Smart Surrounding Awareness System for Industry

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Abstract: In several developing countries industrial automation is that the would like of recent generation. By victimization the varied sensors networks in conjunction with the unconventional power provide we are able to implement sensible close awareness system for trade. By victimization this we are able to scale back the human efforts yet as saves the energy. It conjointly plays vital role for human life safer. In trade the various parameter square measure contemplate like a water level detective work system, pollution detective work system, hearth detective work system. we tend to conjointly contemplate the environmental parameter like earthquake system. Therefore this project can facilitate in detective work numerous parameters. These numerous parameter square measure detective work victimization gas detector, hearth detector and vibration. The alert is given by the LED and buzzer and it show on alphanumeric display. We cannot management natural disaster however providing info in right time. {we can we willowed square measure able to} save several lives that square measure the explanation we tend to are acting on it and creating sensible trade for the longer term automation.

Keywords: Smart surrounding, Water level sensor, Air pollution detector, Industry, Fire sensor.

I. INTRODUCTION

Smart trade is that the want of the new generation. By exploitation varied device networks at the side of the unconventional power offer we are able to implement the sensible trade automation. By exploitation this we are able to reduces the human efforts furthermore as saves the energy. It additionally plays necessary role for creating human life safer. varied natural disasters destroy the human life. a fire device is sort of devices operative on to seek out and warn people through visual and audio appliances once smoke, fire, monoxide gas or totally different emergencies unit of measurement gift. These alarms could also be activated from smoke detector. the largest downside with disrupting degree trade is merely|that you just} simply begin degree earthquake and safer aftershocks square measure you ready to bring down equally. associate earthquake is caused by the abrupt unleash of strain at intervals the earth's crust that ends in waves of shaking that radiate outward from the earthquake offer. During this analysis we recommend early warning system for earthquakes supported wireless device network. With the approaching of the economic revolution humans were ready to advance additional into 21stcentury.Technology develop apace science become advance and producing age get read with this one among the issue pollution occur in trade. In tiny issue smoke is that the main waste material however they're worked in restricted hours. Pollution failed to go considerably however once this issue are available in the complete scale trade and producing units is that the issue of the economic pollution began to withstand the additional importance. Pollution is that the introduction of particulates biological molecules or various harmful materials into earth's atmosphere, inflicting sickness death to human's damage to various living organisms. Pollution could make sure manmade or natural sources. Sulphur oxide, pollutant, monoxide. These gases enclosed in pollution. Water level indicator is wide employed in a lot of trade. Downside is quietly related to poor water allocation, inefficient use and lack of adequate and integrated water levels indicator offer correct and economical water level.

II. LITERATURE SURVEY

The literature study contains doable application areas at intervals industrial automation. This was finished security purpose & Energy conservation. The literature study conjointly includes a chapter covering the aspects of energy economical systems and reduces the human efforts.

In order to fits necessities of oil and gas trade, associate degree air quality observation system was projected supported ZigBee wireless sensing technology. It uses ZigBee wireless network to send results to the observation centre in order that, if some abnormal things happens, a fast warning are going to be generated to inform employees to require effective measures to stop major accidents and shield human lives in trade [1].

Fire detection was done primarily by visual review and confirmation by an individual's being. hearth detection systems primarily utilized smoke detectors hearth alerts notifications ar sent via SMS to the owner of the building and to an online based mostly notification mistreatment the on-board GSM module in time period. Details of the communication based mostly GSM/SMS module ar mentioned during a separate paper [2].

Outlined the user communicates through SMS with the centralized unit. This centralized unit communicates with the system through SMS which is able to be received by the GSM with the assistance of the SIM (Subscriber Identity Module) card [5].

