accessed on August 24, 2010
.

[2]. WHO Guidelines on Hand Hygiene in Health Care. First Global Patient Safety Challenge. Clean Care is Safer Care. Available from: http://www.who.int/patientsafety/en/ , accessed on August 24, 2010.

[3]. Boyce JM, Pittet D. Guideline for Hand Hygiene in Health-Care Settings. Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. PubMed, Google Scholar, Morb Mortal Wkly Rep. 2002;51:1–44.

[4]. Kampf G, Kramer A. Epidemiologic background of Hand Hygiene and evaluation of the most important agents for scrubs and rubs. Clin Microbiol Rev. 2004;17:863–93.

[5]. Daniels IR, Rees BI. Handwashing: simple, but effective. Ann R Coll Surg Engl. 1999;81:117–8.

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

REAL TIME TEMPERATURE AND HUMIDITY MONITORING SYSTEM

YESHVANT.BA[1], MUKESH.P[2], YOKESWARAN.T[3], VIGNESH.S[4]
Second year Instrumentation and Control engineering, Saranathan college of Engineering, Panjappur, Trichy, Tamil Nadu

Abstract:

Indian industries majorly include Biomedical, agricultural and pharmaceutical which are the pillars of country economy. The monitoring of temperature and humidity are major areas for all these industries. Any kind of unbalancing in the environmental conditions or unset parameters can create financial loss in the productivity of pharmaceutical and agriculture industries. Monitoring of temperature and humidity are also required for biomedical industry for drugs and cell culture methods In this paper we are going to measure temperature and humidity by using Arduino tool and DHT11, which will be beneficial for balancing the environment to increase the productivity.

1. Introduction

There are so many embedded devices to interact with environment by connecting internet. The increment of these types of objects is achieving the development of microcontroller based systems which are replacing old complicated electronic circuits. By using IoT, we can control any electronic equipment in homes and industries. Moreover, we can read a data from any sensor and analyze it graphically from anywhere in the world. Arduino is a micro controller board which works as a tiny computer. Arduino is a platform to develop an interaction with required programming software. Arduino UNO is micro controller unit to fetch a data of humidity and temperature from DHT 11 sensor and process it and give it to a ESP8266 module (wi-fi module). In this paper we have different sections to trace the temperature and humidity.

Section I defines the humidity and temperature by using humidity and temperature sensor DHT11, section II reads the DHT sensor module's output and extracts temperature and humidity values into a suitable number in percentage and Celsius scale, section III system displays humidity and temperature on LCD, Section IV defines analyzing and designing the system architecture, section V shows the result and future scope.

ARDUINO:

Arduino is a new open source hardware and software system. It has to take attention of a large technology design and community at affordable cost, which increases its use with advanced technology. Arduino hardware is a motherboard for making interaction between objects and suitable computer programming IDE (Integrated Development Environment)

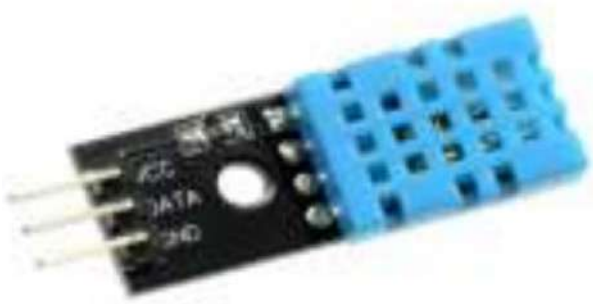
DHT11:

This module features a humidity and temperature complex with a calibrated digital signal output means DHT11 sensor module is a combined module for sensing humidity and temperature which gives a calibrated digital output signal. DHT11 gives us very precise value of humidity and temperature and ensures high reliability and long term stability. This sensor has a resistive type humidity measurement component and NTC type temperature measurement component with an 8-bit microcontroller

inbuilt which has a fast response and cost effective and available in 4-pin single row package.

DHT11 module works on serial communication i.e. single wire communication. This module sends data in form of pulse train of specific time period. Before sending data to Arduino it needs some initialize command with a time delay. And the whole process time is about 4ms.

