A
Project Report
On

Design and Implementation of Automatic Money Counting and Sorting System

Submitted to

Sant Gadge Baba Amravati University, Amravati

Submitted in partial fulfilment of
the requirements for the Degree of
Bachelor of Engineering in
Electronics and Telecommunication Engineering

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Certificate

This is to certify that the project report entitled **"Design and Implementation of Automatic Money Counting and Sorting System"** is hereby approved as a creditable study carried out and presented by

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Prof. M. L. Bhaiyya Project Guide	**Dr. G. S. Gawande** Prof. & Head, E & TC Dept.	**Dr. S. B. Somani** Principal

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Abstract

Money counting has been an issue for temple. Long ago, before the arrival of money counting machine, man has to count the money manually, and it is time consuming and tedious for those who handle the counting work. Mistakes on counting happen most of time due to many reasons: eyes tiredness, losing focus, and again new currency and previous currency of some notes causes confusion while sorting and etc. Alternative money-counting method can appear to be essential because an accurate money-counting is able to provide a quantitative output and time saving. In this paper, color sensor is used for detection of particular note. We are using At mega 328 microcontroller and various components like IR sensors, UV sensor, color sensor, dc motors and LCD display. Note is inserted into the system i.e. paper picking roller mechanism which is used in printer. First IR sensor will be used for detection of notes and then Color sensor will be used for detection of color of notes. Second IR sensor will be used for sorting mechanism. First motor will accept the note and note will be given for sorting mechanism. If in case note is fake then this will be detected by using UV sensor, then it will be given to the faulty compartment. For better output purpose we are using LCD display monitor so that we can get all the information simultaneously and in steady format. In short because of this project donation system will be easier.

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Acknowledgement

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Abbreviations

UV	- Ultra Violet
LCD	- Liquid Crystal Display
IR	-Infrared
LED	- Light Emitting Diode
μC	- Microcontroller
RGB	- Red Green Blue
DC	- Direct Current
RPM	- Revolutions Rer Minute

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Chapter 1

1. Introduction

This report is big solution on social problem which is mainly held at temple. In temples people donate money as per their wish. This donated money is collected at donation box. This donation box is available in all temples. When temple's trusty wants to calculate this money they are using manual method for calculation of money. It is time consuming and tedious for those who handle the counting work. Mistakes on counting happen most of time due to many reasons eyes tiredness, losing focus, rise corruption, fake money are added in calculation, it increases the man power. To overcome this problem we have designed this new system. In this system money are counted and sorted automatically. That's why we made money counting and sorting system. This system count the money as well as sort it one by one, by this the overall problem of Indian temples will be solved, as well as this system is useful for all over the country basically for temples. As we discussed above, the money counting is big issue now a days and no other system can solve this problem. Foreign country can solve counting problem not sorting, so because of that we made such system in that we count the money as well as sort it. Due to this system corruption in temples will be reduced as well as man power will be saved.

1.1 MOTIVATION:

As we visit different temples and public places we do notice a huge manpower and humongous amount of money spend on it while we as an engineer we must provide some most effective and efficient solution for this so we come up with implementing an Industrial IOT solution for this. We as of now we can say that it's near about like a blue print of big solution coming on its way. This is actually a very small but needed question to answer and so here we solved it with a automation tip. While for database management and other recovery management thinks we can use cloud platform to deploy it. So all thinks will get manage in cost effective way and yes it will prove to be great solution at the ground level.

1.2 OBJECTIVES:

The main aim behind this project is to count the money automatically as well as sort it.

- Basic object of this project is to design a sorting mechanism.
- Developing an economical and simple solution for the detection of notes.
- Create an system which will we used in each and every environment(socially).

1.3 SYSTEM OVERVIEW:

System comprises of components like different IR sensor, Color sensor, microcontroller, DC motor, LCD display etc.

- Arduino uno is used as a controller we have used.
- Color sensor to detect color of notes.
- IR sensor to detect presence of object or note.
- DC motor is used for the conveyor belt mechanism and sorting section
- LCD display is used for the proper monitoring on total count.

1.4 PROJECT OUTLINE:

IR sensor will be used for detection of notes in insertion section and then Color sensor will be used for detection of color of notes. Second IR sensor will be used for sorting mechanism. First motor will accept the note and note will be given for sorting mechanism. For better output purpose we are using LCD display monitor so that we can get all the information simultaneously and in steady format. In short because of this project temples donations system will be easier.

Chapter 2

2. Literature Review

Mohd. Syafarudy Abu & Lim Eng Aik "Visual Based Automatic Coin Counting System Using Neural Network." Institute Matematik Kejuruteraan, University Malaysia Perlis 02000 Kuala Perlis, Malaysia, 2009.

In this paper, we introduce a new intelligent coin-counting system, which is based on segmented image. There are two important issues in image processing, namely, feature extraction and method of understanding the image. The performance of our coin counting system showed a high accuracy which exceeds 90%. The improvement of image segmentation gives our system more accurate classification performance.

