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Industrial Process Monitoring and Controlling Through Wireless Communication Using Raspberry PI

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ABSTRACT: In recent research work the wireless technologies are more frequently used in automation and also wireless communication field. Wireless technology offer a good opportunity in the area of communication and also which fastest emerging technology . when the embedded device are provided with the internet access the demand will increase due to the remote accessing capability of these device . User can monitor and control device using IOT server. In this paper we are dealing with modern industrial field , which required for monitoring and controlling the motor system .One of the main criteria is to reduce the power consumption . Now a days Internet of a thing (IOT) is the emerging key technology for future industrial field ,where a numerous of battery, actuator, sensor and smart objet are connected to the internet to provide the service .

In the project we are creating an android application which receives all the data such as how many product as been produced till now and batch count product , if there is any error in the motor that can also be displayed and control the speed of the motor by using a button provided in the app . Main advantage in this project is low cost , reliable in nature & increases the productivity , efficiency of overall industrial operation .

KEYWORDS: IOT server, Raspberry Pi, IR Sensor, GSM,DC Motors conveyer. VGA monitor.

I.INTRODUCTION

Now a days Inter of Things(IOT) has become an emerging key technology, in which a myriad of sensor , actuators, and smart objects in our daily life are connected to the internet . These actuators , sensors are typically equipped with different kind of microcontrollers transceivers, and protocols for communication of sensing and control data . These real life objects , either sensors or actuators, are connected with each other to transfer their sensed data to centralized servers , where information is collectively stored and made available foe particular users with proper accessed rights. IOT device use wireless radio access technologies such as GPRS/GSM to make communication between node with servers.

In this project design , structure modular design concept as adopted and system us mainly composed of single Raspberry pi , VGA monitor, GSM, Relay, IR-TX,IR-RX, L293,USB Mouse, USB Keyboard, bulb, Android application. Raspberry pi is based on the Broadcom BCM2835 system on a chip (SOC) that include an ARM1176JZF-S 7000 MHz processor . Raspberry pi processor runs in 3.3 V so the master module has in built MOSFET based 3.3 to 5 V voltage level shifter circuit. A TTL to RS232 level shifter is used to communicate with any other hardware that accepts RS232 protocol.

GSM in this module SIM900 is used . SIM900 is a tri-band GSM engine that works on frequencies EGSM 900 MHZ, where in this we use the AT commands (attention command) to get the information in SIM card. IR(TX-RX) is mainly use to find out the number of object crossed through the radiation.



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II. RELATED WORK

Mrutyunjaya Sahani, [2015] Proposed a designed and development of a new smart monitoring and controlling system for kitchen environment in real time developed with comparative good architecture using a Zigbee technology where it communicate only specified smaller area.

Ravi.M.[2015] has introduced design automation using wireless communication has made the systems more smart is automated communication architecture and Local Area Network this also sends an alerting SMS to a predefined mobile number

Keerthi VallapReddy [2014] was proposed author has proposed a completely automated license plate recognition system and the aim of research at designing a system automatically captures the image of the number plate of a vehicle which is verified using Raspberry Pi processor for authentication.

In recent days Dense arrays of sensor are required to effectively monitor structures we need to be present in the industries

Wired monitoring systems are expensive, with much of the cost derived from cabling and installation. Centralized data collection is not challenging for monitoring large civil infrastructure

III. PROPOSED SYSTEM

As showed in the fig.1 Many embedded systems have substantially different designs according to their functions and utilities. In this project design, structured modular design concept is adopted and the system is mainly composed of a single Raspberry pi, VGA Monitor, GSM, Relay, IR-TX, IR-RX, L293, USB Mouse, USB keyboard, bulb and android application. The Raspberry Pi located at the centre of the block diagram forms the control unit of the entire project.

In this paper the android app is developed to control the devices like motor, and bulb via GPRS, as the user logs into the smart phone the menu will be provided in that the buttons type are provided to select and control the particular device. When user clicks the button the command is sent through gprs and the device is monitored like controlling the switching bulb on and off and controlling motor speed also we can access the information about these things through cloud server(IOT).

IR (TX-RX) is mainly use to find out the number of product are crossing the conveyor belt per day (because day by day number of vehicles is different).

In an android application an GUI is developed like when user logs to smart phone the menu will be provided, which holds the command to control and monitor the electrical appliances wirelessly, depending upon which device to be controlled, corresponding button is clicked, the command is transferred via GPRS, also we can access the information about status.

