Dynamic Business Solution for Production Management

Kadav Suchita, Gaikwad Madhuri, Dugade Pooja

Abstract— In present system, most of functions are performed physically which consist of quite a lot of risks as far as material handling and production system department is concern. In this issue we are highlighting on providing automation to this field. With the help of integration of mechanical engineering and Information Technology we are trying to accomplish our aspiration. We have used mechanical units such as Conveyor System, RFID tags[10] and other hardware system to construct our total embedded system. As far as software and programming part is concern we employed state-of-art technology so that it can easily right to use and reclaim essential information. The main concern over here is to provide a flawless combination to whole system. By positive tests and experiments we can guarantee that automation is the legitimate and new option to the current situation. In conclusion we will defend the overall contribution of system to boost the esteem and edge of the industry. This project is mainly focusing on providing automation to overall process as possible. Another factor which should take into account is that if you recruiting some people to work then for efficient functionality it mandatory that all employees should pass through complete training. As far as this issue is concern experts suggest some guidelines for the same. Such as proper work practices, equipment, and controls- can help reduce workplaces accidents involving the moving, handling, and storing of materials.

Index Terms— Security, Conveyor system, RFID, DC motor, Embedded system, Datasheets.

I. INTRODUCTION

Design of this project is for a plant where products are manufactured, ERP like system [1] is to be designed and production is to be controlled. In this system the invalid product is captured and put into data base, all depts. like production, sales, maintenance to be updated. The Enterprise Resource Planning i.e. ERP is business management software that allows an organization to use a system of integrated applications to manage the business. ERP software integrates all facets of an operation, including development, manufacturing, sales and marketing. ERP software consists of many enterprise software modules that an enterprise would purchase, based on what best meets its specific needs and technical capabilities. Each ERP module is focused on one area of business processes, such as product development or marketing. Some of the more common ERP modules include those for product planning, material purchasing, inventory control, distribution, accounting, marketing, finance, raw material, stock and HR.

Manuscript received on April , 2013.

Kadav Suchita, B.E. student of Vishwabharti Academy's College of Engg., Department of Computer Engg Ahmednagar. State-Maharashtra, India.

Gaikwad Madhuri, B.E.students of Vishwabharati Academy's College of Engg., Department of Computer Engg Ahmednagar. State-Maharashtra, India.

Dugade Pooja, B.E. student of Vishwabharati Academy's College of Engg., Department of Computer Engg Ahmednagar. State-Maharashtra, India.

Production management means planning, organizing, directing and controlling of production activities. Production management deals with converting raw materials into finished goods or products. It brings together the 6M's i.e. men, money, machines, materials, methods and markets to satisfy the wants of the people. The main objective of production management is to produce goods and services of the right quality, right quantity, at the right time and at minimum cost. It also tries to improve the efficiency. An efficient organization can face competition effectively. Production management ensures full or optimum utilization of available production capacity.

II. LITERATURE SURVEY

Conveyors were first used in industry beginning in 1795, and were primarily used to move grains a short distance. As technology progressed, conveyors grew in sophistication and ability, gaining leather belts and eventually electric motors. Today, conveyors may still move grains, or they may move auto parts, boxes to be shipped, or luggage to be picked up at airports, among many other uses. Material Handling is the movement, storage, control and protection of materials, goods and products throughout the process of manufacturing, distribution, consumption and disposal. The focus is on the methods, mechanical equipment, systems and related controls used to achieve these functions Material handling equipment is used to increase throughput, control costs, and maximize productivity. Material handling equipment is generally separated into four main categories: storage and handling equipment, engineered systems, industrial trucks, and bulk material handling. Engineered systems are typically custom engineered material handling system. Conveyors, handling Robots and most other automated material handling systems fall into this category. Engineered systems are often a combination of products integrated to one system. Many distribution centers will optimize storage and picking by utilizing engineered systems such as pick modules and sortation systems. Products are moving on this conveyor system. With the help of RFID tag information of the product on conveyor belt it can be sensed and immediately all information of that product can be store on the server. Database can be update immediately. Then all control goes to the embedded control system, it supports to the robotic arm to pick that sensed product and stored into the rack. This is the exact sequential automation process. This is statement of the live project of TATA motors, which means provide the automation to material handling, sensing the information of the product, and pick the product by robotic arm on other end and store them into the rack. A conveyor belt (or belt conveyor) moves an object point A to point B consists of two or more pulleys,

with a continuous loop of material - the conveyor belt - that rotates about them. One or both of the pulleys are powered, moving the belt and the material on the belt forward. The powered pulley is called the drive pulley while the unpowered pulley is called the idler.

III. SYSTEM MODEL

In our project bag or boxes which are filled with particular products from "production & bagging" department will be having a unique tag. This unique RF tag stores information about the product containing in that bag.(Using this data of tag, bag information gets detected).The tag will point to information such as Name of products, Date of manufacturing, weight of bag, location at which to be supplied, Batch no. On detection, the embedded system will forward this information to local host which will do the continue process. Then it is passed to server/administrator. Production dept will have all information about every bag that is manufactured & also count of total production at any second, any minute, any hour, and any day. Other departments can also have information of this production & then take timely accurate decision accordingly & with all these details the greater efficiency is carried out, for company & it helps to gain more profit.