Thilan Cooray, Shehan Fernando "Visual-based Automatic Coin Counting System" Department of Mechatronics, Faculty of Engineering, South Asian Institute of Technology and Medicine (Saitm), Srilanka, 2011

In this paper a coin counting system has been developed based on basic image processing techniques such as color to gray image conversion, thresholding, filling holes in binary image. Classification of coins based on value was done by analyzing statistical properties and connected components.

In this paper, an intelligent coin identification system is presented. This system, abbreviated as ICIS, uses image preprocessing and neural network implementation to identify rotated coins. Image preprocessing is the first phase in ICIS and aims at providing meaningful representations of coin patterns while reducing the amount of data within images, thus reducing the computational and time costs. ICIS has been successfully implemented in this paper to identify the 2-EURO and 1-TLcoins.

Minoru Fukumi, Sigeru Omatu, "Rotation-Invariant Neural Pattern." Associate Member, IEEE, Member, IEEE, Fumiaki Takeda, and Toshihisa Kosaka with Application to Coin Recognition IEEE transactions on neural networks, vol. 3, no. 2, march 1992.

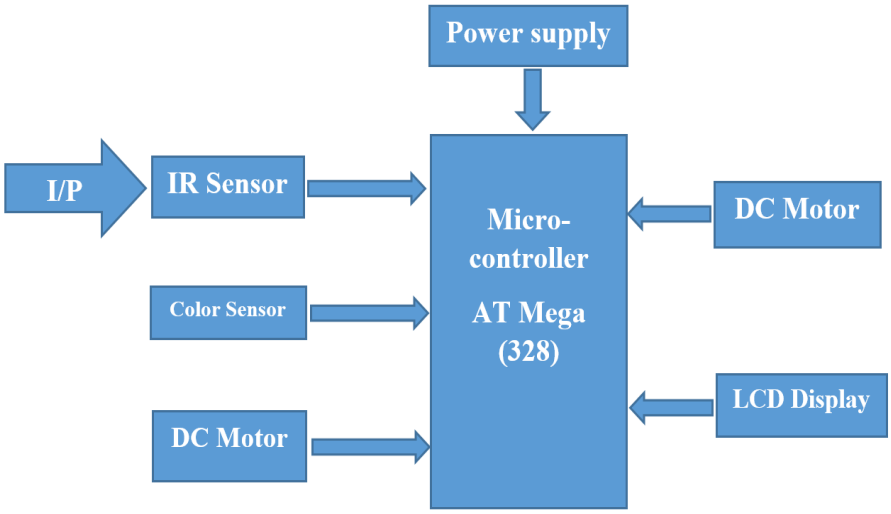
The rotation-invariant neural pattern recognition system presented in this paper shows good performance for coin recognition. The performance of the system changes little when the initial weights of the neuron units in the system change. With regard to real

implementation, the system would require the ability to discriminate more coins, as human can easily do.

Chapter 3

3. Methodology

3.1 Block Diagram



Block diagram contains controller Arduino-uno and other three devices connect with Arduino like IR sensor, color sensor, LCD display (16*2), UV sensor, DC motor, Sort motor.

Chapter 4

4. Components

4.1 Liquid Crystal Display (LCD) 16*2:

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals combined with polarizers. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and seven-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made from a matrix of small pixels, while other displays have larger elements. LCDs can either be normally on (positive) or off (negative), depending on the polarizer arrangement. For example, a character positive LCD with a backlight will have black lettering on a background that is the color of the backlight, and a character negative LCD will have a black background with the letters being of the same color as the backlight. Optical filters are added to white on blue LCDs to give them their characteristic appearance.

The HD44780U dot-matrix liquid crystal display controller and driver LSI displays alphanumeric, Japanese kana characters, and symbol. It can be configured to drive a dot-matrix liquid crystal display under the control of a 4 or 8-bit microcontroller. Since all the functions such as display RAM, character generator, and liquid crystal driver, required for driving a dot matrix liquid crystal display are internally provided on one chip, a minimal system can be interfaced with this controller/driver. A single HD44780U can display up to one 8-character line or two 8-character lines.

The HD44780U has pin function compatibility with the HD44780S which allows the user to easily replace an LCD-II with an HD44780U. The low power supply (2.7V to 5.5V) of the HD4470U is suitable for any portable battery-driven product required low power dissipation.