III. HARDWARE DISCRIPTION

The on top of mentioned diagram illustrates basic operating of our projected model. diagram consists of PIC18F4520, LCD, Buzzer, keypad, water level detector, pollution detector device, hearth device, vibration device, IR sensor. Sensors being connected to the PIC controller they sense the information i.e. (Air pollution, hearth and vibration) and supply it to the controller. Controller then processes the analog knowledge and converts it to the digital kind and transmits it to the LCD via GSM. Knowledge are going to be show on so as to display the values perceived by the device. Buzzer that comes into action as long as the pre-defined values of the parameters exceed the limit. As before long because the values area unit exceeded the buzzer starts ringing and therefore the system turns off.
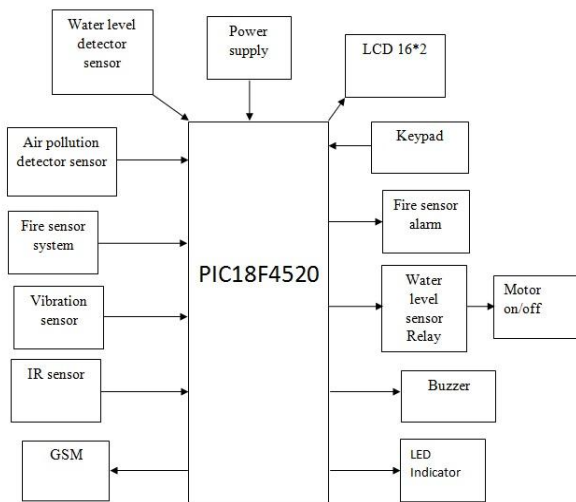

Fig.1. Block diagram of the system

All the key elements of our model are additional delineate intimately.

A. Microcontroller (PIC18F4520)

PIC 18 is 8 bit processor, meaning that the CPU can only 8 bit of data at a time. PIC18 has 40 input output pins. It has maximum 4096 bytes of data RAM .the data RAM size for PIC18 varies from 256 bytes to 4096 bytes. The PIC18 has RISC architecture. That comes with some standard features such as on-chip program ROM, data RAM, data EEPROM, timers , ADC &USART and input output ports.The advantages of all PIC18 microcontrollers' high machine performance at a cheap value – with the addition of high-endurance, increased Flash program memory. Additionally to those options, the PIC18F2480/2580/4480/4580 family introduces style enhancements that create these microcontrollers a logical alternative for several superior, power-sensitive applications.

B. GSM SIM900

GSM can be a globally accepted commonplace for digital cellular communication. GSM is that the name of a commonplace cluster established in 1982 to create commonplace typical regular customary.European mobile phone standard which may formulate specifications for a pan-European mobile cellular radio system operational at 900 rate frequency. Cellular is one all told the fastest growing and most onerous to please telecommunications applications. GSM (Global System for Mobile communication) can be a digital mobile communication system that is wide used in Europe and totally different parts of the world. GSM uses a variation of some time division multiple access (TDMA) and is that the foremost typically used of the three digital wireless phone technologies. GSM digitizes and compresses info, then pass it down a channel with 2 distinctive streams of user info, each in its own measure. It operates at either the 900 rate or 1800 rate band. The structure of a GSM network: The network is structured into style of separate sections: rock bottom Station system (the base stations and their controllers). The Network and switch Subsystem (the region of the network most sort of an onerous and quick network). Typically this can be often typically jointly merely referred to as the core network.

Fig.2. GSM SIM900

C. Liquid crystal display

LCD is employed during a project to ascertain the output of the applying. we've used sixteenx2 liquid crystal display that indicates 16 columns and a couple of rows. So, we will write sixteen characters in e ach line. So, total thirty two characters we will show on 16x2 liquid crystal display.LCD will even used during a project to examine the output of varied modules interfaced with the microcontroller. so liquid crystal display plays an important role during a project to envision the output and to rectify the system module wise just in case of system failure so as to rectify the matter. During this liquid crystal display every character is displayed in 5x7 component matrix. This liquid crystal display has 2 registers, namely, Command and knowledge. The command register stores the command directions given to the liquid crystal display. A command is Associate in Nursing instruction given to liquid show to undertake to to a predefined task like initializing it, clearing its screen, setting the pointer position, dominant show etc. the information register stores the information to be showed on the liquid display. The info is that the code price of the character to be displayed on the liquid crystal display. Click to be told additional concerning internal structure of a liquid crystal display.

