www.ijiarec.com

ISSN:2348-2079

Volume-7 Issue-1

International Journal of Intellectual Advancements and Research in Engineering Computations

Design and fabrication of an metal splitting conveyor using Arduino

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ABSTRACT

This Paper was created to control and monitor movable parts on the conveyor belt by an ARDUINO BOARD. In this work system separate metallic and non-metallic objects. A PNP NO 3-WIRE Proximity Inductive Sensor and proximity capacitive sensor are used to detect object and metallic nature respectively the counter used to counts non-metallic and metallic objects and display the value, whenever a metallic object is detected Stepper Motor pushes it out of the conveyor belt and allows non-metallic objects to reach till the end of conveyor. An arduino board and arduino software are used in this system for performance project. This logic can handle a series of metallic and non-metallic objects. To control the speed of the conveyor ROBODO TB6600 STEPPER MOTOR DRIVER controller is used. Arduino software codings is used to create Arduino logic. During movement this application can be used in pharmaceutical, electronic industries or any industry which deal with metals/plastic.

Keywords: Conveyor, Object separation, Monitoring, Virtual Instruments.

INTRODUCTION

Automation is encompassing virtually every walk of life. Automation solutions are required right from agriculture to space technology. Plant Automation is the necessary for the manufacturing industry to survive the today globally competitive market. The technology by which a process or procedure is accomplished without human assistance. A automation technique that can be used to reduce costs and to improve quality can increase manufacturing speed. Automation can lead to products having consistent quality perhaps even consistently good quality. It is implemented using a program of instruction combined with a control system that executes the instructions. To automate a process, power is required both to drive the process itself and to operate the program and control system. Automated process can be controlled by human operator, by computer or by a combination of two [1].

LITERATURE SURVEY

Now a day's Conveyor belt system are widely used in cement industries, power plant, food industries, production industries etc. So it is essential equipment for in house material transportation today. The modification and latest technologies or methodologies used in different applications to reduce failures, maintenance cost and equipment related a fatal accident occurs during operation. By classifying the colored objects by its color, which are coming on the conveyor by sorting the objects in its respective pre-programmed place which drastically reduces the monotonous work done by human, increasing accuracy and speed in the work. In that the

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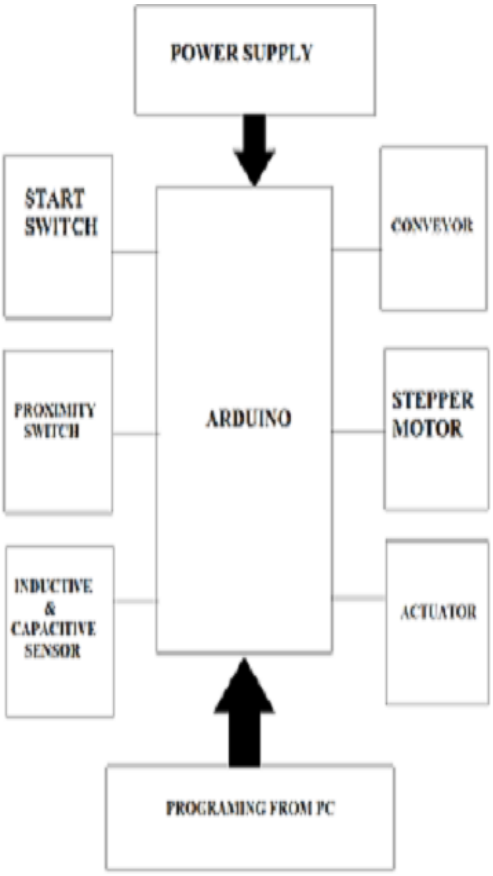
microcontroller sends signal to circuit which drives the various servo motors attached at specific location on the conveyor. Based upon the detected object, the servo motor rotates and pushes the object to its specified location, and returns to the original position [11].

In research applications on robotics and automation where there is need of powerful linear algebra tool, Arduino is widely used software environment mainly because it has a very good collection of image processing toolboxes which supports in the detection of colours for sorting mechanism. Arduino IDE (Integrated Development Environment) is free open source prototype and environment for interfacing interactive analog and digital devices (electronic). Basically it is used for programming the microcontrollers. In this project we have made use of the Arduino library to interface the Atmega 328 microcontroller deployed on our board.

Proposed Method

The proposed system separate metallic and non-metallic objects. A PNP NO 3-WIRE Proximity Inductive Sensor and proximity capacitive sensor are used to detect object and metallic nature respectively the counter used to counts non-metallic and metallic objects and display the value, whenever a metallic object is detected Stepper Motor pushes it out of the conveyor belt and allows non-metallic objects to reach till the end of conveyor [2-5].



Working mechanism

The arduino is connected with Sensors and motors where the command to arduino is given by Arduino Software, where a computer is used in case for programming arduino as per the conveyor needs. The arduino used here is programmed to receive signals on metals and non-metals which is given by sensors namely “proximity”. The Stepper motor placed over conveyor belt pushes the objects

into a slope as per the material. The system proposes a simple way to handle the conveyor system to gives you the suitable product/material needs in industrial area. Day by day industry needs the automatic handling the system and reduce the manpower to increases the profit. The system handles with the arduino improves the visualization. As the conveyor rolls with the help of motors at the front as well as back end which improves the smooth rolling of the conveyor. The electromechanical device i.e. relays which handles the power through the device. As conveyor rolls the material on the conveyor move with the conveyor and detects through the sensor which indicates in the named as the primary sensor. Again, it will move forward through the sensor respectively. The programme burns in the controller of the arduino which uses the arduino programming which is the easiest way to programme the arduino for industrial automation. The commands need to handle the arduino in proper way. The sensor which also connects with the system gives the exact visualization which handles the conveyor system [6].

