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Forest Fire Indication & Control System

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Abstract: ***In this paper we have researched on the forest fire control system. This system is implemented to save forests from uncertain fire events.it is practically small system having capacity to detect fire in range of 100cm .When temperature and fire increases in any particular area of forest . This device is capable to detect it and with the help of buzzer it alerts the whole system and with a new feature of control fire it certainly take action on the stoppage of fire . This system is very cheap and very simple in manufacturing which makes it handy. By use of arduino nano we can easily control its range and functioning. Its feature of display temparature and humidity on LCD makes it vital in protection of forest . This project can be easy to implement with less maintenance cost and economical in price can lighten up the markets by its features. The main aim was economizing this project so that it can easily be implementing.***
Keywords: Practical, temperature, capable, cheap, economical

I. INTRODUCTION

Nowadays, problems with population ,urbanization & deforestation. Forest fires often cause serious threats to the environment and produce real emergency situations and natural disasters. The response time of emergency corps greatly affects the consequences and losses caused by them, so the enhancement of forest fire prevention and detection systems can be considered a main goal for conserving the environment. On the other hand, unusual changes of dynamic forest fire risks such as meteorological collision, polluting gases, or the oxygen level measured in real time can be analysed aiming at performing a short-term estimation of forest fire risks. Likewise, uncommon decrease of humidity values or oxygen level jointly with increasing temperature values or the concentrations of certain polluting gases, such as carbon dioxide and carbon monoxide, may involve a high probability of outbreaks of recent nearby fires. Therefore, environmental monitoring may make the response time of emergency events more efficient. Fire spread can be also estimated by analyzing the values of meteorological collision, wind direction and the oxygen level over nearby forest areas, because these factors have a direct impact on relevant fire occurring factors such as dryness of vegetation and and area. With respect to this, the FOREST FIRE INDICATION AND CONTROL SYSTEM which is economically cheap and efficient with alert and savage option of fire events occurs in forest. This system with flame sensor, regulator, dht11, with advance features of arduino nano coding and pump make it reliable to coping with fire situations. The main goal of the proposal here described is to estimate in short-term the existence of forest fire risks and to detect the recent occurrence of fire outbreaks over different forest areas.

II. LITERATURE REVIEW

Now-a-days things has changed so much, now inventors have been paying attention to the efficiency in working and cost. Seeing the climatic changes need of hour ia changing and in this field here are some other technologies:-

"SAGE PUBLICATIONS Satellite images capturing by two main satellites launched for forest fire detection purposes both are advance techniques:-

A. The advanced very high resolution radiometer (AVHRR) [1], launched in 1998
B. The moderate resolution imaging spectroradiometer (MODIS), launched in 1999, have been used [2]"

"NIDM [3] Provisions of modern and effective tools and machinery e.g. Fire Beaters, Forest Fire Showel, Pulaskis Tools, Fire Rakes, McLeod Tools, Brush Tools, Power Blowers, Back-Pack Pump Sets, Fire Tenders etc."

"SCIENCE DIRECT Features of this semiconductor gas sensor (GTE GSME) are a very fast response time and a high sensitivity [4]. A CXHX-Sensor [0 – 5ppm] is used because hydrocarbon sensors are sensitive to organic fire products. Fast temperature fluctuations are measured by a temperature sensor"

"IJERT [5] there are remote monitoring, surveillance system and ZIGBEE technology etc. But the cost of manufacturing these systems are quite high when compared to the proposed system. In this scenario surveillance systems are that much secure like proposed system, because it is easily detecting the forest fire and send the information o long distance."

"MDPI.com [6]. More recently, early detection systems that combine optical cameras & IR imaging both types have also been introduced. The computer-based methods can process a high number of data aiming to achieve a consistent level of accuracy maintaining a low false alarm rate"