D. Buzzer & Fire sensor

Buzzers area unit employed in a system to point or to grab the eye concerning associate degree emergency scenario occurred. Buzzer act as a panic horn that indicates the requirement of instant attention because the condition goes haywire.
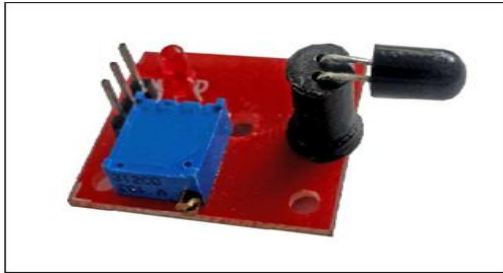
Fig.3. ATK-IR fire sensor

The Fire/Flame detector could be a easy and compact device for sensing the presence of fire/flame. Fireplace detector could be a digital detector that is directly connected to the microcontroller input/output port pin. As fireplace signal could be a digital detector, it perpetually provides digital output. Underneath traditional condition the microcontroller gets active low signal. Once fireplace detector detects the hearth around it, it sends active high signal to the microcontroller and as per the program the required action is taken well on time. During this system we have a tendency to used bronze strip as fireplace detector. The device is simply mounted on the device body .It provides a 'High' output on sleuthing fireplace. This output will then be accustomed take the suitable action. AN on-board light-emitting diode is additionally provided for visual indication.

E. Relay
A relay is associate electrically operated switch. Many relays use associate magnet to figure a charming mechanism mechanically, but various operational principles are used. Relays unit of measurement used where it is necessary management to regulate to manage} a circuit by a low-power signal (with complete electrical isolation between management and controlled circuits). Pump water: Pump can be a tool accustomed move fluids (liquids or gases) or usually slurries by mechanical action. Pumps could also be classified into three major groups keep with the plan of action they use to manoeuvre the fluid direct elevate, displacement, and gravity pumps. Pumps ought to have a mechanism that operates them, and consume energy to perform mechanical work by moving the fluid. The activating mechanism is usually mutual or rotary.

F. LED indicator
Light Emitting Diode may be a 2 lead semiconductor light. It is a contact diode, which emits lightweight once activated. When an appropriate voltage is applied to the leads, electrons area unit able to recombine with negatron holes at intervals the device, releasing energy within the type of photons. This result is named electroluminescence, and the color of the sunshine is set by the energy band gap of the semiconductor. LEDs were used as indicator lamps for electronic devices, replacing tiny incandescent bulbs. LEDs have several blessings as well as lower energy consumption, longer lifetime, improved physical lustiness, smaller size and quicker changeless area unit employed in applications as numerous as aviation lighting, automotive headlamps, advertising, general lighting, traffic signals, camera flashes and even junction rectifier wallpaper.
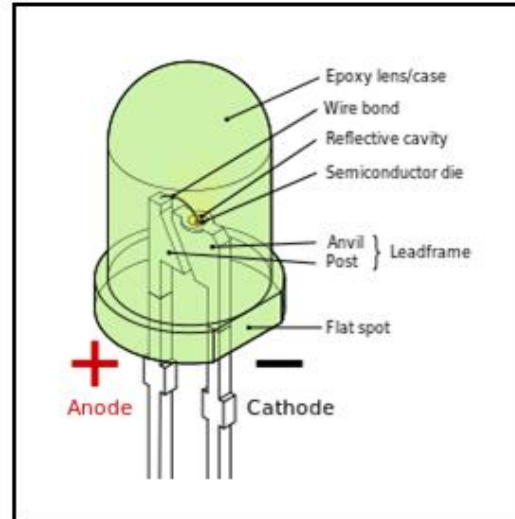