Conveyor Belt

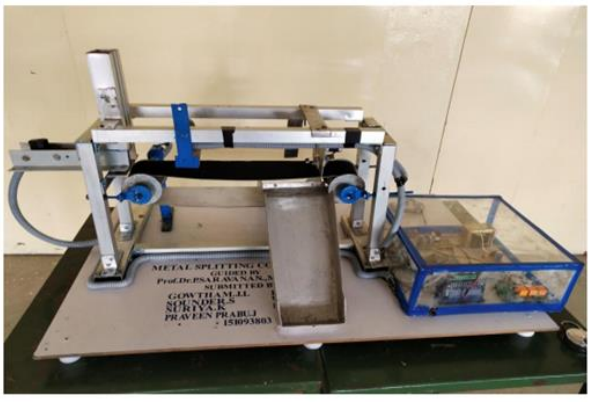
Conveyor belt is a continuous moving band made from fabric, metal or rubber used for transporting objects from one place to another mainly within the industry. A conveyor system consists of a conveyor belt, two or more pulleys that rotate around in endless loop of the conveyor belt. One or both of the pulleys are powered which causes the belt and the material on the belt forward. The drive pulley is the powered pulley while the idler pulley is unpowered pulley [7].

Arduino

Few years ago the Arduino development team designed a AVR microcontroller board and released it under an open source license. Arduino is a registered trademark—only the official boards are named “Arduino”. So clones made by other manufacturers usually have names ending with “duino” [4]. The Arduino developers have created a simple but useful integrated development environment (IDE). This project is intended to design a microcontroller circuit board of its own similar to that developed by Arduino team and make use of the open-source Arduino environment (IDE) and its libraries to make it easy to write code and upload it to the I/O board. The Boot loading package of Arduino IDE is used to burn programs into the Atmega IC [8, 9].

REULT AND IMPLEMENTATION

Hardware setup which shown below



CONCLUSION

Arduino are well-adapted to a range of automation tasks. These are typically useful in industrial processes in manufacturing where the cost of developing and maintaining the automation system is high relative to the total cost of the automation, and where changes to the system would be expected during its operational life. Arduino contain input and output devices compatible with industrial pilot devices and controls; little electrical design is required, and the design problem centers on expressing the desired sequence of operations written in the programming language. Arduino applications are typically highly customized systems, so the cost of a packaged Arduino is low compared to the cost of a specific custom-built controller design. On the other hand, in the case of mass-produced goods, customized control systems are economic due to the lower cost of the components, which can be optimally chosen instead of a "generic" solution, and where the nonrecurring engineering charges are spread over thousands of places. The conveyor system monitored, controlled with the help of Arduino and various sensors. In many plants the conveyor plays an important role to move material and various parts from one place to other. In point of reducing human errors the Arduino are important to design and highly reliable system. Arduino is used for real time monitoring thus proposed system gives better accuracy, time consuming, low power consumption etc.

REFERENCES

[1]. R.Keerthika, M.Jagadeeswari “Coal Conveyor Belt Fault Detection and Control in Thermal power plant using PLC and SCADA”, International Journal of advance research in computer engineering & technology, 4(41), 2015.

[2]. Anup dakre, Junaid G.Sayed, Ekta A.Thorat, Aouruf Ahemad md.Aves Choudhary “Implementation of bottle filling and capping using plc with scada”, International research journal of engineering & technology 2(9), 2015.

[3]. Ashwini Bhivgade “Automation of Conveyor using PLC”, International Journal of current emerging and scientific research, ISSN (print): 2393-8374, (online): 23940697, 2(4), 2015.

[4]. K.Thiyagarajan, Meenakshi R, Sugmaya P “Vision based bottle classification and automatic bottle filling system” International Conference on Advances in Human Machine Interaction (HMI - 2016), 2016.

[5]. D.S.V. Siva vardhan, Y.Shivraj Narayan “Development of an Automatic Monitoring and Control System for the Objects on the Conveyor Belt” International Conference on Man and Machine Interfacing 2015.

[6]. Chitra.s, Vijaya Raghvan “Conveyor Control Using Programmable Logic Controller” International Journal of Advancements in Research & Technology, 3(8), 2014.

[7]. Tard Heljing, Beegat Lannarstau “Sensor Graphs for Discrete Event Modelling Applied to Formal Verification of PLCs” IEEE transactions on control systems technology, 20(6), 2012.

[8]. Babita Nanda, et.alShowed the usage of PLC. Allen Bradley plc is a basic type of plc used forsmall scale applications. It has 8 inputs and 6 outputs. It has a 24v input slot which acts as a power source for Allen Bradley plc

[9]. Chitra.s and VijayaRaghavan, reviewed about PLCs to replace manual work to automated system.PLC are well adapted to a range of automation tasks.