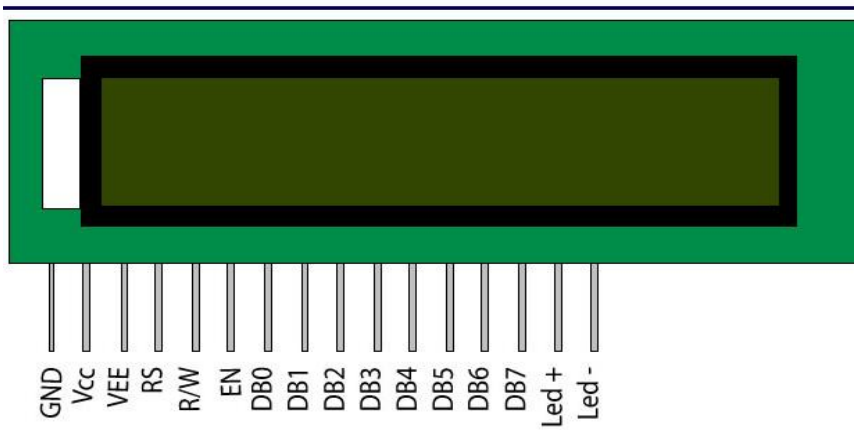


Figure 4.1 Liquid Crystal Display (LCD) 16*2

4.2 IR Sensor:

Features:

5VDC Operating voltage

I/O pins are 5V and 3.3V compliant

Range: Up to 20cm

Adjustable Sensing range

Built-in Ambient Light Sensor

20mA supply current

Mounting hole

Applications:

Obstacle Detection

Industrial safety devices

Wheel encoder

IR LED Transmitter :

IR LED emits light, in the range of Infrared frequency. IR light is invisible to us as its wavelength (700nm – 1mm) is much higher than the visible light range. IR LEDs have light emitting angle of approx. 20-60 degree and range of approx. few centimeters to several feets, it depends upon the type of IR transmitter and the manufacturer. Some transmitters have the range in kilometers. IR LED white or transparent in colour, so it can give out amount of maximum light.

Photodiode Receiver :

Photodiode acts as the IR receiver as its conducts when light falls on it. Photodiode is a semiconductor which has a P-N junction, operated in Reverse Bias, means it start conducting the current in reverse direction when Light falls on it, and the amount of current flow is proportional to the amount of Light. This property makes it useful for IR detection. Photodiode looks like a LED, with a black colour coating on its outer side, Black colour absorbs the highest amount of light.

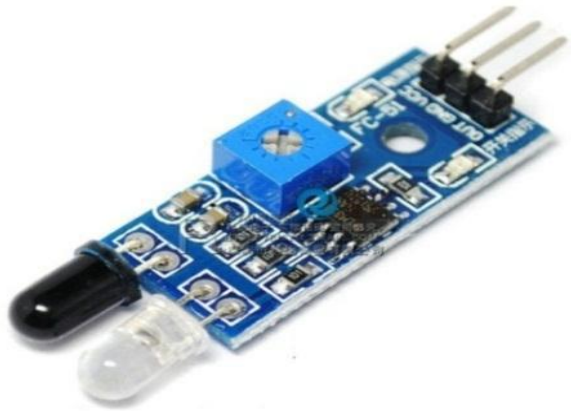


Figure 4.2 IR sensor

4.3 TCS3200 color sensor:

We see the world every day, filled with rich colors, have you ever wondered what actually colors are apart from visually feeling it. Well, colors are electromagnetic wave with different wavelengths. Red, Green, Blue has different wavelengths, human eyes are tuned to pick up these RGB colors, which is a narrow band from electromagnetic spectrum. But, we see more than red, blue and green; that's because our brain can mix two or more colours and gives out a new colour.

Specification **:**

Working voltage: 3V-5V

Breakout all IC TCS3200 PINS

VCC:3V-5V

GND:GND

S0-S3, E0,OUT: Communication interface

The better distance between the TCS3200 and the tested object is 1cm
Dimension: 3cm*2.7cm

The TCS3200 and TCS3210 programmable color light to frequency converters that combine configurable silicon photodiodes and a current-to-frequency converter on a single monolithic CMOS integrated circuit. The output is a square wave (50% duty cycle) with frequency directly proportional to light intensity (irradiance).The full-scale output frequency can be scaled by one of three preset values via two control input pins. Digital inputs and digital output allow direct interface to a microcontroller or other logic circuitry. Output enable (OE) places the output in the high-impedance state for multiple-unit sharing of a microcontroller input line. In the TCS3200, the light-to-frequency converter reads an 8 x 8 array of photodiodes. Sixteen photodiodes have blue filters, 16 photodiodes have green filters, 16 photodiodes have red filters, and 16 photodiodes are clear with no filters.

