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Home Based Smoke detection Using Wifi and IoT

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ABSTRACT: Rural Problems Sharing and Solution Portal is a kind of social application especially for village people. Which is majorly concentrating on school, hospital, roads, drinking water and electricity. This application will help to register and share village problems in the form images or videos and upload it on the website. The interested Donors or Charities can register and communicate with the village head. Interested social workers can join their hand with this application and help to create social awareness about the rural problems. Donors can view the problems shared by the village head and donate amount with the purpose. Donors and charities are donating fund for particular problems solving and they can adopt the village make development in the village in all aspects and also check the fund utilization for the problems. The village head add the fund utilization information to website and donor can access this information from the website. The panchayat also part of this application and will manage the panchayat schemes and rural people has to get know about the schemes properly and necessary documents should be submit and apply for it. panchayat schemes will be updated by the admin.

KEYWORDS: Sensor :used to monitor the surroundings; LED : helps in indication; Wifi Module : helps in communication of the device with internet ; Buzzer : helps in sound indication.

I. INTRODUCTION

Smoke alarm is an example of poorly installed appliances like heaters, boilers, etc. There are several deaths per year due to Smoke, in addition to hundreds of hospitalizations; Smokesafety is something that every house should take seriously. Thousands of people lose their lives and thousands are disabled throughout their life, some people recover and some people do not Human life is more precious than anything in this world.

To reduce this incident, we can detect Smoke using MQ5 sensor. First of all when we activate the circuit the project automatically connects to the WIFI and IOT site. Once the connection to WIFI and IOT site is established the system waits for user to enter manually the maximum and minimum values on IOT site. Once the user enters values the data is received by the system. The LED in the project turns green once the data has been successfully received, then the project continuously monitors the amount of Smoke in the air, when the Smoke exceeds the limit the motor rotates indicating that value closing and the buzzer starts to buzz and LED turns to red indicating leakage.

This system also has the functionality that when detects the Smoke inside the house the detector automatically sends the “warning” message to the house owner as well as to the nearby fire station. For this reason it is possible to avoid high risks of victims and we can also avoid the loss of human life. The loss that happens to the environment can also be prevented. This project can also help to prevent destruction of houses, hotels, hospitals and many other places where Smoke is used in huge volumes. Smoke Detection using Buzzer system 2

II. RELATED WORK

There are many systems that have been built to prevent casualties or losses from occurring in human life and economy. The systems that are built are installed in hotels, schools, collages, hospitals, cafes and many more places where more people are gathered and important buildings of our country. The systems that have been installed are basic systems that no longer provide functionality and are less useful in all media. These systems continuously monitor the area and when there is Gas, Smoke; Fire or water leakage the system turns the RED and starts ringing the alarm. Due to which people become alert and panic-stricken and start running to save their lives. Many people run away and many people fail to escape because the precious human life could be lost. The systems installed are good but society needs better systems that can be useful.

III. PROPOSED ALGORITHM

This system not only detects Smoke but also uses a buzzer to emit a warning sound and an LED to show the status of leakage, and also sends the warning message to the owner of the house and a help message to nearby fire station. It continuously monitors the surroundings for any leakage, this system helps to send a message immediately to the owner of house or the owner of hotel or the head of hospital or to the head of building or to the principal of school or college and at same time sends a message to nearby fire station because the fire brigade can immediately helps them and saves the lives of people and turn down the Smoke alarm or fire. These systems can be useful for saving lives of people and the infrastructure of places. These systems can also avoid loss, hardware, and money. Also huge losses can be avoided. These systems are highly constructed systems compared to existing systems. The installation of these systems ensures that almost all people's lives are saved or the people who are not able to leave the building during panic situation will surely be saved by the firefighters. These systems are best systems than any other systems. These systems are low cost systems and easy to use systems.

FEASIBILITY STUDY

The feasibility study aims to discover an objective and rational way that strengthens and weaknesses of existing systems or the proposed systems, the opportunities and threats presented by the environment, the resources necessary to achieve and ultimately the prospects for success. When writing the feasibility report you need to consider the following:

- A brief description of business to evaluate multiple possible factors that could influence the study.
- The part of activity in question.
- The human and economic factor.
- Possible solutions to the problem.

1 TECHNICAL FEASIBILITY

The technology implemented in this project is emerging in day to day life and widely used in Internet of Things. The project using some components like Light Emitting Diode bulb, arduino board, breadboard, etc. these components are connected in such a way that it requires minimum changes. This project focuses on understanding the organization's present resources and their applicability to the expected needs of proposed system. It is an evaluation of hardware and software and how it meets the needs of proposed system. Therefore this project is technically feasible.