The single-wire serial interface makes system integration quick and easy. Its small size, low power consumption and up-to-20-meter signal transmission making it the best choice for various applications, including those most demanding ones. The component is 4-pin single row pin package. It is convenient to connect and special packages can be provided according to users' request



REQUIREMENTS IDENTIFICATION:

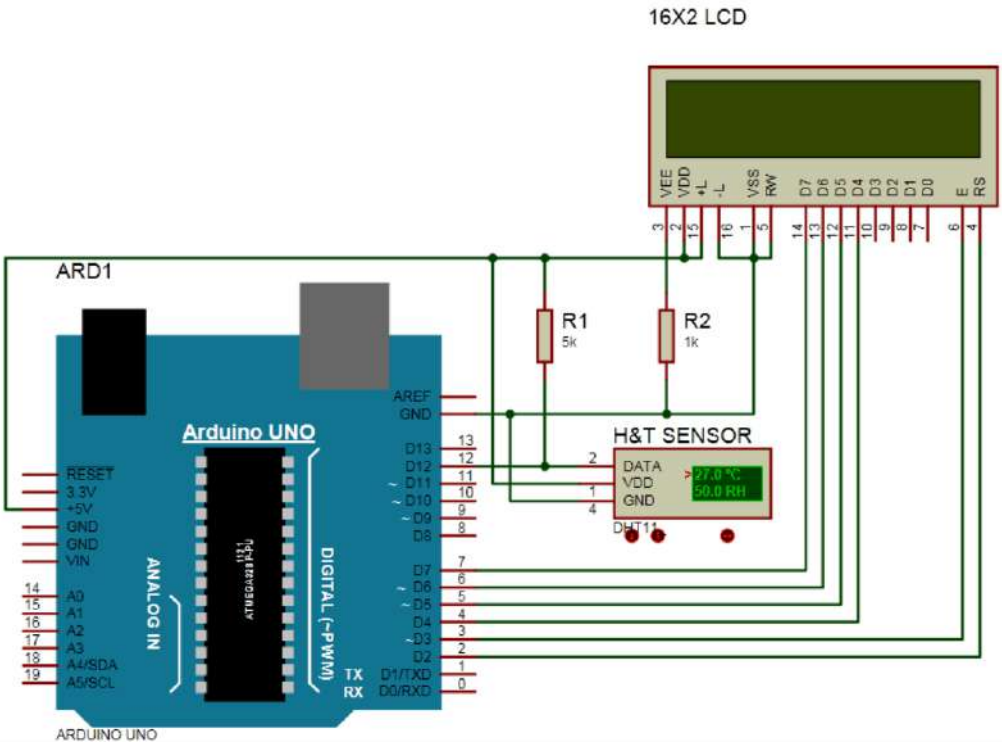
Technology that was used in past scenario was Evaluation Kit for digital Humidity Sensor EEH110 and EEH210. The

problems were as follows:

- It took comparatively more time to process.
- It required additional devices for operation.
- It required external clock.
- Programming for micro controller 8051 was difficult.

- For programming it required development system.
- Circuit size became large.
- PCB making became complex.

CIRCUIT DIAGRAM:



CONCLUSION

This proposed system can provide a convenient method for effective monitoring of temperature and humidity in real time. This system is compact to an extent and cost effective when compared to prices of instruments used to measure the environmental factors. From the above all analysis, it is ensured that the nested wired systems can be replaced by the wireless sensor networks to get an accurate data as well as to avoid many hazardous issues.

REFERENCES:

[1] N. H. A. Aziz, W. N. W. Muhamad, N. A. Wahab, A. J. Alias, A. T. Hashim, and R. Mustafa, "Real time monitoring critical parameters in tissue culture growth room with SMS alert system," in Intelligent Systems, Modelling and Simulation (ISMS), 2010 International Conference on, 2010, pp. 339-343.

[2] E. Parrish and T. Hickey, "A Temperature Monitoring System for Use on Normal Newborn Infants," Instrumentation and Measurement, IEEE Transactions on, vol. 21, pp. 59-60, 1972.

[3] L. Ruiz-Garcia, P. Barreiro, and J. Robla, "Performance of ZigBee-based wireless sensor nodes for real-time monitoring of fruit logistics," Journal of Food Engineering, vol. 87, pp. 405 - 415, 2008.

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

IOT BASED FIRE ALARM SECURITY SYSTEM

Hari Varshini S, Boomika S, Sherene Amalia G, Leena R

Second year ICE, Saranathan College of Engineering, Trichy, Tamilnadu -620012

ABSTRACT

Fire alarm systems are essential in alerting people before fire engulfs their homes. However, fire alarm systems, today, require a lot of wiring and labor to be installed. This discourages users from installing them in their homes. Therefore, we are proposing an IoT based wireless fire alarm system that is easy to install. The proposed system is an ad-hoc network that is distributed over the house. This system consists of a microcontroller (ESP8266 nodeMCU) connected to an infrared flame sensor that continuously senses the surrounding environment to detect the presence of fire. The microcontrollers create their own Wi-Fi network. Once fire is detected by a sensor, it sends a signal to a microcontroller that is triggered to send an SMS to the user, call the user and alert the house by producing a local alarm. The user can also get information about the status of his home via sending an SMS to the system. A prototype was developed for the proposed system and it carried out the desired functionalities successfully with an average delay of less than 30 seconds.

