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Note to Coin Converter Using Digital Image Correlation Technique in Image Processing

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Abstract - *The need of coins has been increased nowadays. We require coins at various public places regularly in our daily lives. Places such as petrol pumps, bus stops, railway station, malls, parking spaces, parks and even in rural areas coins are extensively used. Use of coins has been increased more instead of note in various places thus a system which will give us coins in exchange of notes using image processing will turn out to be very useful.*

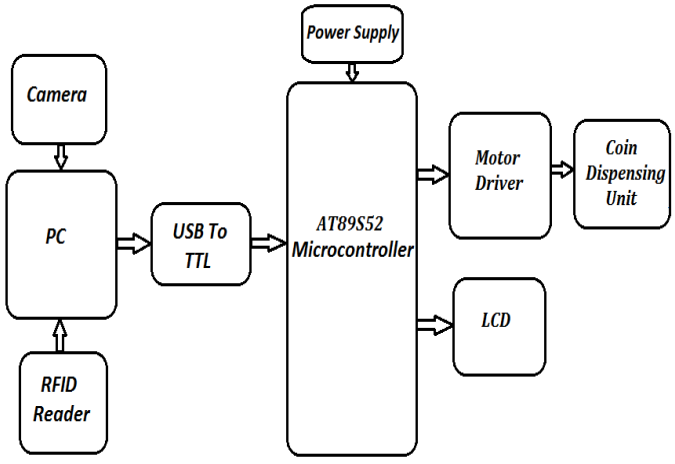
Key Words: **Note To Coin Converter, Image Processing, MATLAB, Digital Image Correlation.**

1. INTRODUCTION

As we require coins at many public places and quite often we don't have the required change, a system that will give us coins in exchange of note will be of great use.

The note to coin converter will check the originality of note using image processing technique. The preferable technique to use would be digital image correlation technique. The note is detected using MATLAB algorithm and the result is given to the microcontroller which will turn on the respective relays and motors of coin dispensing unit. The user will use a keypad to select how many coins of what value are needed.

Using a coin dispensing unit, coins will be provided to the user. The microcontroller will operate the DC motors to Provide the coins.



2. ARCHITECTURE

2.1 Camera

The note should be placed in a dedicated slot where a camera will take a picture of it. The background should be dark so that the note will be clearly distinguished from the background. The picture will be further converted into a frame. The frame will be sent to the MATLAB for preprocessing. The camera should take a clear picture so that the MATLAB processing will be accurate.

2.2 Computer

The computer will use MATLAB to compare the image of the note with the image of the note stored in the database. The digital image correlation technique will be used to compare the two images. In image correlation technique each aspect of the note is compared with the image in the database. If the two images match then the note will be considered as real.

2.3 USB to TTL

The USB to TTL Serial cables are used to provide connectivity between USB and serial UART interfaces. The computer is connected to the microcontroller using a USB to TTL. Once the computer authenticates the entered note, it will command the microcontroller using USB to TTL to perform the required operation. Drivers must be installed on the computer so that the computer will be able to detect and process the data signals.

2.4 RFID Reader

Passive RFID tags does not have internal power source. A passive RFID transponder consists only of a microchip and an antenna. The two are together called as an RFID inlay.

Passive tags wait for a signal from an RFID reader. Once the tag is within range of the RFID reader, the RFID tag's antenna draws energy from the electromagnetic waves. Once the tag's microchip is powered, it transmits a signal.

The change in the electromagnetic wave is detected by the reader's antenna which interprets the information. The antennas in both the tag and reader must be within several meters of each other. The read range depends on several factors such as the equipment settings, transmit frequency, and environmental factors.

The passive RFID tag will be used at the administrative end. It will provide access to enter new coins in the coin stack.

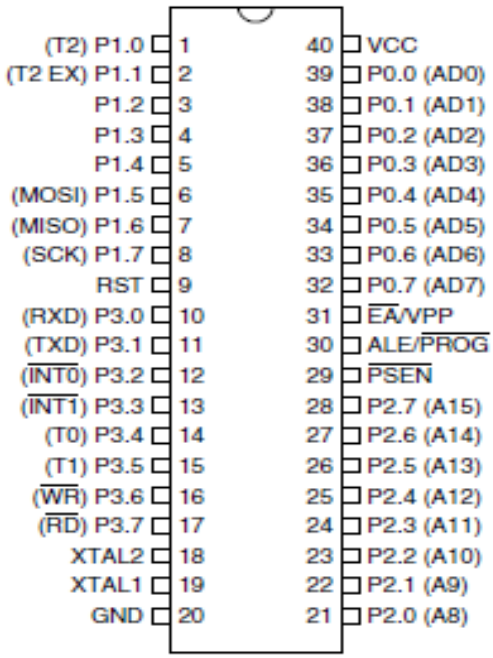
Passive RFID tags generally operate at three frequencies:

- Low Frequency- 125 kHz to 134 kHz
- High Frequency- 13.56 MHz
- Ultra High Frequency- 856 MHz to 960 MHz

2.5 Microcontroller

The microcontroller we are using is AT89C2052. The microcontroller will operate the coin dispensing unit along with the DC motors and LCD. The keil software will be used to burn the program into the microcontroller.

