# Design and Implementaion of Smart Automation using IOT

Keshava A.V[1] and Dr.P.I.Basarkod[2]
[1]M.Tech Scholar, REVA University
keshava.av@gmail.com
[2]Professor, REVA University
basarkodpi@reva.edu.in

*Abstract*— **Automation has turned out be outstandingly pervasive now days in the perspective of its diverse ideal conditions. It accepts a fundamental part on the world economy and in consistently experience. Automation is accomplished by utilizing neighborhood organizing guidelines and consequently controlling, remotely checking gadget parameters by utilizing Raspberry pi3 and IOT. Raspberry pi3 modules comprise of Cortex A53 processor and Real time Raspbian Operating framework. Sensors associated with the Pi3 module forms the detected information and it is send to remote spots utilizing IOT. IOT is a system of physical articles which is utilized to screen and control the sensors information remotely. On the off chance that any basic information is detected it is cautioned by utilizing alerts or signal. By arranging Automation to IOT, a model in this paper is intended to carry on more astute**.

*Index Terms*— **Automation, IOT, Raspberry pi3, VNC viewer, Temperature sesnor**.

## I. INTRODUCTION

As the world is getting all the more innovatively forward looking, we find new innovation coming further into our own and expert lives. In the extent of industrialization, automation is venture past automation. Prior the motivation behind computerization was to expand profitability, and to lessen the cost related with human administrators. By arranging the automation with IOT makes the framework quicker witted. Lately extensive variety of IOT applications has been outlined and created. Advancement of IOT starts from RFID development, where transmission of information is confined to a particular separation. IOT wipes out this RFID advancement and extends its transmission of information to remote spots i.e no partition repression.

IOT has now turned into an imperative theme and has its effect on enterprises, home, urban areas, schools and different parts. This innovation is incorporated in extensive variety of arranged items, framework and sensors, which takes its advantages of changes in registering power, gadgets scaling down and organize interconnect to give new capacities. More use of IOT gadgets guarantees to change numerous parts of the way we live. New IOT items like web empowered applications, home mechanization segment, and power gadgets moving individuals towards a dream of the smart home, smart enterprises and smart urban areas.IOT guarantees to be useful for individuals with disabilities and the and senior citizens with great personal satisfaction at a sensible cost.IOT frameworks like vehicle tracking, intelligent ambulance, smart garbage management, water quality monitoring, automatic dam gate opening and closing and dam  water level

monitoring and intelligent traffic moves us closer to the new idea of smart cities. IOT raises many issues and challenges that need to be considered with end goal for advantages to be figured it out.

## II. Literature Survey

Smart automation is anything that gives remote or programmed control of things in and around the home, business and urban areas. The frameworks that you can control temperature, lightning, moisture substance, smoke or destructive gases, engine control and waste substance specifically put in city. Main objective of smart automation is to save money, time and eliminate repetitive task.

In [1], Francesco Basle, Pasquale Chiacchio, Diego Gebasio proposed industrial automation systems using PLC. In this paper an occasion driven approach is proposed to enhance the outline of mechanical control frameworks utilizing PLCs.

In [2], Niksa Skeledzia, Josip Cesic, Hrvoje Dzapa proposed Smart home automation system for energy efficient housing. This paper exhibits an idea and execution of present day keen observing and control framework for building automation. The framework is intended to empower critical diminishment of vitality by expanding the productivity of the work which is under control. This framework comprises of system controlled by PLC and Linux based control unit.

In [3], Suraj Patinge, Yogesh Suryawanthi, Sandeep Kakde Proposed Design of ARM based data Acquisition and controlling using GSM and TCP\IP network. This paper is based on data Acquisition and Control utilizing GSM and TCP/IP Network. This framework is a intelligent for information securing, monitoring and output control. Proposed framework designed based on ARM Processor with RTOS. An implanted framework with ARM processor can be utilized for differing modern applications required with a real time kernel for task management, multi-entrusting and so on. RTOS can be ported to ARM hardware, so that system can deal with complicated tasks. Embedded system designed provides a generic design with all kinds of data Acquisition and control. System is used as a embedded web server with all data backup in SD card. By typing the IP address of the LAN on the browser the administrator and user can data on the web page.

## III. Methodology

Project design is the model on the premise of which we continue with the outlining part in our venture which is a minimal effort and proficient savvy mechanization framework. This framework has two principle modules: the equipment interface module and programming correspondence module. Heart of this framework is raspberypi3 which as inbuilt Wi-Fi and fit for working as web server and goes about as interface for all equipment modules

Sensors used in this design are temperature sensor, fire sensor and moisture sensor. Relay are used to switch NO and NC by energizing the coil. Temperature sensor, fire sensor and moisture sensor senses the analog signal from environment, raspberrypi3 does not have in built ADC(analog to digital convertor) so we use MCP3008 ADC so that sensed analog signal is given to MCP3008 , this converts analog sensed signal to digital signal.

