

Android Based Pick and Place System Using Conveyor Belt

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ABSTRACT: In many situations, autonomous robots can provide effective solutions to menial or dangerous tasks. In this case, it is desirable to create an autonomous robot that can identify objects from the conveyor belt and relocate them if the object meets certain criteria. Obviously, when dealing with a large number of objects, this is a very menial task. This is an excellent application for a robot of this type. In this case, to keep costs and design complexity low, the robot is designed around the platform and uses several different sensors to collect information about the robots environment to allow the robot to react accordingly.

The LPC2148 are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate. With their

compact 64 pin package, low power consumption, various 32-bit timers, 4-channel 10-bit ADC, USB PORT, PWM channels and 46 GPIO lines with up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access control and point-of-sale. With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.

A geared DC motor with 60RPM is used to control the conveyer belt. Robotic free balance wheel is used to support the conveyer belt on the other end. Here we will be using picking arm using controller motor to pick the particular object from the belt and place it.

This project uses two power supplies, one is regulated 5V for modules and other one is 3.3V for LPC2148. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave

rectifier is used to rectify the ac out put of secondary of 230/12V step down transformer.

I.INTRODUCTION

Auto-motion first opened its doors in 1967 as a distributor of conveyors and conveyor accessories. It did not take long to realize that one could provide far greater service to the customers if one could also control the manufacturing aspects of the conveyor equipment. Auto-motion understood the value of providing service in every facet from design and production to installation, training and ongoing factory trained technical support. Simply stated, Auto-motion was providing Value Added Service long before it became a buzz word in the industrial world.

The application of the conveyor branched out to coal mining in the 1920s, where the technology underwent considerable changes. Conveyor belts were designed made of layers of cotton and rubber coverings. During the manufacturing increase of World War II, manufacturers

BENEFITS OF CONVEYORS

Key words: LPC2148 microcontroller, 12v DC motor, LCD 16X2 display, Conveyor belt, Robotic Arm, Bluetooth.

created synthetic materials to make belting because of the scarcity of natural components. Today's conveyor belting is made from an almost endless list of synthetic polymers and fabrics and can be tailored to any requirements. Possible uses of conveyors have broadened considerably since the early days and they are used in almost any industry where materials have to be handled, stored or dispensed. The longest conveyor belt currently in use operates in the phosphate mines of the Western Sahara and is over 60 miles long.

Conveyors can be classified using the following criteria:

- **Load:** The type of product being handled (unit load or bulk load)
- **Location:** Location of the conveyor (overhead, on-floor or in-floor)
- **Accumulation:** Whether or not loads can accumulate on the conveyor

Conveyors offer a wide range of benefits, many of which are readily

apparent. Before the invention and implementation of conveyors, warehouse and factory workers needed to physically travel with an object from place to place. Not only was this cumbersome for the employee, it was inefficient for the company and, essentially, a huge waste of time. The conveyor brings a project to the worker, rather than a worker having to travel to a project. Conveyors can be used to transport parts to workers or locations throughout a plant or warehouse and, eventually, to the shipping dock for delivery.

The conveyor belt system and working were quite simple in the early days. The conveyor belt system had a flat wooden bed and a belt that traveled over the wooden bed. Earlier, conveyor belts were made of leather, canvas or rubber. This primitive conveyor belt system was very popular for conveying bulky items from one place to another. In the beginning of the 20th

II.EXISTING SYSTEM

From the below proposed diagram for development of pick and place shown ,User will give the input through GUI and it on solenoidal pump it will filled liquid in the bottle. The gripper is connected to robotic

arm that pick the bottle according to programming of Microcontroller and place to desired location. Once work will completed it will report through RF module that work completed ready to do another

century, the applications of conveyor belts became wider.

One of the turning points in the history of conveyor belts was the introduction of synthetic conveyor belts. It was introduced during the Second World War, mainly because of the scarcity of natural materials such as cotton, rubber and canvas. Since then, synthetic conveyor belts have become popular in various fields.

