

Industrial Automation Using Raspberry PI

¹Akanksha N. Chawane, ²Varsha S. Panekar, ³Rupali A. Patil
^{1,2,3}RMD Sinhgad School Of Engineering, INDIA.
¹T9763831434, ²T9822654027, ³T9822625305

Abstract: Security is important for everyone. This Project describes a design of effective security system can monitor an industry with different sensors. Unauthorized access, Fire accident, Gas Leakage, heat Generation The temperature rising in industry and fire detection can be monitored by the status of each individual sensor and is indicated with an LED. This LED shows the sensor has been activated.

1. Introduction

Automation or industrial automation or numerical control is the use of control systems to control industrial machinery and processes, reducing the need for human intervention. In the scope of industrialization, automation is a step beyond mechanization. Whereas mechanization provides human operators with machinery to handle them with the physical requirements of work. Processes and systems can also be automated. Automation plays an increasingly considerable part in the broad economy and in daily experience. Engineers strive to coalesce machine-controlled devices with accurate and organizational tools to create complex systems for a rapidly extending range of applications.

Human performance in industrial processes presently lies beyond the scope of automation. Human-steady model recognition, language notice, and language production aptness are well beyond the capabilities of modern mechanical and computer systems. Tasks requiring objective assessment or synthesis of complicated sensory data, such as smoke and sounds, as well as high-level tasks such as strategic planning, commonly require human expertise. The use of humans is more cost-effective than mechanical approaches even where automation of business tasks is possible.

2. Block Diagram

The purpose of the system is designed for industrial automation purpose. In this system we used different sensors like gas sensor, fire sensor & temperature sensor. All these sensors are interface with Raspberry Pi, these sensors will sense the gases, fire or

temperature & send voltage from of data to the Raspberry Pi.

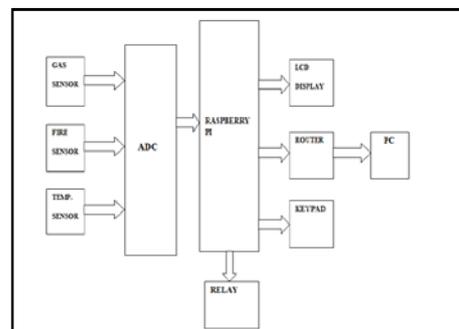


Fig.2 Block Diagram

2.1 SENSORS

2.1.1 GAS SENSOR

A gas detector is a device that discovers the presence of gases in an area, often as part of a safety system. This type of device is used widely in industry and can be found in locations, such as on oil rigs, to monitor manufacture processes and emerging technologies such as photovoltaic.



Fig.2.1.1 Gas Sensor

This type of appointment is used to detect a gas leak and interface with a govern system so a narrative can be automatically shut down.

2.1.2 FIRE SENSOR

A flame detector is a sensory designed to detect and respond to the presence of a flame or fire

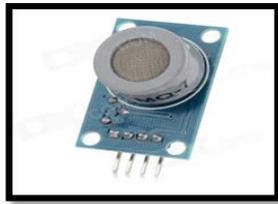


Fig.2.1.2 Fire Sensor

Responses to a detected blaze attend on the installation, but can use sounding an alarm, deactivating a fuel boundary, and activating a fire detention system. Commercial security devices issue a signal to a fire alarm restraint panel as part of a fire alarm system, while household detectors, known as smoke alarms, collectively issue a local audible or visual alarm from the detector itself.

2.1.3 TEMPERATURE SENSOR

The LM35 is an exactness IC temperature sensor with its production proportional to the temperature. The sensor circuitry is sealed and therefore it is not subjected to oxidization and other processes. With LM35, temperature can be measured more efficiently than with a thermistor. It also possess low personification heating and does not increase more than 0.1 oC temperature in still air.

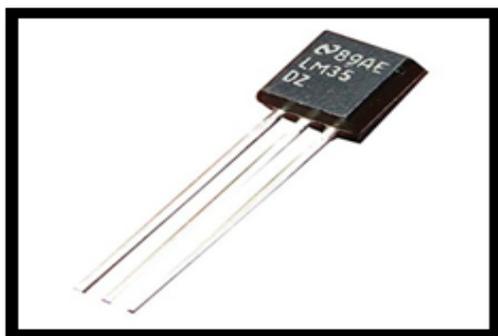


Fig 2.1.3 Temp. Sensor

The operating compound ramble is from -55°C to 150°C. The output voltage varies by 10mV with respect to every oC rise/fall in ambient temperature, i.e., its scale factor is 0.01V/ oC.

2.1.4 RESULES

SENSORS	RANGS
GAS SENSOR	<< 40 oC
FIRE SENSOR	<<750 oC
TEMP. SENSOR	<<1000 oC

2.2 RASPBERRY PI

The Raspberry Pi is a credit-card sized computer that plunger into your TV and a keyboard. It is a capable shallow computer which can be used in electronics projects.



Fig.2.2 Raspberry pi

A 900MHz quad-core ARM Cortex-A7 CPU, 1GB RAM,4 USB ports,40 GPIO pins, Full HDMI port, Ethernet port, Combined 3.5mm audio jack and composite video, Camera interface (CSI) & Display interface (DSI), Micro SD card slot.