Keywords :

Blynk, Fire, IoT, Fire alarm.

1. INTRODUCTION

1.1 PREAMBLE

The traditional way of fire alarm was designed with two fire alarm boxes, each of which contained a telegraphic key. When someone detected a fire, they would crank the handle that was attached to the fire alarm box, which would then send the details of the fire alarm box number to a central alarm station. As soon as the telegrapher at the station received the message they would notify the fire department response team of the box location.

Now we are in the 21st century, everything is modernised. By using those old methods, we cannot save everything. That is why we are introducing the IoT based fire alarm security system. This can save our time and lives.

The fire alarm system is a solution to one of the most dangerous fire disasters. To build a Smart IoT based Fire Alarm System there is a need to integrate different hardware components such as ESP8266 NodeMCU, Flame sensor, Buzzer which in turn needs to be connected with the Computer through which data communication and data handling takes place. Further can be achieved by using the blynk app, which will send the message to the system. Thus the Fire Alarm System is built by basic blocks which comprises both the software and the hardware component. This helps us to identify the fire quickly and can control them.

1.2 LITERATURE REVIEW

In [1], the research on fire using fire alarm systems is discussed. In [3], Fire Behaviour and Fire line Safety is discussed. In [5], Review on Forest Fire Detection using sensors is discussed. In [7], Forest Fire Smoke Video Detection Using Spatiotemporal and Dynamic Texture is discussed. In [10], Multilayer Neural Network Based Fall Alert System Using IOT is discussed. In this paper, we introduce Node MCU instead of Arduino. It will consume less power from the source.

ISSN : 2456-1762
Student Journal of Electrical and Electronics Engineering Issue No. 1, Vol. 1, 2022

1.3 INTERNET OF THINGS

As the concept "Internet of Things" (IoT) has recently attracted growing attention from both academia and industry. IoT is a scenario where devices (even animals or people) are provided with unique identifiers and the ability to automatically transmit data over a network without requiring human-to computer interaction. ESP8266 Node MCU forms an essential block of IoT are wireless microchips used for tagging objects for automated identification. ESP8266 Node MCU is an open source IoT platform. It includes firmware which runs on the low cost Wi-Fi enabled ESP8266 Wi-Fi SoC from Espress if Systems, and hardware which is based on the ESP-12 module. In this IoT Fire Alarm, we are using two GPIO pin to get the digital data from the flame sensor.

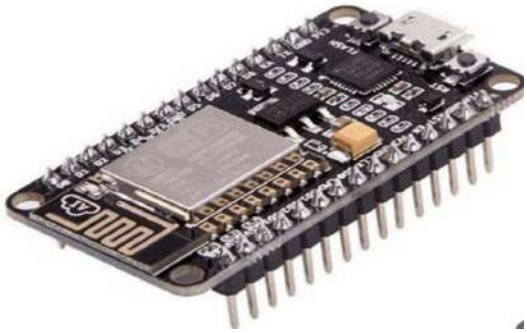


Figure 1. Node MCU

1.4 FIRE ALARM SYSTEM

Our framework utilizes Chemical Factories, Shopping Malls, local shops, Educational institutes, Parking Areas, Companies etc.

2. DEVICES USED IN THE ENTIRE SYSTEM

A Flame Sensor is a device that can be used to detect the presence of a fire source or any other bright light sources. There are several ways to implement a Flame Sensor but the module used in this project is an Infrared Radiation Sensitive Sensor.

The module uses a LM393 comparator chip to provide a stable digital output signal. This comparator has a driving ability of 15 mA. This flame detector sensor can be used in different projects including fire alarms and other fire detecting devices or projects.