III. CIRCUIT DIAGRAM

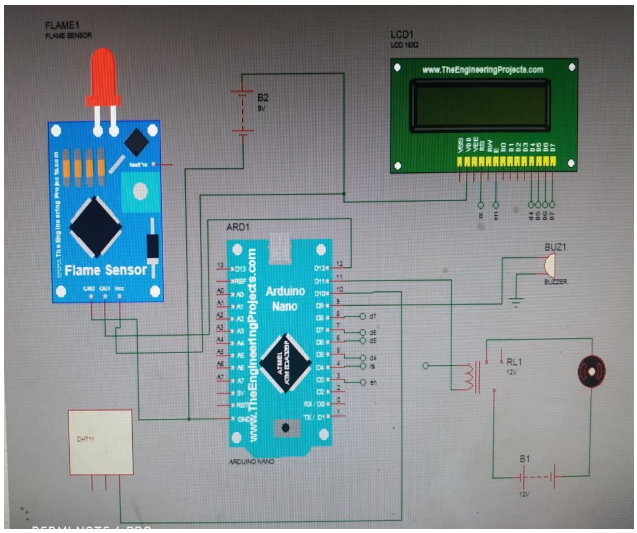

Fig1

In fig1. Circuit diagram shown the connections of components. connect the flame sensor,arduino nano and dht11.Ground the flame sensor,arduino nano & dht11. Connect Dht 11 and arduino nano. Dht 11(tempaprature sensor) output D2 of arduino nano.connect buzzer and arduino nano. Buzzer to D9 of arduino nano. Connect arduino nano and relay 1 channel . D11 of arduino nano, relay1 channel.connect flame sensor and arduino, Flame sensor output to D12 arduino nano.connect LCD and arduino nano. LCD D3,D5,D6,D7,D8 of arduino nano. connect relay and motor.connect motor and battery. Connect Vcc of arduino nano, flame sensor and heat sensor to supply which is through regulator.

IV. WORKING

A power supply of 5 volts is used for the working of the circuit s all components in the circuit requires 5volts. As we design our circuit in which the range of flame sensor is 100 cm . So, if any fire event occur in forest then flme in range of sensor sensed and buzzer will blow . It depends on our operation through arduino nano . In this we set it on 45degree celsius means when temperature reaches above 45 degree, heat sensor indicates that and buzzer will blow then the motor which is connect through relay starts and water will release to which he flame movement can be control.and there is also a feature of display of temperature and humidity on lcd. Which helps us to easily analyze the situation .with the help of arduino we can reset the programming and operation and also change range and temperature of flme sensor and heat sensor respectively.

V. MODULE DESIGN

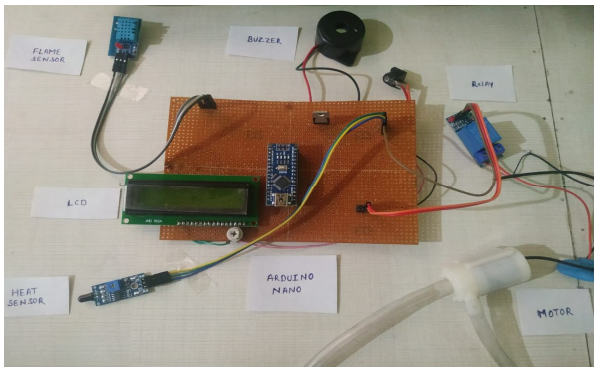

Fig 2

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A. Components

1) *Flame Sensor:* A flame sensor is a sensor to detect and indicate fire and flame.
2) *Heat Sensor:* A heat sensor is a fire alarm device dto respond fire and when increases the temperature of a heat sensitive element.
3) *LCD:* An LCD is an electronic display module to produce a visible image.
4) *Arduino NANO:* The Arduino Nano is very much similar to the Arduino UNO. They use the same Processor (Atmega328p) and hence they both can share the same program.
5) *Relay 1 Channel:* A relay is an electrically operated device. It has a control system and (also called input circuit) and controlled system .
6) *Regulator7805:* Regulators are very common in electronic circuits. They provide a constant output voltage for a varied input voltage.
7) *Buzzer:* A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric .
8) *Pump:* Pump is a device that moves liquid or sometimes more viscous material, by mechanical action, typically converted from electrical energy into hydraulic energy.
9) *Battery:* It is a container consisting inside chemical energy is converted into electrical energy and used as a source of poweror we say supply.

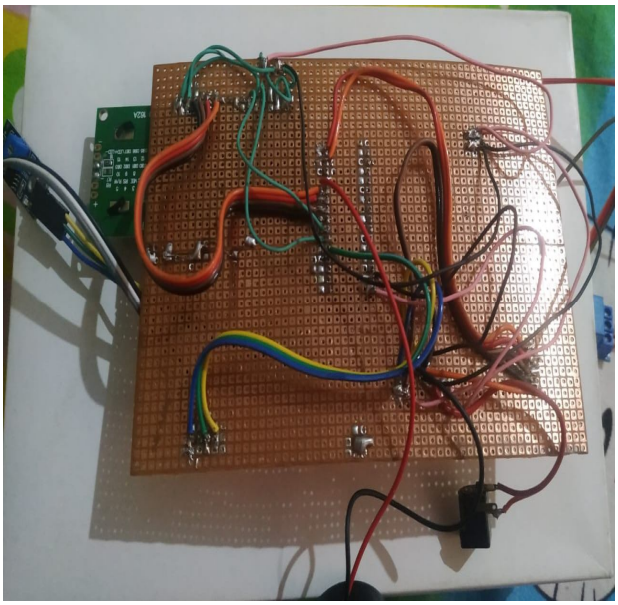

Fig 3 module connections

VI. FUTURE SCOPE

This technology can be changed into big pratical one. By adding the specialized boards instead of arduino and using high quality sensor to give a faster response . we can use arduino nano and PID controller for more efficient results.Forest fire control system can also high scope in GSM based and IoT based technology.