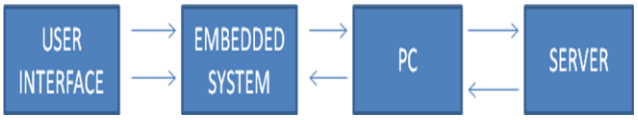

Fig.1. Problem Definition

This System uses RFID TAG to detect the type of production as it goes through the conveyor belt. RFID TAG includes various information about the product such as name, date of manufacturing, quantity etc. Then this production is stored in the main server as chart indicating different products and their quantity produced and sent to the other departments automatically. All the departments are interconnected to each other and the main record is kept with the production department so that any modification in any department is directly changed in the production dept. The system has to be flexible & should be able to provide accurate information not only to production department but also to sales, purchase dept & dispatch dept. It prevent burden of file maintenance & to handle the various complexities with ease.

IV. PROPOSED WORK

Here we use the following modules for implementing our system:

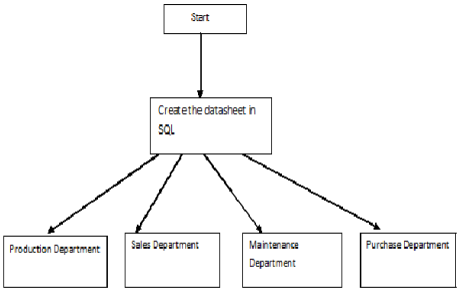

Fig.2.Datasheets

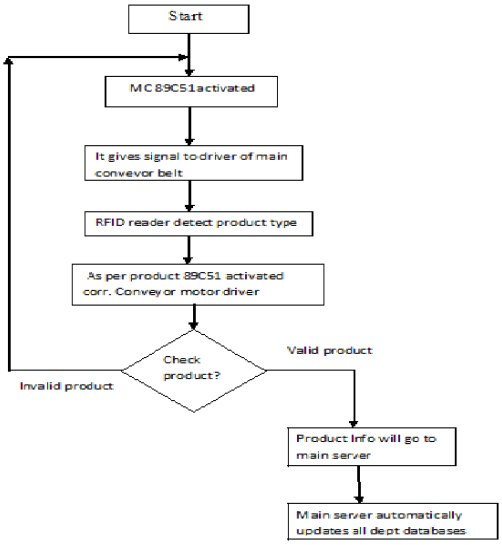

Fig.3.Embedded system

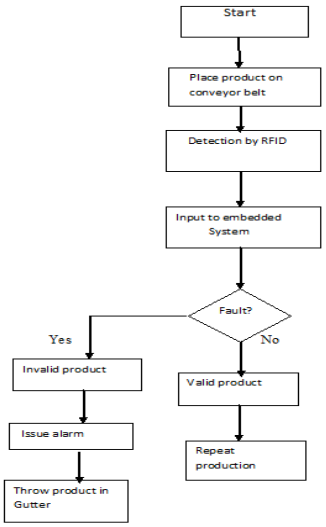

Fig.4.Production management

V. SYSTEM DESIGN

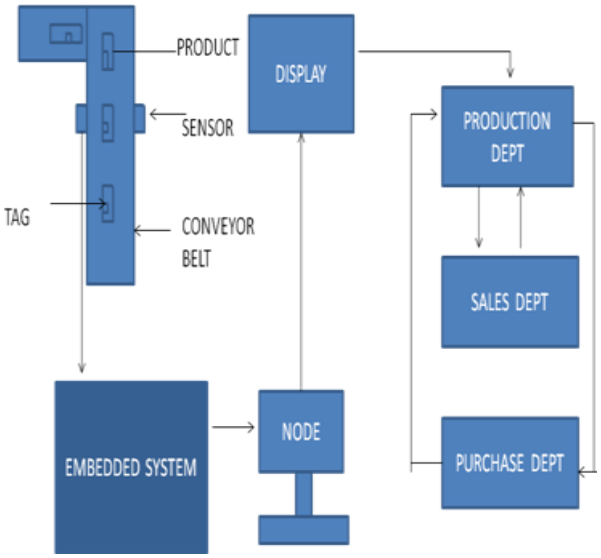

Fig.5. System structure

i. AT89C51:

The AT89C51[8] is a low power, high-performance CMOS 8-bit microcomputer with 4Kbytes of flash programmable and erasable read only memory(PEROM).The device is manufactured using Atmel's high density nonvolatile memory technology and is compatible with the industry standard MCS-51™ instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in- system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C51 is a powerful microcomputer which provides a highly flexible and cost effective solution to many embedded control applications.

