

Industrial Process Monitoring System Using Rfid Technology Based On Embedded Web Server

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Abstract: Industrial automation plays a major role in both OEM (Original Equipment Manufacturer) and EMS (Equipment Manufacturing Services) industries. Process monitoring plays a major role in industrial automation. Here, process monitoring is done by using RFID technology. The information about each process are stored in a database and also the in time and out time of each material going through each process are displayed in a webpage. This helps to monitor the each process wherever required, using the given website. Arduino Uno, Ethernet shield and RFID is used to carry out the process.

Keywords: Arduino UNO, database management, Ethernet shield Industrial automation, RFID reader, RFID tag, web page.

1. INTRODUCTION:

With growing technologies in industries, process monitoring plays a major role. Here, process monitoring is implemented by using RFID technology. A database is created in prior that contains the information about the materials that are going through the process. The in time and out time of these materials entering the particular process is updated in the database. Webpage is created to view the ongoing products in the particular processes. 000webhost server is used to create a database, which stores the data in its sever and it cannot be accessed from outside. It is a free hosting website with high security. A webpage is designed to provide information such as tin which process the materials are in. With the help of the webpage, the process can be monitored. This method will be suitable for almost every assembly and manufacturing process. PHP programming helps to connect it to the MySQL database server. Whenever the RFID is scanned, the data's are updated in the server.

2. LITERATURE SURVEY:

Quan Xu, Yajie Li and Yangang Chu presented a Research on Condition Monitoring Platform for Mineral Processing Equipment Based on Industrial Cloud. They designed a condition monitoring platform using industrial cloud for mineral processing equipments. Condition monitoring system helps in fault diagnosis in equipment. They monitors through mobile monitoring, web monitoring system with the help of industrial cloud. It helps in fault diagnosis of the equipment. Sheng Huang, Oon Peen Gan, Sethu Jose, Mo Li (2017) suggested "Localization for Industrial Warehouse Storage Rack Using Passive UHF RFID System". This paper proposes the Warehouse management using RFID technology. The location of the items stored in the warehouse is automatically tracked using passive UHF RFID. Each stock in the warehouse contains the RFID tag. Localization of the system is done by using support vector clustering. Here they tested the proposed the system by placing storage items with RFID tag in a test bed that contains rack. RFID antenna is placed opposite to the test bed. They found localization using clustering method rather than measuring the physical distance with the help of RSSI and RF phase for localization. Xiaofeng Ning, Hongsheng Zao (2014) proposed "A New Testing Device for RFID Performance Factors of Conveyor Belt System". In this paper, authors tested the RFID performance for process monitoring in industry. For testing the RFID performance,

they have developed AGV (Automated Guided Vehicle). In auto test mode, preset program controls the main control unit. This system is especially meant to calculate the relationship between Speed of the AGV vehicle and the RFID reading rate. The boxes are placed on the AGV vehicle and they are passed through the RFID reader with a distance of 20m long. The test is performed at a different speed of the AGV vehicle to test the reading rate of RFID reader. Main purpose is to test the RFID performance in the conveyor belt. Instead of using conveyor belt they have tested the performance with the AGV vehicle. Deepak C.karia, Vsipi Adajania, Manisha Agarwal, Swapnil Dandekar (2011) represented an "Embedded Web Server Application based Automation and Monitoring System". This system proposes the home automation based on embedded web server. This system replaces the PC based server with Web server. The client server based communication is done using WIZ220IO. WIZ220IO is basically the embedded I/O remote module which is to monitor and control through internet. Web server is configured using the configuration tool. With the help of this tool notification information, network configuration etc can be done. The server used in this system can be accessed from any laptops or computers or PDA's or using Smart phones with an internet. The data collected from the different sensors are processed and upload that information to the web server. The uploaded data are displayed in the web page. These web pages can be viewed using any laptops or smart phones with internet.

3. PROPOSED SYSTEM:

The proposed system is used to track the production process and to provide the production status to the corresponding managing authority. Details about the materials are stored in the database. The production status such as in time, RFID number of the corresponding product and out time of the particular product for every stage in the production process is stored in the database. Then in time, out time of the RFID number of the product in the corresponding process are displayed in the webpage.

3.1. Block diagram:

The outline of the proposed system is shown in the block diagram.