2 ECONOMIC FEASIBILITY

To evaluate a system feasibility of economy should be taken care of and it is the most widely method used. Cost analysis and benefit analysis is determined to have the more benefit compared to costs. If the profit is more than the investment to the product than the product is been designed and implemented into the environment. A company should carefully find the budget of device before building the system. In this project all the care of costs and profits is been taken.

2.1 Cost-based study:

Cost and benefits can be classified as follows:-

- Development costs
- Economic costs

The cost of the system should include the costs of the each component used in building the system. The people working on the system are less in number, therefore the development costs in even lesser. There is no training involved and therefore this system has more profitable than investment.

3. OPERATIONAL FEASIBILITY

An estimate is made on how strong the reaction of user staff is to the development of computerized system.

Interfaces are not used because we are not creating web sites or an android app. In addition to the interfaces, the ease with which the hardware works is remarkable and any user can easily learn to work with it.

IV. SYSTEM REQUIREMENTS

1 LANGUAGE USED

The language used to build this system is Embedded C. It is extension for C programming language to solve the problems that occurs for different systems. This language also supports micro processor functionality like arithmetic, multiple memory banks, input and output operations, etc. This language was extended in 2008 by the C committee. For common standards they provided a single implementation. Embedded C has various options than simple C language. It

includes hardware addressing, basic I/O, arithmetic operations, etc. the syntax is quite similar of both the languages. Conditions, loops, data types variables, main function, joins, etc are all same. A technical report was published in 2008 which said that C language is expanded by providing a common standard. This language consists of lot of options which C does not have like fast functioning of operations, naming the areas of address, and addressing the basic input and output.

2 TOOLS AND TECHNOLOGIES USED

- LED Bulb: This is a semi conductor which lights when a current is passed to it. Photons, a form of energy is released when electrons combines with electron holes. In a LED bulb there are different types of colours which can be used in different systems in different types.
- F-F Connection Wires: These wires are used to connect devices on breadboard. A small range of electricity flows through these wires providing current to the components. These wires contain pins at each end. There are different types of wires such as F-F wires, M-F wires and M-M wires.
- Resistors: It is an electrical terminal device which provides electricity. It has two terminals. It acts as a circuit for these systems. This reduces the flow of current and lowers the voltage. It also reduces the level of signal and lines of transmission can also be transmitted. Resistors are connected for bulbs, sensors, etc.
- Arduino Board: This is a device which provides all the functionality of a system. It is a bridge between components and system. Controllers and micro processors can be designed using this. This device has various connection ports and a ground connection. Input and output of digital and analog can be done. N number of devices can be connected to it.
- Bread Board: This is a base for all the components, wires, resistors and devices. This board is reusable. This board supplies electricity underground. This board provides the main current to the devices and ground current as well.
- Smoke Sensor: This is a device which is used to detect smoke or gas. It acts as an fire indicator as well. This sensor has for connections one to ground, second to 5 volts electricity, third to A5 in Arduino board and last to A0 in Arduino board.
- Buzzer: It is a device which acts as an alerting device. It is an audio signalling device. There are different types in this. They may be mechanical or electro-mechanical or they can be piezoelectric. These are more used in timers or alarm devices.
- WI-FI Module: This device is a tcp/ip stack microchip. This is manufactured in china in state of Shenghai by the ExpressIf systems. This is a device which connects to wifi and get tcp/ip connection using different commands.
- Technology used : INTERNET OF THINGS(IOT) Famously known as IoT and abbreviated as Internet of Things it is a system which completely works on IT devices, machines which has UID or RFID. This technology gets data from far away across a network without the help of a single person but with the help of machines. The definition of IoT is in multiple forms different from each other due to multiple technologies and integrated systems. Wireless networks, automation and many more things contribute to the more and more use and emerging of this technology.

3. SOFTWARE REQUIREMENTS SPECIFICATION

1 FUNCTIONAL REQUIREMENTS

- Home owner warning: When a Smoke occurs in home, notify house owner by sending a warning message.
- Fire station warning: when there is Smoke in house, notify nearby fire station by sending a warning message.
- Smokedetection: This device detects the Smoke.
- Monitoring: constantly monitors the environment in which device is repaired for any Smoke.
- Provide directions: give direction to people by turning on the Red LED bulb.
- Data collection: in case of leakage detection, high values must be displayed on serial monitor otherwise low values are displayed.