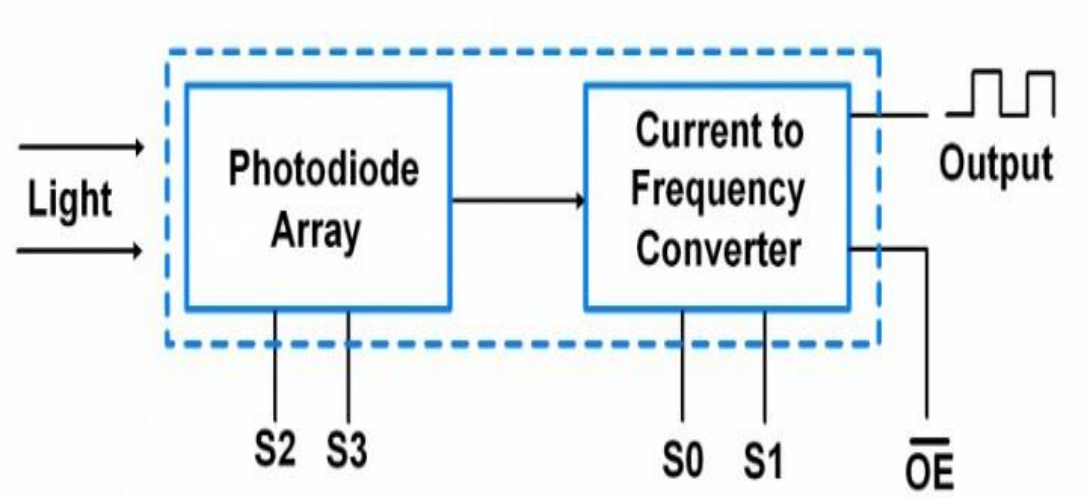


Figure 4.3 : Functional block diagram of colour sensor TCS3200

This project is used for detecting primary colors (red, green and blue, or RGB) colors that are physically available in LEDs in one package; for example, common cathode or common-cathode RGB LED. We can display primary colors and also generate specific colors by modifying the Arduino code. The project demonstrates the basic interfacing of TCS3200 sensor, Arduino Uno and common-cathode RGB LED.

Figure 4.4 Color sensor

As light from object strikes photodiode array, each filter allows only one color to pass through and blocks other colors. Then the current (I) output of these photodiode array is converted into frequency. This output is in the form of square wave. Change in input incident light, changes the current flow through photodiode due to which the frequency of the square waves changes. The output square wave frequency is later used to detect the RGB content of color to define object color. PinS2 and S3 are used to choose array of photodiodes (red, green, blue, clear). We can select the Scaling of frequency by using pins S0 and S1.

TABLE I
TERMINAL FUNCTIONS

Pin name	Pin number	I/O	Description
GND	4		Power supply ground. All voltages referenced to GND
$\overline{OE}$	3	I	Enable for fo (active low)
OUT	6	O	Output frequency (fo)
S0, S1	1, 2	I	Output frequency scaling selection inputs
S2, S3	7, 8	I	Photodiode type selection inputs
V_{DD}	5		Supply voltage (5V)

TABLE II
S0 AND S1 FUNCTIONS

S0	S1	Output Frequency (fo)
L	L	Power down
L	H	2%
H	L	20%
H	H	100%

TABLE III
S2 AND S3 FUNCTIONS

S2	S3	Photodiode type
L	L	Red
L	H	Blue
H	L	Clear
H	H	Green

4.4 DC motors:

A DC motor is an electric motor that runs on direct current power. In any electric motor, operation is dependent upon simple electromagnetism. A current carrying conductor generates a magnetic field, when this is then placed in an external magnetic field, it will encounter a force proportional to the current in the conductor and to the strength of the external magnetic field.It is a device which converts electrical energy to mechanical energy. It works on the fact that a current carrying conductor placed in a magnetic field experiences a force which causes it to rotate with respect to its original position. A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor. DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills. The advent of power electronics hasmade replacement of DC motors with AC motors possible in many applications.

Principle of DC Motor:

When a current carrying conductor is placed in a magnetic field, it experiences a torque and has a tendency to move. In other words, when a magnetic field and an electric field interact, a mechanical force is produced. The DC motor or direct current motor works on that principal. This is known as motoring action.

Motor Specifications

- Standard 130 Type DC motor
- Operating Voltage: 4.5V to 9V
- Recommended/Rated Voltage: 6V
- Current at No load: 70mA (max)
- No-load Speed: 9000 rpm
- Loaded current: 250mA (approx)
- Rated Load: 10g*cm
- Motor Size: 27.5mm x 20mm x 15mm

- Weight: 17 grams

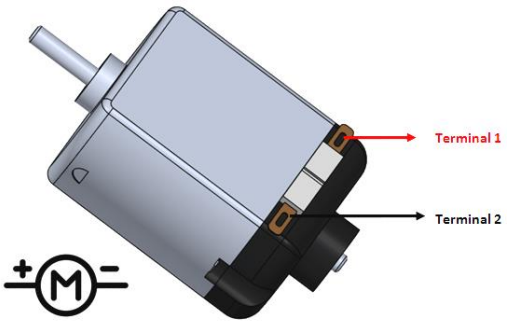


Figure 4.5 DC motor

4.5 Power Supply:

All power supplies have a power input connection, which receives energy in the form of electric current from a source, and one or more power output connections that deliver current to the load. The source power may come from the electric power grid, such as an electrical outlet, energy storage devices such as batteries or fuel cells, generators or alternators, solar power converters, or another power supply. The input and output are usually hardwired circuit connections, though some power supplies employ wireless energy transfer to power their loads without wired connections. Some power supplies have other types of inputs and outputs as well, for functions such as external monitoring and control.