When temperature sensor senses the temperature above threshold value, pi3 process this signal and checks the sensed value is above the threshold value ,if the it is equal or greater than threshold value a coolant or fan will be ON to reduce the temperature below threshold value by this we can control the temperature in the surrounding environment. Fire sensor senses the fire or flame, pi3 process this signal and a buzzer will be ON to alert the people around and sprinkler will be ON to switch off the fire by this we can switch off the fire in the surrounding environment. Moisture sensor senses the water content in soil if no water content in the soil it sends a signal to pi3, pi3 process this signal and a sprinkler will be ON to increase the water content in the soil  by this we can increase the volume of water content in the soil if it dry. All sensors will be continuously sensing and this sensors will be operated by triggering the 555 timer based on the trigger pulses.

### A. Hardware Used

*Raspberry pi 3 processor:*Raspberry Pi 3 is the third form of Raspberry Pi. Raspberry pi 3 replaces the more settled adjustments of Raspberry Pi (i.e. 2, 0, B, A+). It is a Master card measured processor. The past forms did not have the Wi-Fi and Bluetooth accessibility in it. Be that as it may, along these lines this model has inbuilt Bluetooth and WIFI. It can be utilized for Internet of Things applications. It is a single board PC that can be used for a few applications and replaces the relative characteristics of special Raspberry Pi. Features of Raspberry pi3 are

- Broadcom BCM2837 is 64bit cortex ARM A-53 having Quad core processor
- 1.2GHz CPU
- 1GB Random Access Memory.
- On board Wi-Fi
- On board Bluetooth
- 40pin extended GPIO
- 4 USB ports
- HDMI
- CSI camera port
- DSI display port
- Micro SD port for operating system

*Temperature sensor:* The LM35 courses of action are precision joined circuit temperature sensors, whose yield voltage is straightforwardly relative to the Celsius (Centigrade) temperature. The LM35 in this way has slack over straight temperature sensors balanced in ° Kelvin, as the customer is not required to subtract a generous unfaltering voltage from its yield to obtain profitable Centigrade scaling. The LM35 does not require any outer adjustment to give ordinary exact nesses of ±¼°C at room temperature and ±¾°C over a full - 55 to +150°C temperature extend. Straightforwardness is ensured by trimming and arrangement at the water level. The LM35's low yield impedance, coordinate yield, and correct normal change make interfacing to readout or control equipment especially straightforward. Its info voltage ranges from (30v to - 3v), yield voltage ranges frame (5v to-2v) and Ground is 0v. It can be used with single power supplies, or with in addition to and less supplies. As it draws 60 µA from its supply has low self-warming, under 0.1°C in still air.
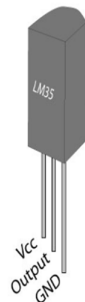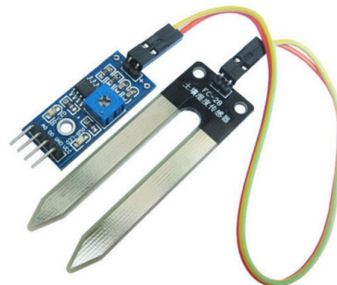


Figure 2: Temperature sensor                    Figure3: Moisture sensor

*Moisture sensor:* Moisture sensor measures the water content in the soil and control the flow of water this sensor help the farmers to use the water more efficiently and effectively and increase the yield and get better quality crop. Moisture sensor consists of two probes. If two probes are placed in dry place, resistance increases and there is no conductivity between the probes. If two probes are placed in water, conductivity exits and current flows through the circuit and sprinkler turn on. Moisture sensor plays very important role in Industries, Farming and other different sectors.

*Fire sensor:* Fire sensor is used to utilize to identify fire blazes. The makes utilization of fire sensor and comparator to recognize start up to a scope of 1 meter. When this sensor placed in robot, it enables to identify flame from up to 1m away. Range of this sensor can be adjusted using calibration. LED is used to indicate interface connection. Input voltage is +5vdc.