2.3 RELAY SYSTEM

A relay is an electrical switch. Many squad use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state squad. Relays are manner where it is necessary to control a circuit by a low-power signal.Here we are using one pole one throw: they repeated the signal coming in from one circuit and re-transmitted it on another circumlocution

2.4 LCD DISPLAY

LCD (liquid crystal display is the technology used for displays in computers and other smaller computers. Like light-emitting diode (LED) and vapor-protoplasm technologies, LCDs allow displays to be much thinner than cathode ray tube or cowl (CRT) technology

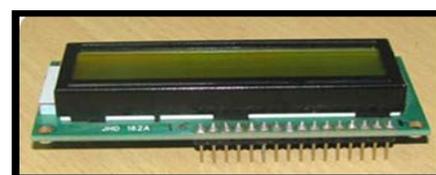


Fig.2.4 LCD Display

Some passive matrix LCD's have dual scanning, meaning that they scan the grid twice with current in the same time that it took for one scan in the original technology. However, active matrix is still a superior technology.

2.5 ROUTER

A router is a networking device that forwards data packets between computer networks. Routers perform the "traffic directing" functions on the Internet.



Fig.2.5 Router

A data packet is typically forwarded from one router to another through the networks that constitute the internetwork until it reaches its destination node.

2.6 SOFTWARE

2.6.1 PROTEUS

Common parts database – unified database management system of all ability and elements in the current project. Enables automatic updating of data between Proteus modules (e.g. Schematic and PCB). Live net listing – A live net list is now maintained and accessible throughout the system. Enables changes on the schematic to be introverted across PCB, BOM and Design Explorer in real repetition. 3D Viewer – Now supports direct (as well as OpenGL) and runs multithreaded. Includes dwell update mechanism so changes made in ARES are reflected in the 3D Viewer.

2.6.2 PYTHON

Python is a high flat programming speech. Its design philosophy contributes digest readability, and its organism allows programmers to express concept in fewer lines of digest than would be possible in languages such as C. It features a strong system and automatic memory charge and has a large and comprehensive standard library. There are various instructions that we use and run using the putty

configurations the platform. Also it can be employment for booting up the raspbian in operation system. Mainly available as an open spring.⁹

2.7 HARDWARE

This board we have **improved** a appliance control code the raspberry pi board .The Raspberry Pi and Raspberry Pi 2 are manufactured in several board configurations through licensed manufacturing agreements, RS Components and Egoman. These companies **betray** the Raspberry Pi online.

Requirement for setting raspberry-pi:

Table 1

Item	Minimum recommended Specification & Notes
SD Card	Minimum size 4GB;class4
Keyboard & Mouse	Any standard USB keycard & mouse should work.
Ethernet cable	Usedfornetworking.Makes updating new software for Raspberry pi easier.
Power Adapter	To give the supply for Raspberry pi.

.3. FUTURE SCOPE

Industrial automation can and will generate explosive growth with technology related to new fulminant: nanotechnology and nanoscale assembly systems; MEMS and nanotech sensors which can measure everything and anything; and the pervasive Internet, coach to machine (M2M) networking. Real-time systems gives way to complex adaptive systems and multi-processing. The future belongs to nanotech.

New software applications will be in wireless sensors and distributed linked networks – tiny operating systems in wireless sensor nodes, and the software that allows nodes to communicate with each other as a larger complex adaptable system. That is the wave of the future.

The advantages is Sophisticated security,Monitors all hazards and threats & the application of our system is Banks, Offices, Industries, JewelerShop, Home Applications.

4. CONCLUSION

The world is moving towards the automation by using the various techniques for the communication.

The Raspberry Pi provides fast transmission over long range. It saves resources and time. Thus data can be monitored at remote locations with much secured manner. Industrial automation has recently found more and more acceptance from various industries because of its huge benefits, such as, increased productivity, quality and safety at low costs. Necessary action can be taken in short span of time in the case of emergency conditions.

5. REFERENCES

1. Tarun Kumar Patel, Utkarsh Wadekar, Aniket Wabale, Prof. S. S. Datkhore, "Appliances Control Using Ethernet and Raspberry PI", March - 2015, pp. 494-497
2. Amol A. Dharmapurikar, R.B. Waghmare, " An Effective Wireless Solution For Industrial Automation ByUsing Raspberry Pi", ISSN 2320-883X,VOLUME 3 ISSUE 2 ,01/04/2015.
3. F. Akyildiz , W. Su , Y. Sankarasubramaniam , E. Cayirci, " Wireless sensor networks: a survey" , Computer Networks: The International Journal of Computer and Telecommunications Networking, v.38 n.4, p.393-422, 2002
4. Mitchell, Gareth. "The Raspberry Pi single-board computer will revolutionise computer science teaching [For & Against]." *Engineering & Technology* 7.3 (2012): 26-26.
5. Raspberry Pi Community. [Online] Available: <http://www.element14.com/community/community/raspberry-pi/>