4.6 Arduino UNO

"UNO" means one in Italian. Arduino UNO consists of Atmega 328, 8 bit microcontroller from AVR Family. The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, 16 MHz ceramic resonator, USB connections, power jack, ICSP header , and reset button. It contains everything needed to support the microcontroller; simply connect to a computer with a USB cable or power it is with a AC-to-DC adapter or battery to get started. Arduino does provide flexibility to designer for developing industrial grade devices for automation and security and lots more.

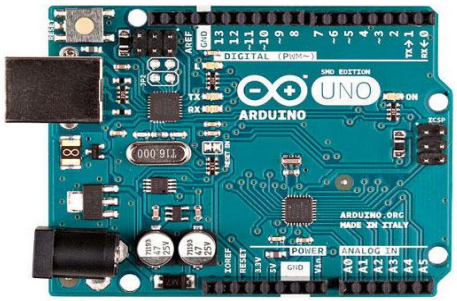
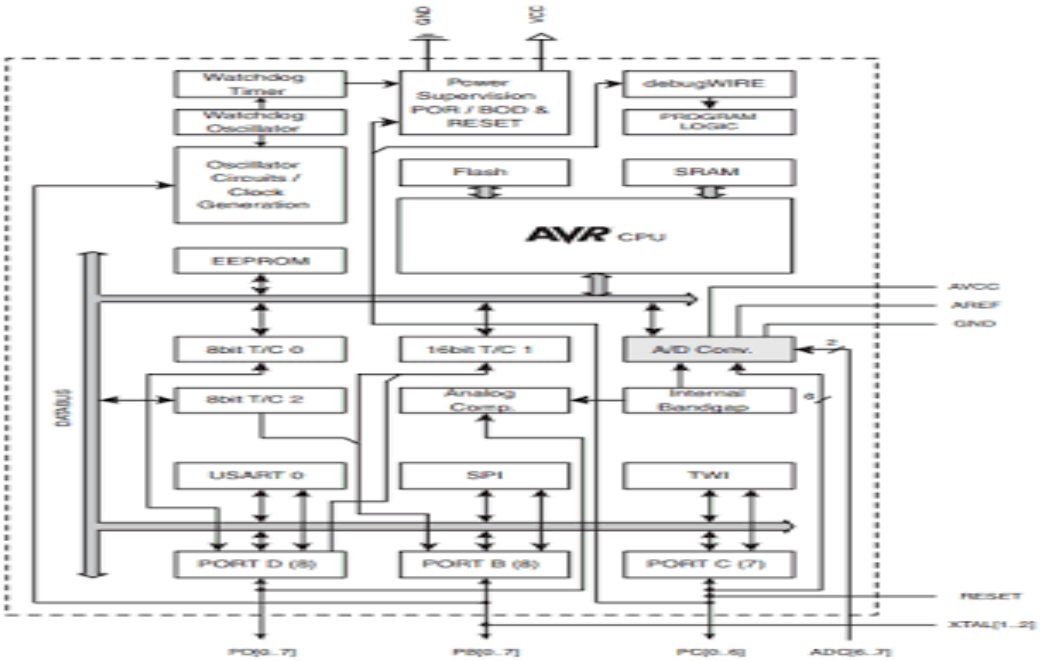


Figure 4.6 Arduino UNO

Figure 4.7 ATmega 328

ATmega328 is commonly used in many projects and autonomous systems where a simple, low-powered, low-cost micro-controller is needed[citation needed]. Perhaps the most common implementation of this chip is on the popular Arduino development platform, namely the Arduino Uno and Arduino Nano models.

ATmega328 Architecture :



Parametrics

Name	**Value**
Program Memory Type	Flash
Program Memory Size (KB)	32

CPU Speed (MIPS/DMIPS)	20
SRAM (B)	2,048
Data EEPROM/HEF (bytes)	1024
Digital Communication Peripherals	1-UART, 2-SPI, 1-I2C
Capture/Compare/PWM Peripherals	1 Input Capture, 1 CCP, 6PWM
Timers	2 x 8-bit, 1 x 16-bit
Number of Comparators	1
Temperature Range (°C)	-40 to 85
Operating Voltage Range (V)	1.8 to 5.5
Pin Count	32

Chapter 5

5. Experimental Setup

5.1 Flow of Project:

The block diagram of our project can be divided into two sections:

5.1.1 Insertion Section: - It consist of,

- 1. IR Sensors
- 2. Color Sensor
- 3. DC Motor

5.1.2 Sorting Section: - It consist of,

- 1. DC Motor
- 2. LCD Display

In insertion section where we insert currency note manually, we developed a conveyor belt mechanism using DC motor as shown above which carries note up to colour sensor. At this place where actual detection process is performed by colour sensor. Depending on colours of the notes colour sensor detects the RGB values of notes and by performing some calculations as per the program of the project. After detecting the note conveyor belt move note forward to the sorting section.