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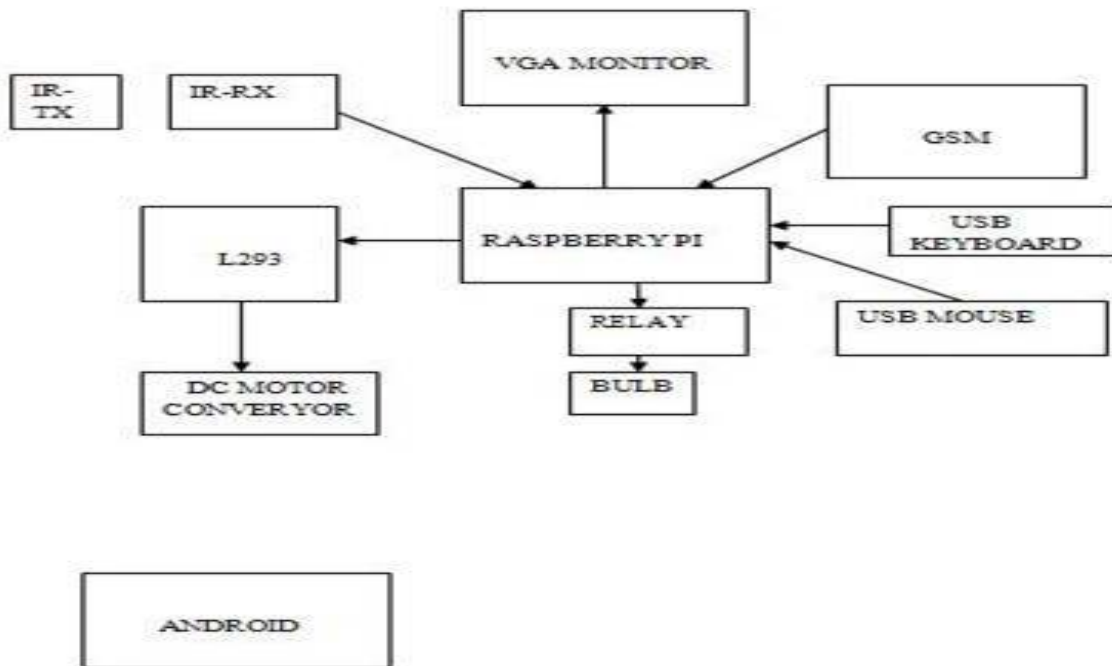


Fig.1 Block Diagram

IV.RESULT

Integrated module of the project , in which it contain DC motor , DC driver , GSM, IR sensor, Raspberry Pi , Relay , Blub. In above image we need to connect the Raspberry Pi board to the Monitor, which provide GUI to Run the module. When we run the module it will switch on the bulb it means the motor status is going on properly. When bulb is off it shows the status of motor off.

When we run the module all the module get initialized and it will starts the conveyor belt to count the product . when one product get sensed by the IR sensor it takes the count as one. when product count becomes five then it takes batch count as one. Once the batch count becomes one, waits for the command from the user. An user(Owner of industries) will have the android application through which he can send the command like motor off or on and conveyor off or on . the user will have one android application called Industrial Automation through which he can fetch the product count , it give the product count details including date and time and also batch count. Android application which have two login Id one is Admin and another one is manager.

Once user login through Admin he can fetch the information of the industries product count in details . Its not necessary that the owner should always be in industries he can get the information anywhere.

Once the batch count becomes one the GSM will send some string to the user then it will wait for the command . So as soon as the string come the manager app page will get opens we have to send some command like M1 or M0 which means Motor off Motor on respectively either we can send conveyor off or On by sending the commands like C1 or C0 respectively. We have to type the number which is in GSM.