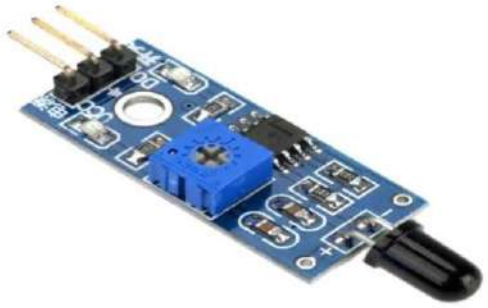


Figure 2. Flame sensor

2.1 FUNCTIONAL DIAGRAM

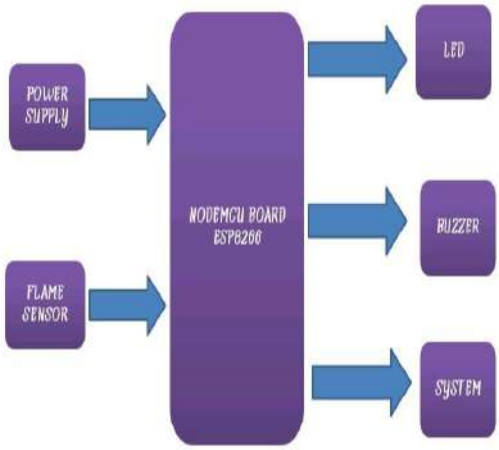


Figure. 3. Functional block diagram

2.2 OVERVIEW

Node MCU is an open source firmware for which open source prototyping board designs are available. The name "Node MCU" combines "node" and "MCU" (micro-controller unit).The term "Node MCU" strictly speaking refers to the firmware rather than the associated development kits. Both the firmware and prototyping board designs are open source. It also informs the authority using IoT Blynk Application.

3. SOFTWARE DESCRIPTION

This system can be done by using programming language C. SMTP (Simple Mail Transfer Protocol) is a platform used to send and receive large numbers of emails from remote locations automatically. Due to its fast and reliable service it is mostly used by developers and marketers to save their time in sending emails in a secure way. Its servers and data centres are all around the world which helps it to select the nearest server and hence provides the fastest connection in sending and receiving emails. It can be used in IOT projects to send emails automatically when a particular task occurs. In this project we will be using SMTP2GO to send email alerts when fire is detected by the flame sensor.

3.1 FIRE ALARM SECURITY SYSTEM

Flexible: Fire alarms are now available that can also be monitored on mobile devices and can receive messages from the alarm, including an alarm event; which detector has triggered so you know the location of the potential fire.

Accessible: It can be used from anywhere through the system or mobile.

4. PROPOSED METHODOLOGY

Fire safety is one of the crucial factors to ensure the safety of your premises, be it home or office. It is essential to have a good quality fire alarm system in place to protect the premises and warn people when a fire breaks out. In case you own a commercial property, it is your fundamental duty to install a conventional fire alarm control panel to ensure 100% safety of the employees and resources. The primary aim of installing a fire alarm system is to get warned when the fire or smoke is detected in premises giving people enough time to escape. There are various types of fire alarms that provide different features, and you can choose one according to the requirement of your premises. Installing a fire alarm in your premises must be in your priority security checklists as it saves lives and there is nothing more important than securing the lives of people entering your residence or commercial space.

4.1. SCHEMATIC OF THE SYSTEM

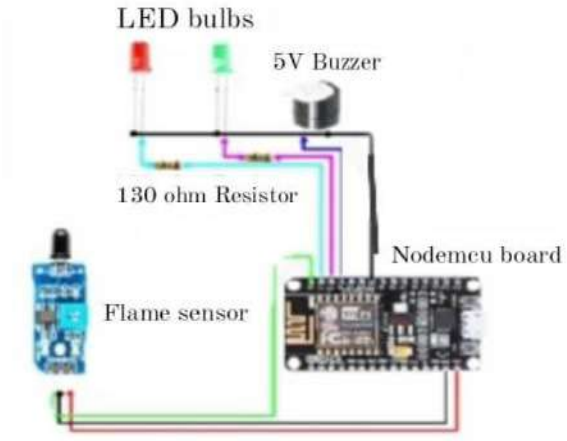


Figure 4. Schematic diagram

This is the schematic diagram of the fire alarm security system.

4.2. CIRCUIT CONNECTION

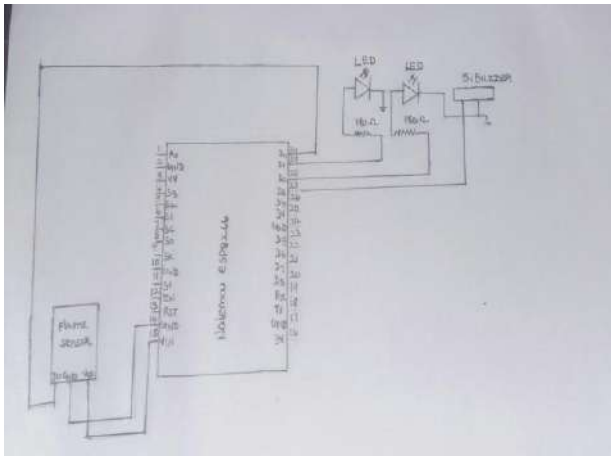


Figure 5. Circuit diagram

4.3. EXPERIMENTAL SETUP/ HARDWARE

The below figure depicts the hardware prototype that has been developed to realize the proposed methodology. The tests were conducted using the below experimental setup.