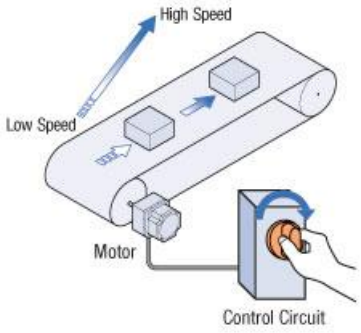


Figure 5.1 conveyor belt mechanism

We design sorting section also with DC motor 3000 rpm and there are 4 sections for 50, 100, 200 and 500 rs of notes respectively. We did calculations for each compartments of notes with the help of revolutions per min capacity of the motor. Initially 50rs compartment is in front of the conveyor belt. In below diagrams sorting section is shown roughly but in our project the sorting section have only four compartments.

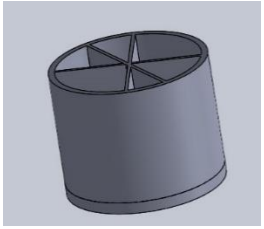


Figure 5.2 Side view of sorting section

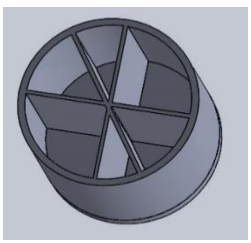


Figure 5.3 Top view of sorting section

Initially sorting section is at 50rs position. If 50rs note is detected, program forward our 50rs note directly into 50rs compartment by keeping conveyor belt moving. If detected note is of 100 rs , 100 rs compartment needs to move in front clockwise similarly if detected note is of 200 rs , 200 rs compartment needs to move in front anticlockwise and for 500 rs note, 500rs compartment should be in front. We can rotate in both anticlock and clockwise for half revolution so that 500rs compartment will come in front. Below block diagram give idea about how it works actually.

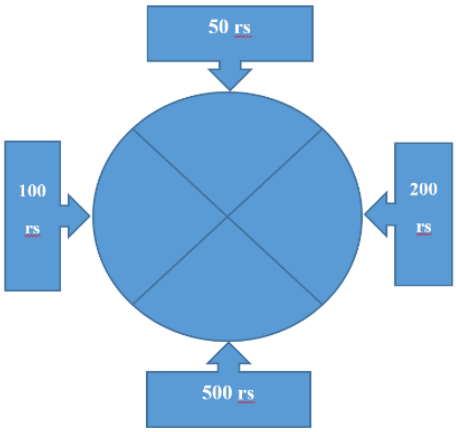


Figure 5.4 2d view of sorting section

5.2 HARDWARE SETUP:

This project consist of various working blocks

1. Power Section(2 pin base).
   Battery/adapter connection (12v supply)
   Push button/switch
   Capacitor 1K microF (25v)
   IC 7805 is used to convert 12v to 5v – 3 terminals (input,ground,output).
   Resistor(270 ohm) to protect LED.

2. Processing unit
   Atmega 328 of (32kbs flash memory)
   Crystal oscillator of (16MHz) attached to minimize external frequency

3. 16*2 LCD

4. 2DC Motors of 10RPM each is attached to drive converyer belt and the sorting section.

IC 7805 Voltage Regulator :

IC 7805 is a 5V Voltage Regulator that restricts the output voltage to 5V output for various ranges of input voltage. It acts as an excellent component against input voltage fluctuations for circuits, and adds an additional safety to your circuitry. It is

inexpensive, easily available and very much commonly used. With few capacitors and this IC you can build pretty solid and reliable voltage regulator in no time. A Circuit diagram with pinout is given. It also comes with provision to add heatsink.

The maximum value for input to the voltage regulator is 35V. It can provide a constant steady voltage flow of 5V for higher voltage input till the threshold limit of 35V. If the input voltage is near to 7.2V to 12V then it does not produce any heat and hence no need of heatsink. Higher the input volts - the more it gets heated up, and excess electricity is liberated as heat from 7805. Hence the provision of heatsink. IC7805 also comes as smaller SMD component as well.

Important features of the 7805 IC :

It can deliver up to 1.5 A of current (with heat sink).

Has both internal current limiting and thermal shutdown features.

Requires very minimum external components to fully function.

Advantages:

7805 voltage regulator ic does not require any component to balance or saturate their output voltage.

The 7805 ic has built-in protection from the high current. There is a heat-sink with the common ground connected with which is helpful in order to prevent our regulator ic from overheating and short-circuits making it uncompromising in the most application.