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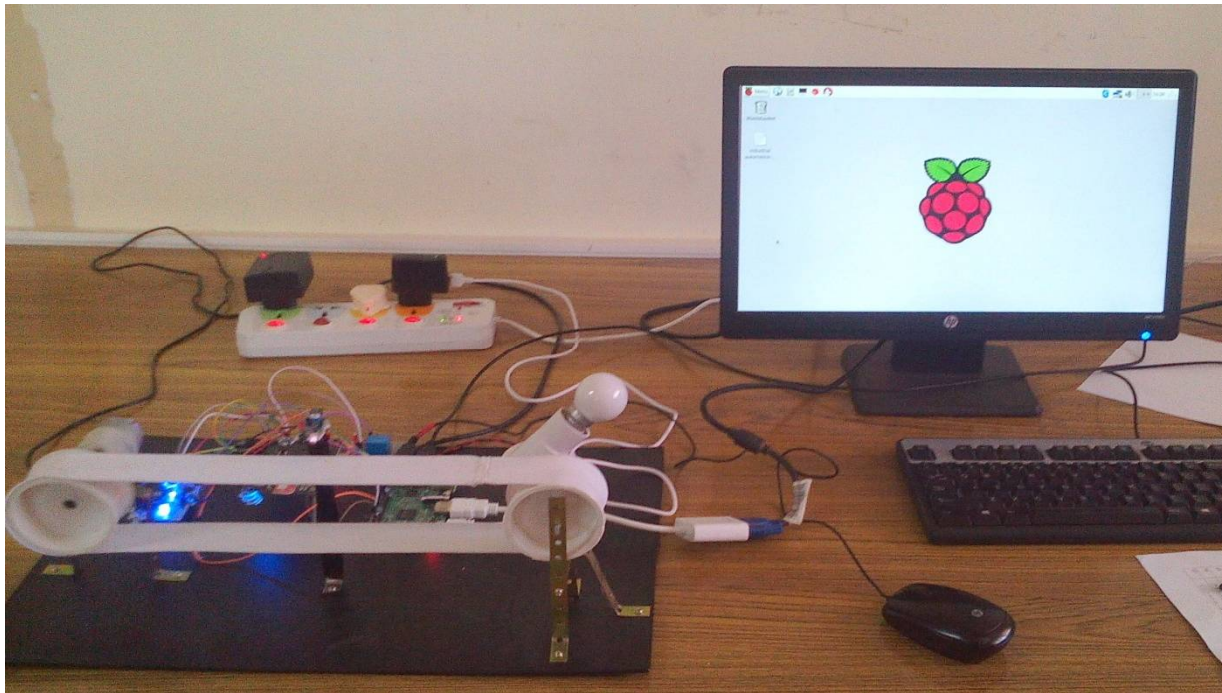


Fig 2. Integrated Modules of the project

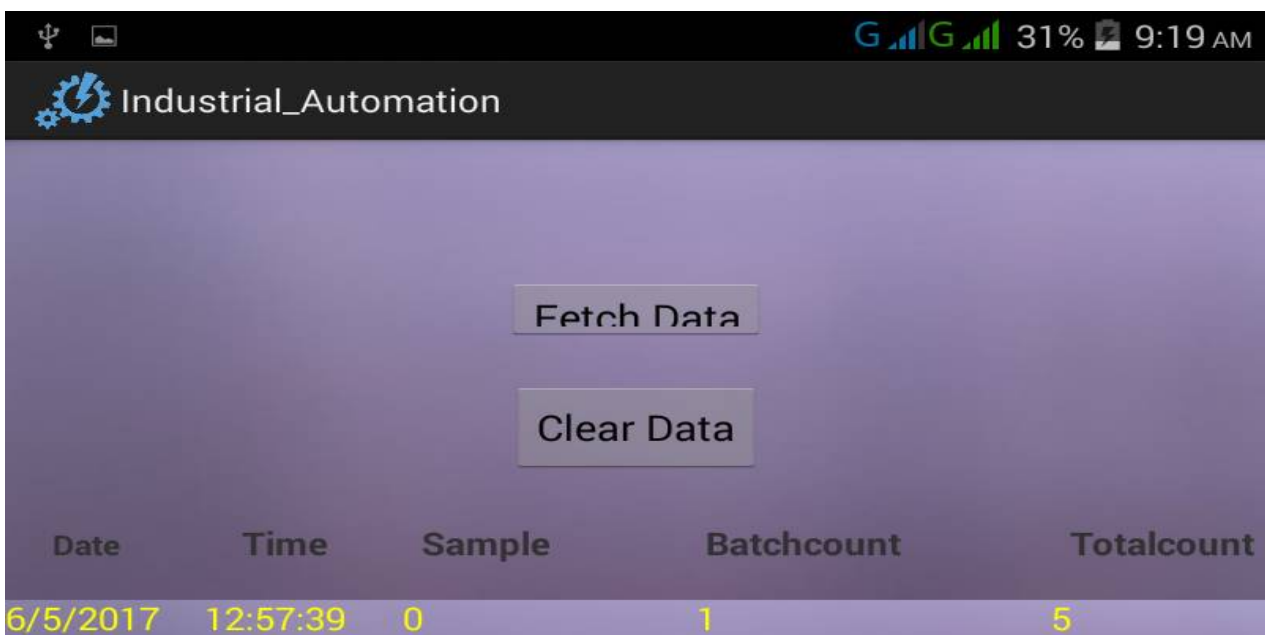


Fig.3 : Android App to fetch the product details



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IV.CONCLUSION

We have developed a prototype module. In future we can taken to the product level. To make this module as user friendly and durable, we need to make it compact and cost effective. Most of the units can be embedded along with the controller on a single board with change in technology, there by reducing the size of the system. In this paper, we can save time, manual operation has been reduce to major extent, easy to use and efficient and reliable.

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BIOGRAPHY

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