Production Monitoring System Using Industry 4.0

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***Abstract*— Industrial security systems have grown in popularity in recent years, an Industrial owner's look for ways to protect their personal space and enhance their Industrial values. Our objective is to design an Industrial machine control and monitoring system Surveillance is most important security systems in home, industrial, office and public places. In this security system is based on the embedded system along with Microcontroller and sensor networks. The human movement is detected using the PIR sensors. In this time, the system triggers an alarm detecting the presence of person in a specific interval of time and simultaneously sends the how many persons are intruder. When the security system is activated, the PIR Sensor is activated. This highly reactive approach has low computational requirement. Therefore it is well suited for Industrial surveillance system.**

***Keywords* — IOT(Internet of Things), Sensors, Cloud, Power supply.**

INTRODUCTION

Industry 4.0 is trend of automation and data exchange in manufacturing technologies. Industry 4.0 includes cyber-physical systems, Internet of things, cloud computing and cognitive computing. Industry 4.0 is a Fourth revolution. Industry 4.0 fosters has been called a "smart factory". The structure of smart factories, cyber-physical systems, create a virtual copy of physical world and its make decisions. Internet of Things, cyber-physical systems communicate and cooperate with each other and with humans in real-time both internally. Numerical management is methodology of mechanically in operation a producing machine supported code of letters, numbers, and special characters. The numerical information needed to provide district is provided to a machine within the kind of program.The program is translated into the suitable electrical signals for input to motors that run the machine. The NC is the automation of machine tools that square measure operated by exactly programmed commands as critical controlled manually via hand wheels or levers, or automatically machine-driven. Pc numerical management, during which computers play associate degree integral a part of the management.

NEED OF RESEARCH :

Problem Statement :

Implemention of production monitoring system using Industry 4.0.

Objective:

1) To Implement industrial machine by controlling Raspberry pi.

2) Design database to store production record.

3) To implement cloud computing so to acess data from anywhere.

PROPOSED SYSTEM

Block Diagram:

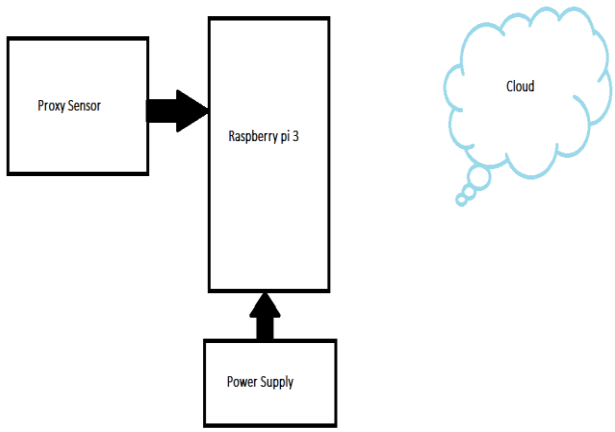

Fig. 1. *Block Diagram of production monitoring system using 4.0*

Working:

- The proxy sensor is interface to the raspberry pi module.
- The pi module is power up by 5v power supply.
- The system is used for how many production in shifts that is First Shift, Second shift, Night shift.
- It gives the qualitative analysis and quantitative analysis.
- The daily product count is recorded by the cloud.
- Suppose that in first shift 5 hrs. time for 1000 product as compared to night shift gives for same production 1000 product but time is 2 hrs. then quality of that product is low or many more rejection in that product.

Hardware Required :

1) **Raspberry pi model 3B+**

Fig.2. *Raspberry pi 3B+ model*

Raspberry pi 3 model B+ has a 64 bit 1.4GHz quad coprocessor. 1GB of RAM faster dual band 802.11b/g/n/ac wireless LAN, Bluetooth 4.2.Raspberry pi is version of the credit card sized computer. Raspberry Pi 3B+ is faster than Raspberry pi 2 model. It includes built in WIFI and Bluetooth Low Energy connectivity, making it truly an IOT ready device.

Features:

- 4 GHz 64 bit quad core ARM Cortex -A53 CPU.
- 1GB RAM of LPDDR2 SDRAM.
- On-board wireless Lan- dual band 802.11b/g/n/ac.
- On-board bluetooth 4.2 HS low energy.
- 4 X USB 2.0 Ports
- 300Mbit/s Ethernet

OS :

- The Pi can run Raspbian OS, Ubuntu Mate, Ubuntu Core.
- It can also run Windows 10 IoT Core.