5.3 WORKING:

IR sensor

This IR sensor have Tx and Rx which basically works on the principle of transmitting and reciving and the infrared signal whenever there is change in the signal output

This sensor is placed in our setup so as to detect the note insertion

It consists of 3 pins vcc, GND, output connected to micro controller

Power section

This is customized section designed to power according to need of each hardware

So, firstly we have ON/OFF button to a capacitor of 1000microF 25v it acts as an filter

To, drive LCD, sensor we need 5v supply and so we attached IC 7805 to convert 12v to 5v supply.

It consist of 3 terminlas – input ,GND ,output

We designed PCB

According to our need we customized the PCB while making connection without PCB there were total 25 wires poping out and so we designed PCB

The Brain of the Processing

Atmega 328 plays a vital role in proceesing of data it comes with a dynamic features of (32kb's flash memory).it have 3 ports PORT B, PORT C , PORT D.

We have given a supply of 5v to Atmega 328 and to maintain external frequency crystal oscillator (16MHz) this is basically done to make the setup of micro controller work as given in data sheet. The power supply is provided a capacitor of 1000 microF to withstand the fluctuation.

Output Monitoring

By 16 * 2 LCD display we can monitor the data

10 RPM DC motor is provided to move conveyer belt and sorting section. The conveyer belt is in the insertion section while the 2nd DC motor is attached at the bottom of sorting section.

To drive the motor we need more current in amperes and so the motor driver IC L290 is used to amplify two motor interfaced. it is 16 pin IC so it makes it work at 1.2AMP.

Example: If 200rs of note is get detected by insertion section and moved forward for sorting, if we have already declared that there will be a 30 degree of rotation for a 200rs note then as per our predefined input, sorting section will rotate for 30 degree and the 200rs for note is get collected in that 200rs of compartment. Similarly it will work for all the input notes of indian currency.

