



WAREHOUSE AUTOMATION USING ARTIFICIAL INTELLIGENCE IN PIPE INDUSTRY

V Aravind

PG – M Tech Student, Kumaraguru College of Technology, Coimbatore

M V Umesh

Associate Professor, Department of Electronics and Instrumentation Engineering,
Kumaraguru College of Technology, Coimbatore

Abstract: The advancements in the technologies, leads the business world to modify the operation in the warehousing as the result of the shortage in the management skills has paved way for the emergence of the automated warehousing. More over as the warehousing takes a vital role in the supply chain and prevails as the key feature in the logistics, enhance the organization to improve efficiency in proper inventory by using IoT devices like barcodes & scanners for proper arrangements. The application of the artificial intelligence in the warehousing operations enhances the potentials of the warehousing functioning in the logistics, and supply chain management. The artificial intelligence in the warehousing is to make it a smart environment for the automated logistics is proposed in the pipe industry . The paper concentrates on the Automated Warehouse in inventory process in pipe industry using the internet of things, artificial intelligence to have an any time access.

Keywords: Artificial intelligence, Smart Warehousing, Automated Logistics, Internet of Things.

1.INTRODUCTION:

Warehouse Management system is a software applications, designed to support warehouse or distribution centre management and staff. It helps in daily planning, organizing, staff, directing and controlling the resources , to move and store materials within and out of a warehouse [1]. The major operation of the warehouse involves the storage of goods, protection of goods, risk bearing, financing, processing and transportations.

2.NECESSITY FOR WAREHOUSE:

- The warehouse becomes essential for storing the goods that are produced in offseason and the goods that are demanded in offseason.
- They play a significant role in the organizations that has a bulk production and supply.
- Ware housing is a storage facility that enables the goods to be stored and handled goods properly when requested for.
- It ensure the quick and the faster supply of the goods that are in demand and also in the continuous production and the movement of the goods.
- They enhance the economic benefit of the business as well as the customer.

Despite the advantages of the warehouse, growing demand and supply. it has made the conventional warehouse operations incompatible for the smooth and the easy handling of the goods stored in it. So this necessitates a change in the operation of the warehousing. For the smooth handling of the warehouse operations involved in the application of the internet of things [2]. The wireless sensor networks , RFID, tag readers, robots and the artificial intelligence etc., to automate the process in the warehouse ensuring the efficient storage and the retrieval of the products and efficient functioning of the warehouse [3] .

3. PROPOSED WORK:

- Each pipe batch is printed with small barcode stickers placed on it
- Scanners are used to track the pipes
- Motion Sensors in the cranes used to track the pipes and moves to required place
- Each Row based floor type is marked with barcodes
- By reading the barcodes in floor racks with the help of scanner placed at the bottom of the crane will be detected and place the pipes in it

The modification in the process of the automation is brought in the warehouse-logistics using the Internet of things, artificial intelligence, sensor networks could improve the customer satisfaction by enabling them to enhance the efficiency in goods handling [4]. The motion sensor in the system ensures the total number of goods unloaded in the store house, the RFID tags used to enable the tag readers to identify the type of goods received and the barcode ensure the variety in the goods. The robot process automation, inbuilt with the sensor and the tag reader and the barcode, receives the output from the scanners to recognize the product types and behave as the forklifts to load them in the appropriate floor based rack, the sensors fitted to the rack intimates the count over Wi-Fi to the nearest PC to be monitored by the workers and the production unit as well as to provide information with the stock availability for the customers. Once the order is placed for a particular variety of goods, the customer is assigned with the order and the tracking number.

The details of the customer order are provided to the warehouse and where the manual interference is required for the feeding of the product required. The information of the order is transmitted to the PC, that decides with the proper item to be fetched from warehouse based on the barcode mentioned and the decision algorithm fed to the provide the detailed information of the items in the warehouse to track it [5].

Once product is recognized , Further the Camera and Videos in the warehouse monitored from control room, help their movement using the distance measurement system based on cranks connected with hooks. It picks the ordered goods and updates the count to the PC of the orders taken and scanners scan the floor rack updates the count of the left over in the rack to the nearby PC, production unit. Thus the proposed system provides the knowledge of the goods in stock and out of stock to the production unit.