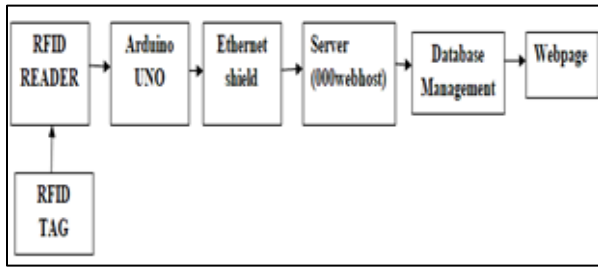


fig 3.1. Block diagram of proposed system

Whenever the material enters the process, the RFID reader placed in the process reads the RFID tag in the material and updates the information to the database. RFID reader is connected to the Arduino UNO microcontroller. Ethernet Shield is connected with the arduino to connect it to the network. Data's from arduino are updated to MySQL database through the PHP programming. Here, 000webhost hosting server is used to store the database. Prior to the process, a database regarding the materials such as RFID number, Job ID, job size etc... are created and stored. Whenever the material enters and leaves the process, the in time and out time of the material is updated in the database. The webpage displays the in time, out time and RFID number of the material. Thus, it helps us to monitor the different process at the same time whenever it is required.

3.2. Hardware requirements:

3.2.1. Arduino Uno:

Arduino Uno microcontroller is an open source microcontroller board. Arduino UNO is based on ATmega328P microcontroller. Arduino microcontroller is a user friendly microcontroller board. It consists of 14 digital pins, 6 analog pins and also it is programmable with an arduino IDE (Integrated Development Environment). Ethernet shield and RFID reader is connected to the arduino board. The information regarding the material entering and leaving the process in the database are collected from arduino board.

3.2.3. Ethernet shield:

Ethernet shield is used to connect arduino to the internet. It connects arduino to internet and to carry data to the database through the PHP. PHP (hypertext preprocessor) is a general purpose scripting language which is mainly used for web development purpose.

3.3. Database management:

A database is created regarding the information of the materials. The current data are updated to the database from arduino via PHP. The data are updated to its corresponding column. PHP is a hypertext markup scripting language. It is most widely used in web page development process. It helps arduino to send data to the database server. PHP is one of the powerful scripting languages to perform interactive WebPages. MySQL is an open-source relational database management system and it is based on the SQL (Structured Query Language) which is used to manage the data in the database.

3.4. Webpage:

Webpage is a document that acts as a web source on World Wide Web which can be accessed through the particular website. Website is a path to the webpage. The contents we wish to deliver can be presented on the webpage. In this project, the webpage displays the Number of process, within which it displays the details of materials (such as RFID_no, job_id, job_name etc...) ongoing under those processes. It helps us to monitor the process wherever we need. It will be much more use full for growing industrial technology.

4. RESULT:

When the RFID is scanned, the out time and in time of the scanning process is recorded in the database and at the same time the RFID number, Out time and date, In time and date are displayed simultaneously in the webpage that are created. The fig.4.1. shows the RFID number scanned in arduino and they are displayed in serial monitor

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COM3
|
Initialize Ethernet with DHCP:
  DHCP assigned IP 10.10.64.243
  connecting to continuing-lifeboat.000webhostapp.com...
  Waiting :)
  a : 270013014B7E
  connecting...
  accessed..
  b:270013014B7E
  HTTP/1.1 200 OK
  Date: Mon, 16 Sep 2019 05:35:08 GMT
  Content-Type: text/html; charset=utf-8
  accessed..
  Waiting :)
  a : 270012ECE930
  HTTP/1.1 200 OK
  Date: Mon, 16 Sep 2019 05:35:24 GMT
  Content-Type: text/html; charset=utf-8
  accessed..
  b:270012ECE930
  HTTP/1.1 200 OK
  Date: Mon, 16 Sep 2019 05:36:09 GMT
  Content-Type: text/html; charset=utf-8
  accessed..
  Waiting :)
  
```

fig.4.1. Arduino serial monitor data.

The fig.4.2. shows the database with RFID no and their details with their updated in time and out time.

RFID No	In Time	Out Time
270013014B7E	2019-09-16 05:35:08	2019-09-16 05:35:24
270012ECE930	2019-09-16 05:36:09	

Fig.4.2. Database of the process

The fig 4.3. shows the webpage that displays RFID no, In time of the product and also the out time of the product.



Fig.4.3. web page of two process.

Thus by using this web page, one can monitor the process from wherever required.

5. CONCLUSION:

This paper presents, RFID based industrial automation along with database management system and webpage development. To increase the quality of the product, continuous monitoring of process is required. Monitoring the process manually in high production industries does not provide accuracy. Thus, this system provides automation for process monitoring. RFID scanning time while entering and leaving the process are updated to the database. With help of database we can easily find the status of every process. A web page is developed and the data's from the database are updated regularly in the web page. Thus, web page provides data required by the specified authorities to monitor each and every process from wherever they wish to monitor. It provides more accuracy than manual monitoring. Thus increase in product quality increases the customer satisfaction and also the reputation of the company.

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