Fig.4. LED indicator

G. Water level sensor
Water level sensing element is employed to find water level in cistern .Basically the unit is formed of sensing element acting as switch .In planned system we have a tendency to create use of IC CD4066 for water level sensing. It works on principle of physical phenomenon of motor.
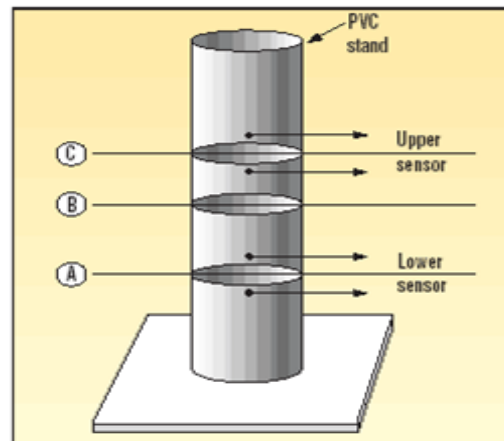

Fig.5. Water level sensor

A low voltage electronic circuit that senses higher and lower water levels is usually use for alarms and sump-pump activation. Since associate degree electronic sensing element sensing element has no moving mechanical elements. It eliminates issues with corrosion wear the tear. The sensor should have distinct cut-on and cut-off trigger levels. If it controls a sump-pump, the distinction between trigger levels stops the pump from being short cycle and probably broken. fig.5 shows the sensing element setup. Two pairs of wires square measure mounted on PVC pipe equivalent to water level A and C. The pump switches solely when water rises past levels A, B and C.As the water recedes past levels C and B, the pump can stay on. It will switch solely when the water drops below level A.

H. Pollution detector sensor (MQ2 gas sensor)
Grove product have a system and everyone have a same instrumentation which may plug onto the bottom protect. You can gain this voltage voltage through the SIG pin of

detector. The higher the concentration of the gas, the bigger the output voltage of the SIG pin. Sensitivity will be regulated by rotating the potentiometer.

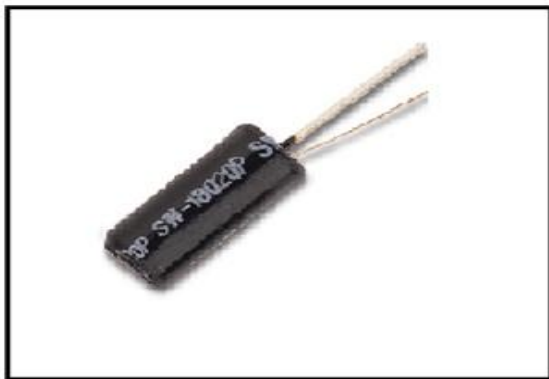Fig.6. MQ2 gas sensor

I. Vibration sensor

Fig.7. 10PCs-SW-18020P (vibration switch sensor)

This is a very easy vibration switch, it use quite common in natural philosophy toys, alarm, domestic appliance, natural philosophy devices, sensible home system.

Vibration sensors area unit accustomed Automotive devices Home electrical devices, automatic power-off perform for social unit appliances, Air-condition / Air heat blower fall bar defend switches, Communication devices, Toys.

IV. WORKING OF MODEL

Here we are making smart awareness system for industry. If any person enters in the industry then IR sensor will detect that person. After entering in the industry person need to enter the password and if entered password is correct then door will be open. Otherwise buzzer will be ON. At the same time LED will turn ON and GSM will send the message and display on LCD.

If water level in the water tank is below the set limit then motor will turn on and when water tank is full then motor will be automatically turn OFF. If sudden occurrence of fire generated in the industry then fire flame sensor will detect it and buzzer will be ON. At the same time LED will turn ON and GSM will send the message and display on LCD.