Chapter 6

6. Program

```
#include <LiquidCrystal.h>
Liquid Crystal lcd (13,12,11,10,9,A0);
#define S0 4;
#define S1 5;
#define S2 6;
#define S3 7;
#define sensorout 8;
int Rfrequency = 0;
int Gfrequency = 0;
int Bfrequency = 0;
int R=0;
int G=0;
int B=0;
void setup()
{
        PinMode (A5, Output); digitalwrite(A5,low);
        PinMode (A4, Output); digitalwrite(A4,low);
        PinMode (A3, Output); digitalwrite(A3,low);
        PinMode (A2, Output); digitalwrite(A2,low);
        PinMode (S0,Output);
        PinMode (S1,Output);
        PinMode (S2,Output);
        PinMode (S3,Output);
        PinMode (sensorOut, input);
        Lcd.begin (16,2);
Lcd.setcursor(0,0);
Lcd.print (“ note sorting”);
```

```
Lcd.set Cursor (0.1):
Lcd.print (“Not Sorting):
Lcd.set Cursor (0.1):

Lcd.print (“  Syst. ”):
// Setting frequency-scaling to 20%
Digitalwrite (S0 HIGH):
Digitalwrite (S1 LOW):
Delay (2000):
Lcd.clear ()
}
Intx=0, Two=0, One=0, Five=0, F=0
Void loop ()
{
R=0; G=0; B=0;
If analogRead (A1) < 400)
{
Delay (2000):
If analogRead (A1) < 400)
{
x=1
lcd.set cursor (0, 0);
lcd.print (“Note Detected”);
Digitalwrite (A5, HIGH);
Digitalwrite (A4, LOW);
Delay (3500);
Digitalwrite (A5, LOW);
Digitalwrite (A4, LOW);
Delay (500);
Lcd.clear ();
}
```

```
}
Int v=0
While  (x ==1)
{
While (v<3)
{
For (int i=0; i<18; i++)
{
// Setting Red filtered photodiodes to be read
Digitalwrite (S2, LOW);
Digitalwrite (S3, LOW);
// Reading to output frequency
Rfrequency = Pulse In (SensorOut, LOW);
Delay (30);
Setting Green filtered photodiodes to be read
Digitalwrite (S2, HIGH);
Digitalwrite (S3, HIGH);
// Reading to output frequency
Gfrequency = Pulse In (SensorOut, LOW);
Delay (30):

Setting Blue filtered photodiodes to be read
Digitalwrite (S2, LOW);
Digitalwrite (S3, HIGH);
// Reading to output frequency
Bfrequency = Pulse In (SensorOut, LOW);
Delay (30):
R=R+Rfrequency: G=G+Gfrequency: B=B+Bfrequency:
}
Lcd.setCursor(0, 0; lcd.Print (“                    “);
R=R/18; G=G/18; B=B/18;
```

```
Lcd.setCursor (0, 0); lcd.print (R);
Lcd.setCursor (6 0); lcd.print (G);
Lcd.setCursor (12, 0); lcd.print (B);
V=v+1;
}
If (R>63 && R < 75 && G > 93 &&  G < 105 && B > 68 && B < 80)
{
Lcd.setCursor (0, 1); lcd.print (" 200/- Rs Note  ");
Delay (500);
Two=two+1;
Digitalwrite (A3, HIGH); Digitalwrite (A2, LOW); delay (1350); // bottom rotation
Digitalwrite (A3, LOW); Digitalwrite (A2, LOW); delay (500); // bottom rotation stop
Digitalwrite (A5, HIGH); Digitalwrite (A4, LOW); delay (8500);
Digitalwrite (A5, LOW); Digitalwrite (A4, LOW); delay (500);
Digitalwrite (A3, LOW); Digitalwrite (A2, HIGH); delay (1380); // bottom rotation
Digitalwrite (A3, LOW); Digitalwrite (A2, LOW); delay (500); // bottom rotation stop
X=0; lcd.clear ();
}
Else if If (R>80 &&  R < 95 &&  G > 105 &&  G < 130   && B > 75 &&  B < 90)
{
Lcd.setCursor (0, 1); lcd.print (" 100/- Rs Note  ");
Delay (500);
One=One+1;
Digitalwrite (A3, HIGH); Digitalwrite (A2, LOW); delay (2650); // bottom rotation
Digitalwrite (A3, LOW); Digitalwrite (A2, LOW); delay (500); // bottom rotation stop
Digitalwrite (A5, HIGH); Digitalwrite (A4, LOW); delay (8500);
Digitalwrite (A5, LOW); Digitalwrite (A4, LOW); delay (500);
Digitalwrite (A3, LOW); Digitalwrite (A2, HIGH); delay (2700); // bottom rotation
Digitalwrite (A3, LOW); Digitalwrite (A2, LOW); delay (500); // bottom rotation stop
X=0; lcd.clear ();
}
```

```
Else if If (R>75 &&  R < 90&&  G > 95 &&  G < 110   && B > 73 &&  B < 90)
{
Lcd.setCursor (0, 1); lcd.print (“ 500/- Rs Note  “);
Delay (500);
Five=Five+1;
Digitalwrite (A2, HIGH); Digitalwrite (A3, LOW); delay (1400); // bottom rotation
Digitalwrite (A3, LOW); Digitalwrite (A2, LOW); delay (500); // bottom rotation stop
Digitalwrite (A5, HIGH); Digitalwrite (A4, LOW); delay (8500);
Digitalwrite (A5, LOW); Digitalwrite (A4, LOW); delay (500);
Digitalwrite (A2, LOW); Digitalwrite (A3, HIGH); delay (1380); // bottom rotation
Digitalwrite (A3, LOW); Digitalwrite (A2, LOW); delay (500); // bottom rotation stop
X=0; lcd.clear ();
}
Else if If (R>70 &&  R < 90 &&  G > 90 &&  G < 100   && B > 60 &&  B < 73)
{
Lcd.setCursor (0, 1); lcd.print (“ 50/- Rs Note  “);
Delay (500);
F=F+1;
Digitalwrite (A5, HIGH); Digitalwrite (A4, LOW); delay (8500);
Digitalwrite (A5, LOW); Digitalwrite (A4, LOW); delay (500);
Digitalwrite (A3, LOW); Digitalwrite (A2, LOW); delay (500); // bottom rotation stop
X=0; lcd.clear ();
}
Else    {
        Lcd.setCursor (0, 0); lcd.print (“ 200-100-50-500 ”);
        Lcd.setCursor (1, 1); lcd.print (“ Two  “);
        Lcd.setCursor (5, 1); lcd.print (“ One  “);
        Lcd.setCursor (9, 1); lcd.print (“ Five  “);
        Lcd.setCursor (14, 1); lcd.print (“ F  “);
        }
}
```

Chapter 7

7. Image

Chapter 8

8. Advantages

- By counting some mistake can happen that will reduce by using this system.
- It saves manpower because it systematically counts the notes and sorts it too.
- It helps to reduced corruption by detecting the illegal currency.
- It saves time.

Chapter 9

9. Summery

By taking care of today, it is important to reduce corruption as much as possible by taking one small step towards it. So that we are introducing „Automatic money counting and sorting system". It is very much helpful for temples and other places where people can donate the money. It reduces manpower, reduces corruption. So by taking care of all the above problems we have developed this system.

Chapter 10

10. Conclusion

In this project we are introducing money counting and sorting system using color sensor. This is one of the big step towards Digital India. Whole operation of this system is performed digitally. For this we are using Aurdino. The designed system for digital donation boxes will save lots of human efforts and time and also it tends to decrease any possibility of corruption and miscalculation in note counting. Due to the use of Electronics technology for the calculation it stores all the data regarding to the calculation because it has its own data sorting memory. This is big improvement in the calculation. By using this facility corruption will be reduced and another big benefit of this system is to detect the fake note by using special detection sensor i.e. UV Sensor. This system saves the man power and increase the accuracy in calculation.

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