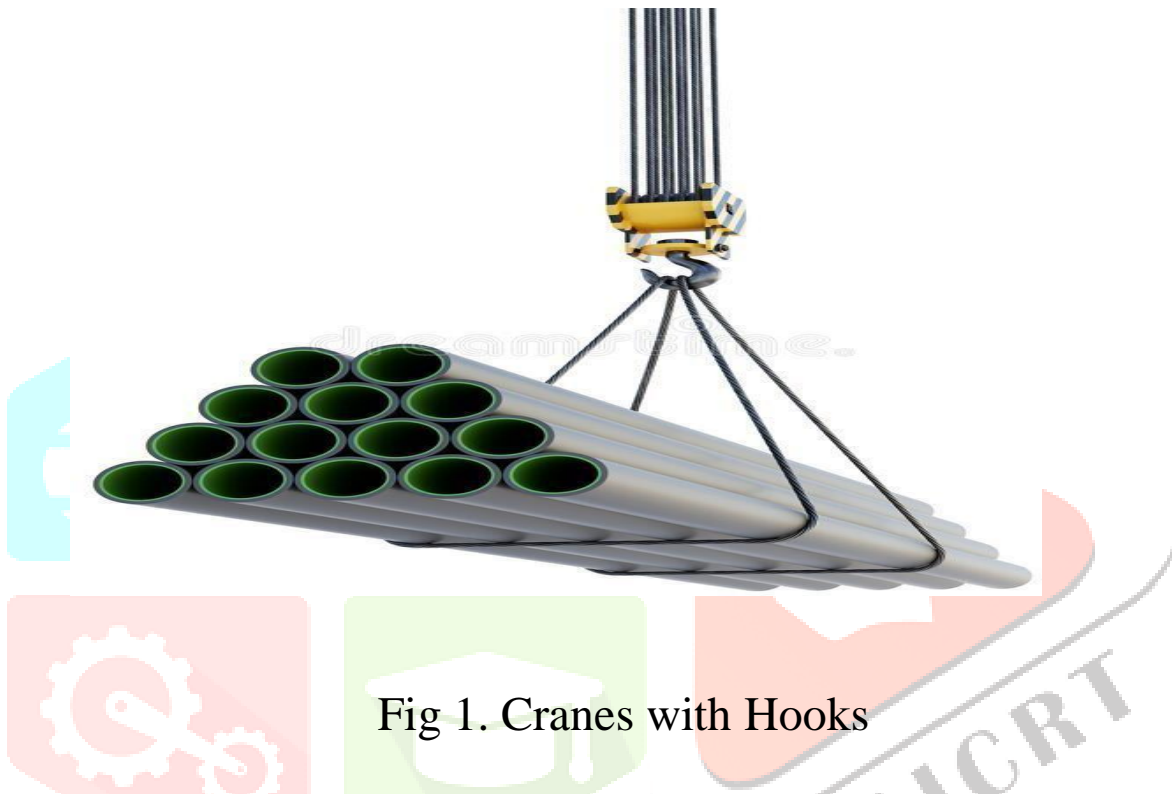


Fig 1. Cranes with Hooks



Fig 2. Packing & Printing Barcodes



Fig 3. Scanner

4. RESULTS AND DISCUSSION:

The proposed system with the ability to handle the warehouse-logistics in the smart way enhances the efficiency of the warehouse-logistics operation. By utilizing the internet of things, artificial intelligence. The proposed methods put forward an effective work to reduce the inventory time consumption in the procuring and dispatching of the goods from the warehouse.

Warehouse logistics	pipes moving time from production	pipes entering the warehouse	pipes leaving the warehouse
Traditional	1 - 2 hours	30 min	30 min
Automated	30 min	10 min	10 min

5. CONCLUSION:-

Smart Warehouse with the automated logistics to handle the goods inside the warehouse is preferred in this paper. The proposed method of automated warehouse logistics uses the sensor networks to gather the information about the number of the items entering and leaving the warehouse and the artificial intelligence in properly handling them inside the store house such as placing them in the proper floor racks, picking back the items from the rack as per the order placed etc. The information gathered through the sensor is transmitted using the internet to enable the customers from anywhere to know about the goods availability in the warehouse. The proposed system of smart warehousing logistics shows higher performance and enhanced efficiency for the warehouse that holds a vast range / types of goods that are available in huge number.

6. REFERENCES:

1. Liu, X., Cao, J., Yang, Y., Jiang, S., 2018. CPS-based smart warehouse for industry 4.0: a survey of the underlying technologies. *Computers* 7 (1), 13. .
2. Colakovic, A., Causevic, S., Kosovac, A., Muharemovic, E., 2020]. A review of enabling technologies and solutions for IoT based smart warehouse monitoring system. In: *International Conference New Technologies, Development and Applications*, Springer, Cham June, pp. 630–637. 27
3. Yongsheng, L., Wenling, Z., 2004]. *Warehousing and Distribution Management*
4. Lee, C.K.M., Lv, Y., Ng, K.K.H., Ho, W., Choy, K.L., 2017a]. Design and application of Internet of things-based warehouse management system for smartlogistics . *Int.J.Prod.Res.*,1–16.
5. Yao, Z.Q., Zhu, H.J., Du, W.H., 2014]. Design and implementation of automated warehouse monitoring system based on the Internet of Things. *Appl. Mech. Mater.* 543, 1099–1102, Trans Tech Publications Ltd.