MQ-2 gas sensor set for Air pollution detection purpose. If air pollution in industry occurs greater than specific limit then buzzer will be ON and LED will turn glow and GSM will send the message and display on LCD. If vibration is

occurring in the industry then GAOXIN sensor will detect it and buzzer will be automatically turn ON, GSM will send the message and display on LCD and LED will be glow.

V. COMMAND FLOW
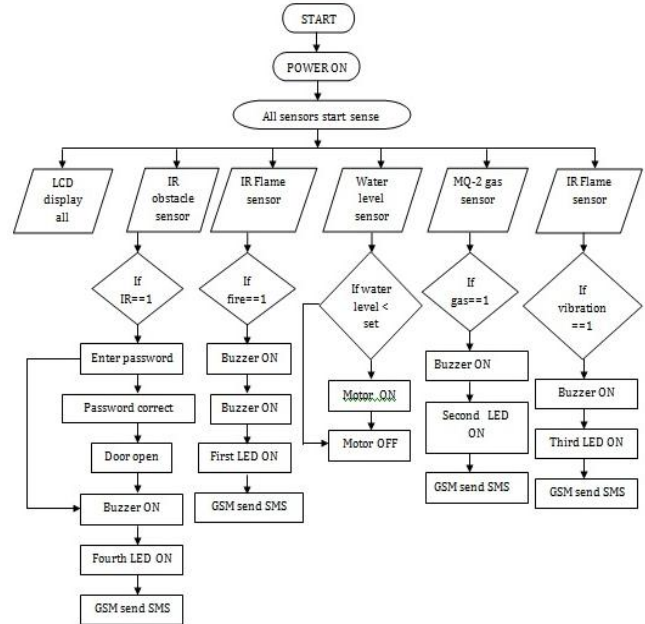
VI. RESULTS

The monitoring is done using various sensor and the parameters are measured through the PIC interface module the monitored data is display on LCD and send to mobile through GSM. The all the parameter analysed and gives alert on the right time before it causes major damage.

The parameters like gas detection system, fire detection system, water level indicator and the vibration in the surface of the earth can be measure by using this system. Therefore in this project, the design of the smart surrounding awareness system for industry on PIC. Finally the System performance and the efficiency are effective and reliable.

TABLE 1: RESULT TABLE OF THE SYSTEM

| SR. NO.	Detected parameter	Action taken by system	Message display on mobile
1	Flame detected	1st led glow and buzzer ON	"fire detected"
2	LPG gas detected	2nd led glow and buzzer	"gas detected"
3	Vibration occurs	1st led glow and buzzer ON	"vibration alert"
4	Water level below the threshold level	Motor on automatically	-
5	Person is detected	Password is correct door will open	-
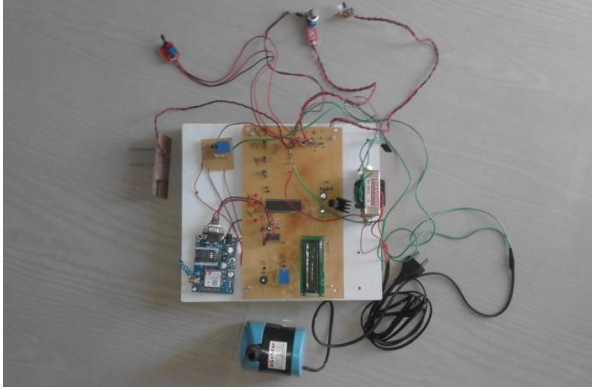
Fig.8. Implemented Model snap

VII. CONCLUSION

The possibility of working in hazardous area is accomplished with the help of wireless system. The hand gesture and voice control robot system gives an alternative way of controlling robot. We have provided two techniques for giving inputs to the system that are hand gesture and voice recognition. Therefore the conclusion is that features like user friendly interface and accuracy makes the robot absolute. Human efforts are minimized effectively and have been done without causing any harm.

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