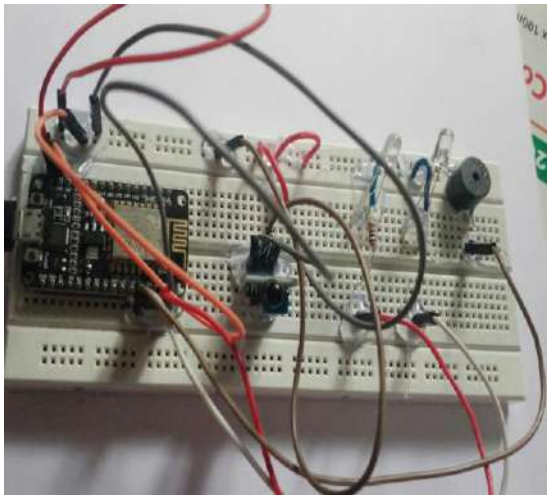


Figure 6. Experimental design

4.4. WORKING

A fire alarm system is an active fire protection system that controls all the fire alarm modules in a building. It is composed of alarm initiating devices (smoke detectors and heat sensors), alarm notification appliances (sirens or devices that produce loud noises), fire control units (sprinkler systems or fire extinguisher systems), power supplies and wirings. The fire alarm system can be set off automatically by smoke detectors, heat detectors or manually. These sensors are set to detect certain levels of heat or smoke that could be an indication of fire. A loud bell or a siren sometimes accompanied by blinking or flashing lights for individuals who have hearing problems, blasts to alert occupants in the building. To truly understand how a fire alarm system works, let us go further into the components of the fire alarm system. In a fire alarm system there is always a smoke detector to detect smoke or fire. The process of this system When this system is powered on, the Node mcu board connects to the Blynk cloud through the internet. Then, we can turn ON and OFF this system using the Blynk app interface. When the system is activated, the smartphone receives a push notification as soon as the red LED and buzzer is activated in the event of a fire. Afterward, the system goes back to normal. Then the green LED bulb is activated.

5. RESULTS

The result is shown below.

Figure 7. Result

6. CONCLUSION AND FUTURE SCOPE

Thus the IoT based non-contact fire alarm security system was successfully developed and validated. The proposed scheme can be extended by using GSM(Global System Mobile) for long distance.

REFERENCES

[1] Breejen E. D. et al 2003–2012 In Proceedings of 3rd International Conference on Forest Fire Research and 14thConference on Fire and Forest Meteorology (Luso, Portugal) Autonomous forest fire detection 16-20.

[2] Hartung C. and Han R. 2006 Fire WxNet: A Multi Environments 4thInternational Conference of Mobile Systems, Applications and Services.

[3] Viegas D.X. 1993 Fire Behaviour and Fire line Safety Annual Mediterranean Burns Club 6.

[4] Scott J. H. 2012 Introduction to Wildfire Behaviour Modelling National Interagency Fuels, Fire and Vegetation Technology, Wildland Fire Management RD&A.

[5] Alkhatib A. A. A. 2014 A Review on Forest Fire Detection Techniques International Journal of Distributed Sensor Networks Article ID: 597368.

[6] Vicente F. B., Carbajal N., Felipe L. and Martínez L. P. 2014 Estimation of Total Yearly CO2 Emissions by Wildfires in Mexico during the Period 1999-2010 Advances in Meteorology Article ID: 958457, 2014.

[7] Zhao Y., Zhou Z. and Xu M. 2015 Forest Fire Smoke Video Detection Using Spatiotemporal and Dynamic Texture Features Journal of Electrical and Computer Engineering Article ID: 706187, 2015.

[8] Vijayabaskar V. and Rajendran V. 2010 Analysis and modelling of wind dependence of ambient noise in shallow water of Arabian sea European Journal of Scientific Research 50 28-34 SJR IF: 0.21, Nov.

[9] Manjula P. and Balachandra P. Information and Communication Technology for Sustainable Development. Lecture Notes in Networks and Systems 9 ed D. Mishra, M. Nayak and A. Joshi (Singapore: Springer) An Analysis on Pricing Strategies of Software ‘I-Med’ in Healthcare Industry.

[10] Shahada SA, Hreiji SM, Atudu SI and Shamsudheen S 2019 Multilayer Neural Network Based Fall Alert System Using IOT International Journal of MC Square Scientific Research 11 1-5.