Uses:

- The Raspberry Pi released the Raspberry Pi 3.
- It's a full computer, as small as a credit card.
- Its specs includes Wi-Fi and Bluetooth.

2. Proximity Sensor:

- Proximity sensor is a sensor which able to detect the nearby objects without any physical contact.
- Also it emits an electromagnetic field of electromagnetic radiation.

Uses:

- Proximity sensors used in industrial applications.
- They are used in vehicles for detecting the proximity of other vehicle.

OS INSTALLATION:

Stuff needed for installation:

1. Raspberry pi board for sure.
2. SD card and its reader.
3. Monitor and HDMI to Vega if the monitor doesn't have HDMI port.
4. 5v converter.

Steps of installation:

Step No 1: Download the latest version of Raspbian on the Raspberry Pi from Foundation's website.

Step No. 2: Unzip the file.
The Raspbian disc image is compressed, so you shall need to unzip it.

Step No. 3: Write the disc image to your micro SD card.
Insert your micro SD card into your computer and write the disc image to it. You shall need a specific program to do this such as Etcher.

Step No. 4: Insert the microSD card in your Pi and boot up
Once the disc image has been written to the micro SD card. Put the card into your Raspberry Pi , Plug in the peripherals and power source to the Raspberry Pi board. (Connect monitor, usb mouse, keyboard to raspberry pi then power it on, connect 5v power converter.) wait until it is powered on and you see the desktop.

Step No. 5: Password edit.
Your user is pi and password is raspberry. and you need to change password. Open terminal and write $ sudo raspi-config.
Then choose change password to change the password.

ADVANTAGES

- Optimization
- Customization
- Pushing Research
- It is low cost system.
- By using Raspberry Pi, the system becomes scalable and flexible.
- The system can be modified easily without disturbing the other components in the system.
- Raspberry Pi is to develop the system, the total system has become low power system.
- Embedded technologies can be easily implemented to development due to raspberry pi.

APPLICATIONS

- Machine adjustments are easy to make microcomputers.
- Tooling costs are reduced, since templates and other fixtures are not required.
- Improve the quality and accuracy of manufactured parts.
- Increase production throughput.
- Stabilize manufacturing costs.

CONCLUSION

The production monitoring system using Industry 4.0 is reliable for managing the production of that product. We used advanced technology Raspberry pi 3B+ model. This system also gives the qualitative analysis and quantitative analysis of that product. It saves the manpower and time. Thus the low cost industrial production monitoring machine is successfully implemented and tested.

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REFERENCES

[1] E. Monmasson, L. Idkhajine, M. N. Cirstea, I. Bahri, A. Tisan, "FPGAs in Industrial Control Applications," IEEE Trans. Ind. Informat., Vol. 7, No. 2, May 2011, pp. 224-243.

[2] Gu G.Y., Zhu L.M., Xiong Z.H., Ding H., "Design of a Distributed Multiaxis Motion Control System Using the IEEE-1394 Bus," IEEE Trans. T. Harmon, M. Schoeberl, R. Kirner, R. Klefstad, K. H. K. Kim, M.R.Lowry, "Fast, Interactive Worst-Case Execution Time Analysis.

[3] Hu Chaobin, Li Wanli, and Xu Wuquan, "Study on the industrial system interpolation based on windows CE.NET and its real-time," Zunino,"Evaluation of EtherCAT Distributed Clock Performance," IEEE Trans. Ind. Informat., Vol. 8, No. 1, February 2012, pp. 20-29.

[4] Andreas Jacobssona, Martin Boldtb, Bengt Carlsson, "A risk analysis of a smart home automation system". Future Generation Computer Systems, 56, 2016.

[5] Avier Suareza,n, Jose Quevedob, Ivan Vidala, Daniel Corujob, Jaime Garcia-Reinosoa, Rui L. Aguiarb , "A secure IoT management architecture based on Information-Centric Networking", Journal of Network and Computer Applications, 63, 2016.

[6] M. Fazio, A. Celesti, A. Puliafito, M. Villari, "Big Data Storage in the Cloud for Smart Environment Monitoring".

[7] Muhammad Waseem Ahmada, Monjur Mourshedа, David Mundowb, Mario Sisinnic, Yacine Rezgui "Building energy metering and environmental monitoring – A state-of-the-art.