Intelligent Paper Bundle Counting and Automatic Software Entry

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Abstract- **In today's world of technology and due to speed running industries, the production rate has increased tremendously. In such cases industries can't bare human errors for counting these products. Thus it become necessary to develop Low Cost Automation (LCM) for counting those products in accurate manner. Finally, here we have developed a LCA system for counting paper bundles when it is coming in the conveyer belt to the storage area using ultrasonic sensor and the number of bundles that is sensed and counted is made an automatic software entry using Node MCU.**

Keywords – Automation, Low cost Automation(LCA), Arduino UNO, Node MCU

I. INTRODUCTION

The development of the manufacturing industries is dependent upon research in manufacturing process and innovation in new products. The countries that have higher manufacturing rate are known to be developed whereas those with little manufacturing are considered under development. Suring processing, the raw materials gets processed it earns a value for sale. The value that is earned by the product should have more cost allowing the organization to make money out of it. In old days it was possible to implement labor for counting similar objects. But now due to the increase production and for minimizing the labor expenditure for such unskilled task, industries can't afford human errors for counting these products. This forced industry to tend towards atomizing the counting process. As economy has always been a considerable factor in developing industry, thus it become necessary to develop Low Cost Automation (LCA) for counting these products in accurate manner. In automation industry, continuous innovation, finding effective ways to enhance productivity operations is the key to success. Industrial automation focuses on developing automations having low cost, low maintenance, long durability. Intelligent paper bundle counting and automatic software entry system proposes the idea of fast and efficient counting of bundle without human e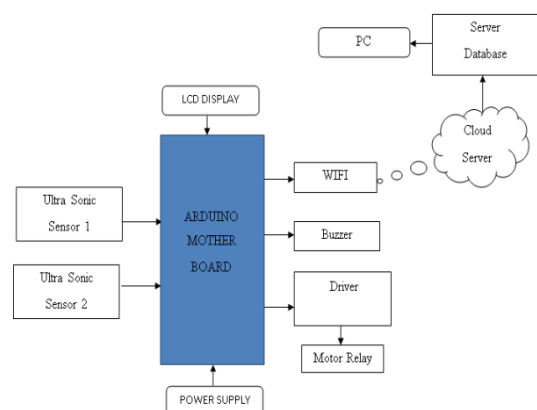ffort. The proposed paper bundle counting system uses the embedded system Arduino for the functioning of the system. It uses a sensing technology to sense the count of the bundle and sends the signal to the Arduino Uno and enter the number of bundles in the software automatically using node MCU. The usage of Arduino makes the interfacing of the display and node MCU programming of the proposed project more convenient. The required count of paper bundles can be counted out from a conveyer belt. The paper bundle counting can be sorted in system by using internet with respective date and time.

II. EXISTING SYSTEM

In the existing system the counting of paper bundles are done manually. The number of counted bundles is entered manually according to the variety of paper and thickness of the paper. The existing system is totally based on man power and time consuming.

III. PROPOSED SYSTEM

In the proposed system we introduce an automatic paper bundle counting system with automatic software entry. This system uses an ultrasonic sensor that senses the number of incoming paper bundle in the conveyer belt and sends the signal to the Arduino UNO. The number of paper bundles is made a software entry with respective date and time using node MCU.

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IV. HARDWARE REQUIREMENTS

V. A.ARDUINO

Arduino is an open source microcontroller board which designs and manufactures microcontroller kits to sense and control the objects in the physical environment. Arduino board consists of variety of microprocessors and microcontrollers. The arduino board is equipped with sets of analog and digital pins that may be interfaced with various expansions boards and circuits. Arduino Uno is a microcontroller board supported ATmega328P. It has 14 digital and 6 analog pins, 16MHz quartz crystal, a USB connection, a influence jack, an ICSP header and push button. It contains everything that supports microcontroller and it is connected to the computer using USB port. It is powered using ac-dc adapter or battery.

Fig 1A.rduino Uno

B. ULTRASONIC SENSOR

The ultrasonic sensor is used to determine the distance of an object using sound waves. It offers excellent range detection with high accuracy and stable readings from 2cm to 400cm or 1 to 13feet. The operation is not affected by any external factors. It send and receive ultrasonic pulses that relay back information about an object.

Fig 2 Ultrasonic sensor Technical Specifications

- ➢ Power Supply - +5V DC
- ➢ Quiescent Current - <2 mA
- ➢ Working Current – 15 mA
- ➢ Effectual Angle - <15 degree
- ➢ Ranging Distance – 2cm-400 cm/1-13ft
- ➢ Resolution – 0.3 cm
- ➢ Measuring Angle – 30 degree

C. BUZZER

Piezo buzzer is an electronic device which is used to produce sound. The construction of piezo buzzer is simple with light weight and low cost. Piezo buzzer is based on the inverse principle of piezo electricity and such materials are called piezo electric materials. These materials are naturally available or manmade.
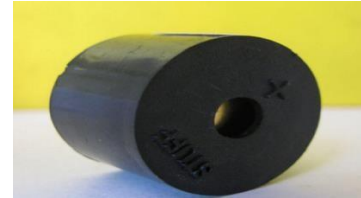

Fig 3.Buzzer

D. RELAY DRIVER

Relay is one of the most important electromechanical device, highly used in industrial automation. A relay is used for electronics to electrical interfacing that is used to switch on or off of electrical circuits that operates at high AC voltage using a low DC voltage. A relay consist of two parts, a coil which operates at rated Dc voltage and a mechanically movable switch. The electronics and electrical circuits are electrically separated and mechanically connected to each other, hence the fault on one side will not affect the other side.