VII. CONCLUSION

This work describes a proposal aimed at performing a short-term estimation of forest fire risks to enhance the response time of emergency corps and existing forest fire prevention, detection, and monitoring systems. In order to do it with making module with help of arduino and sensors . which is very cheap and efficient.

VIII. ACKNOWLEDGEMENT

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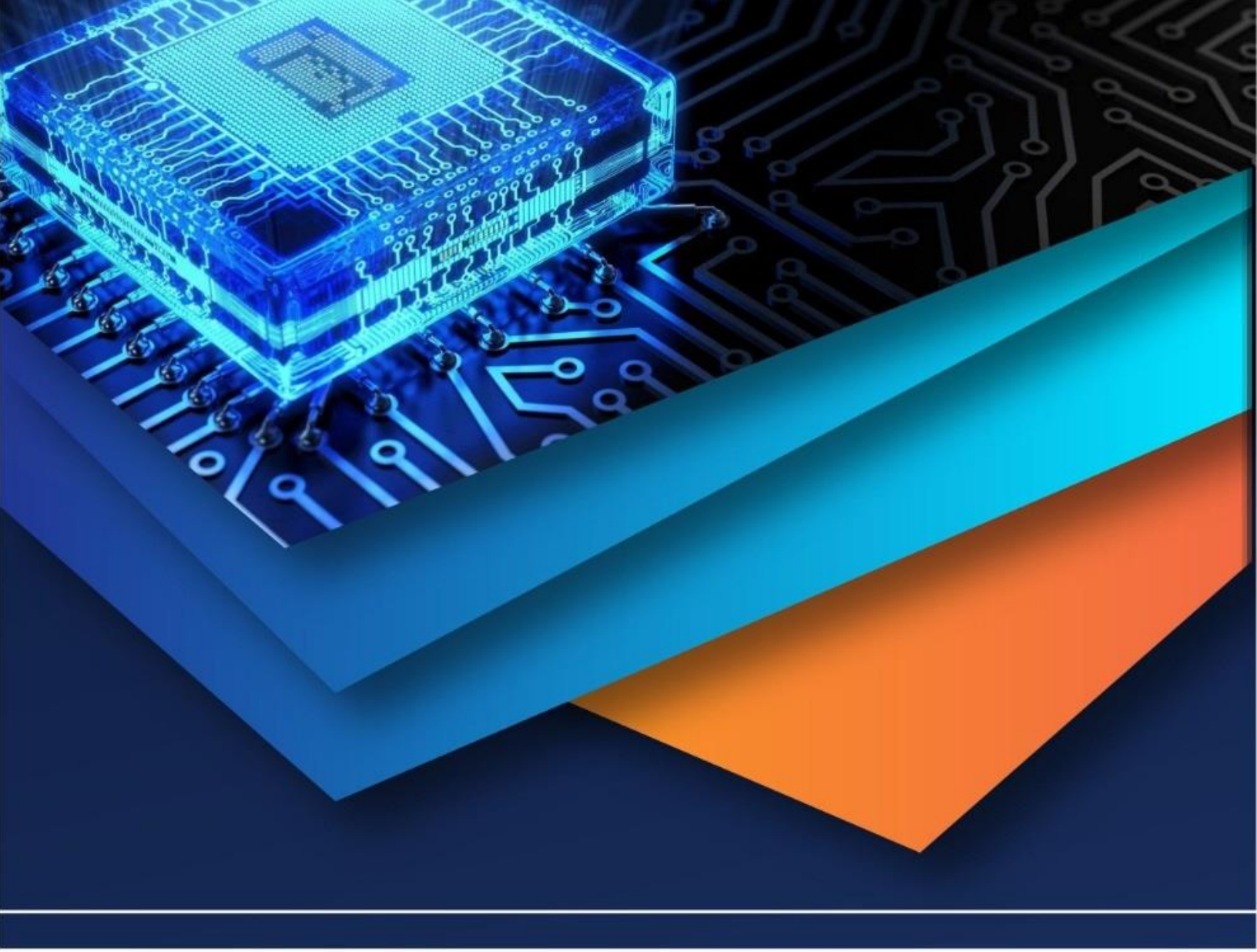

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