The AT89S52 is a 40 pin, low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory.



2.6 Power Supply

The power supply converts A.C into D.C, and also provides output voltage of 5 volts, 1 amp. The important components of the power supply are:

•TRANSFORMER:

It transforms the voltage level from one level to another. Transformer used is the step down transformer

•RECTIFIER:

The rectifier is used to convert A.C to D.C voltage. We have used a bridge rectifier.

•FILTER:

A filter circuit is a device, which removes ac component of rectified output but allows the dc component to reach the load.

•REGULATOR:

A voltage regulator is a circuit that supplies a constant voltage regardless of changes in load current. We have used IC7805 as the regulator.

2.7 LCD

LCD stands for Liquid Crystal Display. It is a display module and is widely used. A 16x2 LCD display is used in various devices and circuits. LCDs are economical, easily programmable and can even display special & custom characters..A 16x2 LCD means it can display 16 characters per line and there are 2 lines. Here each character is displayed in 5x7 pixel matrix.

The LCD will be used for user interaction. The authenticity of the note and the number of coins left in the coin stack will be displayed through LCD.

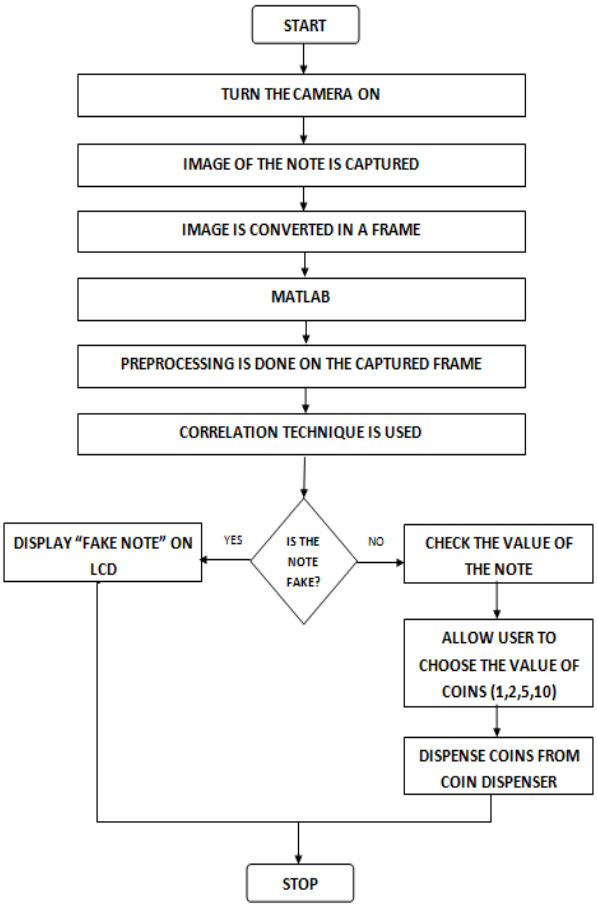
2.8 Motor Driver

L293D is a Motor driver or Motor Driver IC. It allows DC motor to drive on either direction. L293D is a 16-pin IC. It can control a set of two DC motors simultaneously in any direction. That means you can control two DC motor with a single L293D IC.

2.9 Coin Dispensing Unit

Sample The coin dispensing unit will consist of 4 trays containing coins of 1 rupee, 2 rupee, 5 rupee, 10 rupee. DC motors will be used to dispense coins out of the system .If the coins are not sufficient the LCD will display "Insufficient coins".

3. FLOWCHART



3. CONCLUSION

This is an efficient system which provides us coins in exchange of notes and reduces the human effort. The system uses a camera and a computer to recognize the note and authenticate it using MATLAB. The note to coin converter can be used at various public places such as petrol pumps, malls, parks and parking spaces, etc.

4. FUTURESCOPE

The system can be further designed in a manner such that it will provide us Indian currency in exchange of foreign currency. It will function as an excellent currency exchange system.

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