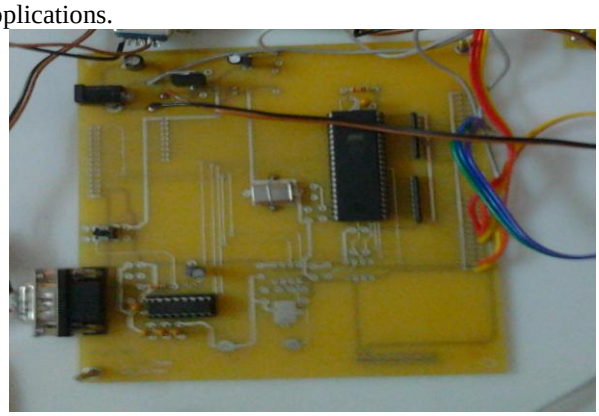

Fig.6.Microcontroller board

ii. AT24C512[9]

Features:

- Internally Organized 65,536 x 8
- 2-wire Serial Interface
- Schmitt Triggers, Filtered Inputs for Noise Suppression
- Bidirectional Data Transfer Protocol
- 1 MHz (5V), 400 kHz (2.7V) and 100 kHz (1.8V) Compatibility
- Write Protect Pin for Hardware and Software Data Protection
- 128-byte Page Write Mode (Partial Page Writes Allowed)
- Self-timed Write Cycle (5 ms Typical)
- High Reliability

iii. RFID(Radio Frequency Identification):

It provides following features:

- Read only data transmission
- 96 or 128 bits of One-time Programmable(OPT)user memory(also supports 48 and 64-bit protocols)
- Typically operates at 125kHz
- On chip rectifier and voltage regulator

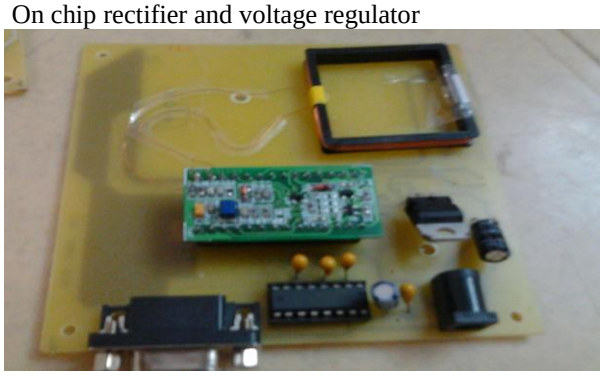

Fig.7.RFID reader board

VI. TECHNICAL SPECIFICATION

A. Advantages

- To develop a standard embedded system that allows communication between RF tag and RFID.
- To maintain the information of the tag.
- To maintain, update & check all the information about production of products.
- To record the total count of products.
- It's a more flexible system.
- Easy interactive, user friendly.
- It prevent burden of file maintenance.
- System will be able to handle the various complexities with ease.

B. Disadvantage

- It will cost more for purchasing SQL Server

VII. CONCLUSION

According to this paper we are going to develop an ERP like system which automatically stores the information of each product. In our project, each product will have an unique tag, which stores the information about the product such as Name, date of manufacturing, Weight, Batch No. On detection the embedded system will forward this information to the local host & then it passes to server/administrator.

All departments like purchase, sales, maintenance is will get information of this production & then take timely accurate decisions accordingly & with all these details the greater efficiency carried out, for company & it helps to gain more profit.

ACKNOWLEDGMENT

Our genuine thanks go to Vishwabharti Academy's College of Engineering for providing me a strong podium to enlarge my skillfulness and capabilities. We would like to thanks to my friends & family for their support and inspiration for us. We would like to thank Prof. P.P.Gawali for their support. We are very obliged to F. A. Author for giving us an opportunity for presenting this paper. Last but not least, we would like to thank all those who directly or indirectly assist us in presenting the paper.

REFERENCES

1. www.webopedia.com/terme/erp.html
2. Ang J., Dhillon, R., "The dynamic stress of conveyor belt system during starting and stopping", 1994, pp.866-71, vol. 26.
3. Bahake, "Dimensioning and application of belt conveyors with intermediate drive", International Journal of Advanced Manufacturing Technology, 1999, pp.822-31.
4. Shah R. and Rabaey J., "Energy aware routing for low energy ad hoc sensor networks," in Wireless Communications and Networking Conference, 2002. WCNC2002, vol.1, pp. 350–355, Mar 2002 IEEE.
5. www.microsoft.com
6. Wang L. and Xiao Y., "A survey of energy-efficient scheduling mechanisms in sensor networks," Mob. Netw. Appl., vol. 11, no. 5, pp. 723–740, 2006.
7. "Castalia a simulator for wireless sensor networks," http://castalia.npc.nicta.com.au/pdfs/Castalia User Manual.pdf.
8. Interfacing serial port (Rs232) with 8051 Microcontroller http://www.engineersgarage.com/microcontroller/8051project/interface-serialport-RS232-AT89C51-circuit.
9. 24c512 datasheets and application notes, data sheets, circuits http://www.datasheets.org.uk/24C512*-datasheet.html
10. RFID tagging http://whatis.techtarget.com/glossary/Computer-Science