With the increasing demand in the market, many synthetic polymers and fabrics began to be used in the manufacture of conveyor belts. Today, cotton, canvas, EPDM, leather, neoprene, nylon, polyester, polyurethane, urethane, PVC, rubber, silicone and steel are commonly used in conveyor belts. Nowadays, the material used for making a conveyor belt is determined by its application.

arm that pick the bottle according to programming of Microcontroller and place to desired location. Once work will completed it will report through RF module that work completed ready to do another

work user can move the robot position and command through PC.

The microcontroller then sends data to the RF module using Rx-Tx (Receiver-Transmitter) Serial UART interface. The RF module manufactured by Roving Networks is used here is Atmega-16 that comes under AVR family which itself has an Analog to Digital Converter (ADC). The microcontroller then sends data to the RF module using Rx-TX (Receiver-Transmitter) Serial UART interface. The RF module manufactured by Roving Networks is used. Atmega16 has higher code memory and RAM as compare to 8051. The AVR is much faster. It executes most instructions in a single clock cycle, as against 12 for a standard 8051 or 6 for one of the high speed variants. If you're converting an existing project, it's really important to take this into account, or all the timing will be wrong.

III.PROPOSED SYSTEM

The below figure shows the overall block diagram of **Android Based Pick And Place System Using Conveyor Belt** which consists of two sensors which are connected to the LPC2148.

These system is designed to pick and place the object when the metal detector detects

Further, AVRs have an internal calibrated clock option, so in many cases you don't need a crystal and gain two extra port pins. They had inbuilt circuitry for ADC , SPI , I2C, UART, internal pull up registers etc. with their L&H 8bit registers , they were capable of performing primitive 16bit operations by breaking down the data in to H and L 8 bit values. They even had internal oscillators on certain flavors

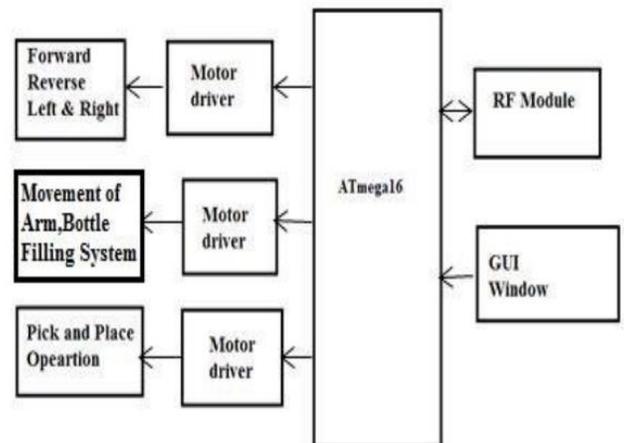


Fig 1:Existing system block diagram

the metal. The objects are counted by the IR sensor to insure how many objects had moved. The movements of the robotic arm and the direction of the motors (clock wise anti clock wise) can be controlled by the Bluetooth Application.

The **Bluetooth** helps to control the functions of the motor and the robotic arm wirelessly. The objects which are counted by the IR

sensor will be displayed on the 16X2 LCD display. We are using LPC2148 Phillips microcontroller because it is multitasking and fast in response in performing the operations.

The **NXP** (founded by Philips) **LPC2148** is an **ARM7TDMI-S** based high-performance 32-bit RISC Microcontroller with Thumb extensions 512KB on-chip Flash ROM with In-System Programming (ISP) and In-Application Programming (IAP), 32KB RAM, Vectored Interrupt Controller, Two 10bit ADCs with 14 channels, USB 2.0 Full Speed Device Controller, Two UARTs, one with full modem interface. Two I2C serial interfaces, Two SPI serial interfaces Two 32-bit timers, Watchdog Timer, PWM unit, Real Time Clock with optional battery backup, Brown out detect circuit General purpose I/O pins. CPU clock up to 60 MHz, On-chip crystal oscillator and On-chip PLL.