2 NON FUNCTIONAL REQUIREMENTS

- Scalability: can adapt to changes in the environment and meet its needs.
- Maintenance: can be managed by the house owner.

- Efficiency: It is more efficient and can work for a long time.
- Easy to use: this device is easy to use and easy to repair.
- Performance: this software quickly detects Smoke and is environment friendly.
- Reliability: it is believed that the device is always available to users.
- Usability: the system is very simple to use and interactive with users.

IV. TESTING

1TEST CASES

Testing is done for the system to work according to the requirements of used mentioned. By doing this errors can be found out and corrected. There are various testing types done accordingly. After doing this we can read the code easily and can understand it. Whether the system is been built as per requirements and working is same direction with smooth flow can be verified easily during this process.

TEST CASE	PRE-CONDITION	TEST STEPS	TEST DATA	EXPECTED RESULT	ACTUAL RESULT	STATUS(PASS/FAIL)
Enter valid code	Need only code	Compile the code	<code>	Compiled successfully	As Expected	Pass
Enter Invalid Code	Need only code	Compile the code	<code>	Not Compiled successfully	Not As Expected	Fail
Upload the code	Need arduino board with valid connections	Send code to arduino	<code>	Uploaded successfully	As Expected	Pass
Upload the code	Arduino board not connected	Send code to arduino	<code>	Uploaded successfully	Not As Expected	Fail
Connections	Valid connections	Upload the code	<connections>	Successful connection	As Expected	Pass
Connections	Invalid connections	Upload the code	<connections>	No Successful connection	Not As Expected	Fail
LED & Buzzer	Need valid connection	Upload the code	<valid connection>	LED turn Red and Buzzer is on	As Expected	Pass
LED & Buzzer	Need Invalid connection	Upload the code	<Invalid connection>	No LED turn Red and Buzzer is off	Not As Expected	Fail
Smoke detected	All valid connections	Upload the code	<valid connections>	LED turns red and buzzer is on wifi sends message	As Expected	Pass
Smoke not detected	All valid connections	Upload the code	<valid connections>	No LED turns red and buzzer is off wifi sends no message	Not As Expected	Fail

V. CONCLUSION AND FUTURE WORK

In the past few decades no one thought that we will be so much ahead and developed where we are now and in the same way the rate at which the technologies are emerging and new platforms have been developed and provided to people and they are making very good use of it and not leaving any single opportunity given to them. There will be so many platforms and technologies in the nearing future like a menu card full of food items in a hotel. There is a lot of



competition between the individuals as well as the IT companies. Every country in the world is trying hard to be the greatest developed country so that all the rest of the countries could invest in them and it builds the greatest economy in the world and be one of the powerful countries. The rate of growth and development is very high and it will be increasing more than that in the future compared to the past. This system built on IOT technology takes lot of efforts and hardware components where in the future it could take any new and simpler hardware and less efforts using new platforms and technologies. The future of this project could be very colourful and different if used and developed very carefully and in a very creative way. Leaving apart the developed system, the future systems can develop this project using many more tools and new technologies. The system could be a simple Android app or a creative and indifferent app full of options along with this system. This app could be using to monitor the house for detecting gas leakage or fire leakage or water leakage or any other kind of leakage, along with that it can be used to switch on or switch off all the electronics of the house like Fridge, AC`s, Heaters, Fans, Tubes, Bulbs, etc. The system also could be a website. We may be able to do online shopping or browsing the internet using the same website. We don't know what this system will be turning out in the future. We cannot predict it. This system has limited places where we have installed but in future there may be many more new places which we haven't thought of or where we couldn't think of where it can be installed.

After successfully implementing and running the project smoothly and successfully we can come to the conclusion that, by using this system we can avoid a lot of chaos, mass destruction, human and animal lives, destruction of infrastructure, casualties, destruction of houses and buildings and lastly loss of money. We also can avoid huge leakage of any gases in the environment or atmosphere due to which air pollution can be avoided and helps to keep the environment clean which results in the good health of people and birds flying in sky. We also can reduce the death rate or the rate of loss of human and animal life by using this system which immediately informs the authorities and the owner of house or hotel or any other place of human gathering when there is low leakage of any gas before it turns out to be a disaster for all. Hence the final verdict would be that, this system is more feasible and helpful in all the ways to environment and human life as well as for animal life.

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