Fig 4.Relay

E. MOTOR

The Dc motors featuring gears for the shaft to obtain the optimal performance characteristics. They are known as center shaft DC geared motors because their shaft extends through the center of their gear box assembly. However, using the motor outside this range will result in high temperature rises and deterioration of motor parts. If voltage is continuously applied to a motor in a locked rotor condition, the motor will heat up and fail in a relatively short time. Load torque can be determined by measuring the current drawn when the motor is attached to a machine whose actual load is known.
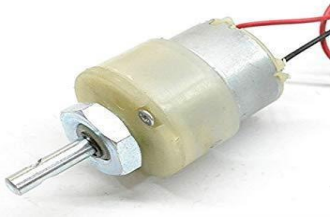
Fig 4. Motor

F. POWER SUPPLY

Power supply is referred as a source of electrical power. A device or system which supplies electrical energy to an output load is called as power supply unit or PSU. This term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others.

G. LCD DISPLAY

A liquid crystal display is an electronically- modulated optical device. It is often utilized in battery powered electronic devices because it uses very small amount of electric power. LCD consists of two glass panels. The common type of LCDs connected to the microcontrollers are 16x2 and 20x2 displays which means 16 characters per line by 2 lines and 20 characters per line by 2 lines.

Fig 6 LCD display

H. NODE MCU

Node MCU is an open source LUA based firmware and development kit that helps to prototype or built IoT products. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif system. The firmware uses the LUA scripting language.

Fig7. NodeMCU Development Board/kit

SOFTWARE REQUIREMENTS

A. ARDUINO IDE

The Arduino Integrated Development Environment contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects the Arduino and hardware to upload programs and communicate with them.

B. SAMPLE CODING FOR ANALYZER SECTION

```
#include<LiquidCrystal.h>
Const int rs=2,en=3,d4=4,d5=5,d6=6,d7=7; LiquidCrystal
lcd(rs,en,d4,d5,d6,d7); #define trigPin 8
#define echoPin 9
#define strigPin 10
#define swchoPin 11 const int buzzer=12; const int
motor=13; Void setup()
{

  Lcd.begin(16,2); pinMode(13,
  OUTPUT); PinMode(trigPin,
  OUTPUT); PinMode(echo.Pin,
  INPUT); pinMode(strigPin,
  OUTPUT);

  pinMode(sehoPin, INPUT); lcd,setCursor(0,0);
  lcd.print(" PAPER BUNDLE"); lcd.setCursor(0.1);
  lcd.print(" COUNT USING IoT"); delay(1000);
  pinMode(buzzer, OUTPUT); pinMode(motor, OUTPUT);
  digitalWrite(buzzer, HIGH); digitalWrite(motor, HIGH);
  Serial.begin(115200);
  }

Void loop()
{
Long duration, distance; digitalErite(trigPin, LOW);
delayMicrosecongs(2); digitalWrite(trigPin, HIGH);
delayMivroseconds(10); digitalWrite(trigPin, LOW);
duration=pulseIn(echoPin, HIGH); distance=
(duration/2)/29.1;
long sduration, sdistance; digitalWrite(strigPin, LOW);
delayMicroseconds(2); digitalWrite(strigPin, HIGH);
delayMicroseconds(10); digitalWrite(strigPin, LOW);
sduration=pulseIn(sechoPin, HIGH);
sdistance=(sduration/2)/29.1;
lcd.clear();
lcd.setCursor(0,0); lcd.print("SENSOR 1:");
lcd.print(distance); lcd.print("cm"); lcd.setCursor(0,1);
lcd.print("SENSOR 2:"); lcd.print(sdistance);
lcd.print("cm");
if((distance <= 30) && (distance >= 20) && ((sdistance <=
30) && (sdistance >=20)))
{
digitalWrite(motor, LOW); lcd.clear(); digitalWrite(buzzer,
LOW); lcd.setCursor(0,0);
lcd.print(" BUNDLE DETECTED");
delay(300);

digitalWrite(buzzer, HIGH); delay(1000);
String url= "1,1"; Serial.println(url); digitalWrite(motor,
HIGH);
}
Delay (1000);
}
```

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VII. WORKING PRINCIPLE

The Ultrasonic sensor is placed in the conveyer belt. The Arduino is connected with the Ultrasonic sensor. Arduino board uses a microprocessor to take input and give output. The Ultrasonic sensor senses the number of bundles in the conveyer belt. The sensor sends the signal to the Arduino UNO then it sends to the motor or relay. The node MCU gets the signal from the Arduino UNO and makes the software entry automatically according to the number of bundles sensed by the ultrasonic sensor. The count of the received bundles is entered in the software with the respective date and time. The sensor senses the incoming bundle in the conveyer belt and updates the number of bundles that are stored in the software. The paper bundle counting and automatic software entry saves the time and human power.
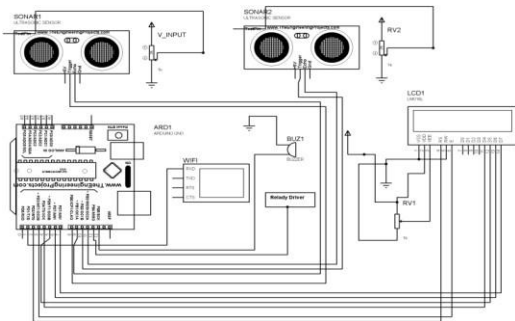
VIII. CONCLUSION

Every project work features a thought or purposes behind it. Our project might not promise to make the simplest machine but it certainly promises to be ready to use because the base for further development. The most feature of the project is its portability and adaptableness. Since it is implemented in small size this permits it to be portable and therefore the ability to handle very easily. The bundle of papers is counted and therefore the number of bundles counted is automatically entered in the software.

IX. REFERENCE

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