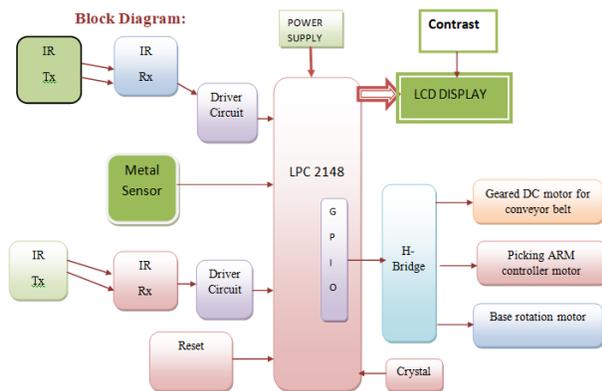
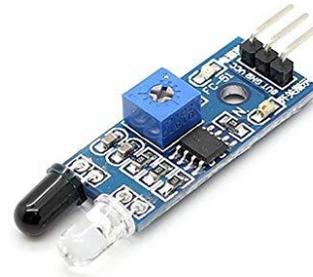


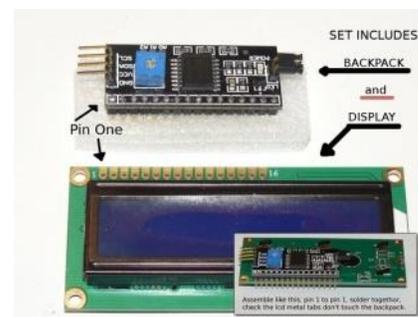
Fig 2:Proposed system block diagram

IR SENSOR



An infrared Sensor is an electronic instrument that is used to sense certain characteristics of its surroundings. It does this by either emitting or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion.

LCD



LCD (liquid crystal display) is the technology used for displays in notebook and other smaller computers. Like light-emitting diode (LED) and gas-plasma technologies, LCDs allow displays to be

much thinner than cathode ray tube (CRT) technology.

METAL SENSOR

A **metal detector** is an electronic instrument which detects the presence of metal nearby. The simplest form of a metal detector consists of an oscillator producing an alternating current that passes through a coil producing an alternating magnetic field. If a piece of electrically conductive metal is close to the coil, eddy currents will be induced in the metal, and this produces a magnetic field of its own. If another coil is used to measure the magnetic

field (acting as a magnetometer), the change in the magnetic field due to the metallic object can be detected.



IV.ADVANTAGES & DISADVANTAGE

ADVANTAGE

- Less manpower required.
- As the whole system is performed by machine there is less possibility of mistake.
- It can reduce cost of inspection.
- It can increase the percentage of good product.
- Conveyor belt can handle huge products with low cost at hazard environment.
- The installation cost and running cost of this system is very low. So, it is very economic.

DISADVANTAGE

- The maintenance for the conveyor belt requires time to time around once in 3 month.
- The conveyor belt must be replaced by new one after one year because the rubber grips will be wiped off.

V.APPLICATIONS

- Transportation of specific product to a desired place.
- Can be used in industry production stream.
- Used for assembling the products.

- Used in supermarkets for moving large and heavy objects at the cashier.

VI.CONCLUSION

The project works successfully and detects the metal and count the objects using sensor. The sensor result was converted chiefly to the command that drive the handling systems which drive the pick and place robot to pick up the object and place it into its designated place. There are two main steps in sensing part, objects detection and object counting. The system has successfully performed handling station task, namely pick and place mechanism with help of metal sensor and IR sensor.

Thus a cost effective Mechatronics system was designed using the simplest concepts and efficient result was being observed. This system is a depicting the prototype of android based pick and place systems which can be used in industries.

VII.FUTURE SCOPE

Another area of improvement is design of efficient gripper of Digital Image Processing (DIP) is a multidisciplinary

science. The applications of image processing include: astronomy, ultrasonic imaging, remote sensing, medicine, space exploration, surveillance, automated industry inspection and many more areas. Different types of an image can be discriminated using some image classification algorithms using spectral features, the brightness and "colour" information contained in each pixel. The Classification procedures can be "supervised" or "unsupervised". With supervised classification, identified examples of the Information classes (i.e., land cover type) of interest in the image. These are called "*training sites*". The image processing software system is then used to develop a statistical characterization of the reflectance for each information class. Genetic algorithm has the merits of plentiful coding, and decoding, conveying complex knowledge flexibly. An advantage of the Genetic Algorithm is that it works well during global optimization especially with poorly behaved objective functions such as those that are discontinuous or with many local minima. MATLAB genetic algorithm toolbox is easy to use, does not need to write long codes, the run time is very fast and the results can be visual. The aim of this work

was to realize the image classification using Matlab software.

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