*Electric DC Motor :*All the electro mechanical developments around us are master by an electric AC or DC engines. Electric DC engine is a sort electric machine utilized for changing over electrical type of vitality into mechanical type of vitality. This engine relies on upon the attractive field. Here the course of engine changes discontinuously in the both cases. Regularly the speed of DC-engine is controlled by using variable power supply voltage or by changing the nature of current in its windings

*Relay:*A relay is electrical switch which consists of 3 pins normally open, normally closed and movable contact. By default movable contact can be on normally open or normally closed. When current is supplied to relay, coil inside the relay energizes and shifts movable contact to normally closed or open.
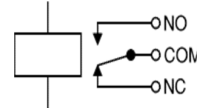
Figure 4: Fire sensor



Figure 5: circuit of relay

*B. Software Used*

*Raspbian OS:* Raspbian OS is free working software which is based on Debian. It is specially developed for Raspberry Pi hardware, comes with more than 35,000 packages, pre-compiled software bundled in nice format so that installation can be done in easier way on raspberry pi.

*VNC Viewer:* VNC (Virtual Network Computing) viewer is a free software app that gives us the power to access and control our computer remotely from anywhere with help of internet. With the help of this app we can control and monitor the applications of home, industries, health and farming without the help of human intervention. This is specially designed for raspberry pi.
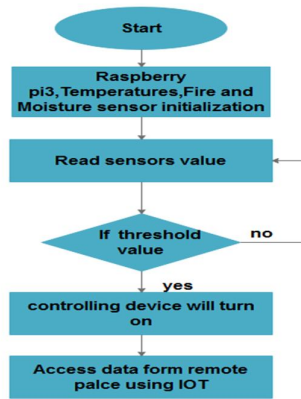
## IV. FLOW CHART
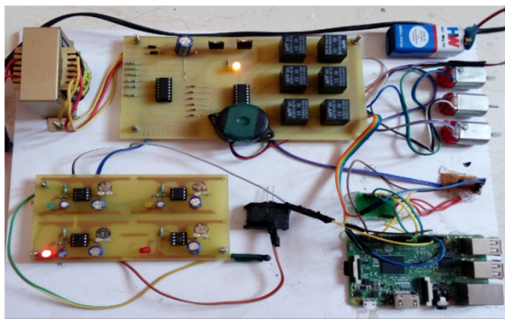


Fig 6: Flow chart of model

## V. RESULTS



Figure 7: Experimental Hardware



Figure 8: Experimental results

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## VI. CONCLUSION

This paper gives usage of sensors utilizing Raspberry pI3 to control and screen the shrewd automation framework and also advises the dependable individual to bring suitable measures with the assistance of IOT. By utilizing this framework we can caution the general population before any basic circumstance occurs in businesses, home or in urban communities for instance when fire softens out up an industry. This framework can have correspondence ports; it underpins online supervision and Control Private Network and in addition Public system. This model has great convenience, lucidness, simple support and minimal effort. This work can be additionally reached out by utilizing more sensors and particular installed servers..

## REFERENCES

[1] Daogang Peng, Hao Zhang, Kai Zhang, HuiLi, FeiXia"Research of the Embedded Dynamic Web Monitoring System" 978-1-4244-4520-2/09 2009 IEEE.

[2] Francesco Basle, Pasquale Chiacchio, Diego Gebasio "industrial automation systems using PLC" 978-14788-1597-2/14 2008 IEEE.

[3] Miss.Vrushali R. Deore, Prof. V.M. Umale "Wireless Monitoring of the Green House System Using Embedded Controllers" Volume 3, Issue 2, February-2012 1 ISSN2229-5518 IJSER ©2012.

[4] Soham Banerjee, Divyashikha Sethia, Tanuj Mitta, Ujjwal Arora, Akash Chauhan "Secure Sensor Node with Raspberry Pi" IMPACT-201,978-1-47991205-6/13/©IEEE

[5] Suraj Patinge, Suryawanshi, Sandeep Kakde "Design of ARM Based Data Acquisition & Control Using GSM & TCP/IP Network" 978-14799-1597-2/13/©2013 IEEE.

[6] Nakul Padhye and Preet Jain, "IMPLEMENTATION OF ARM EMBEDDED -WEB - SERVER FOR DATA USING RASPBERRY PI." 2014 IJEDR |Volume 2, Issue2 | ISSN: 2321-9939Vol 04, Article 06118; July 2013.

[7] Jiang.J.N, Peng D.G, Zhang.H, (2008) Design and Realization of Embedded Web Server Based on ARM and Linux. Mechatronics, Vol.14 (10):3740.

[8] Kumaresan N, Manivannan M, International Journal of Engineering Science and Technology Vol. 2(11), 2010,6074-6081 Embedded web server & GPRS Based Advanced Industrial Automation using Linux RTOS.