Fuel Automation Using Currency Recognition

Prof. Shilpa Sonawane,Sandeep Kore,Vinita Halwane, Priyanka Kothawade.

Department of Electronics and telecommunication Engineering,

JSPM's Rajarshi Shahu College of Engineering, Tathawade, Pune-33.

Abstract : As increase in the technology like scanning, colour printing and duplicating because of that there is increase in counterfeit problem. This paper develops a new technique for fuel automation using currency recognition. This system is based on fake currency note detection technique using feature extraction with HSV (Hue, Saturation, and Value) colour space.

IndexTerms: fake currency, counterfeit detection, feature extraction.

I. INTRODUCTION:

Manual testing of all notes in transactions is very time consuming and also there is a chance of tearing while handing notes. Therefore Automatic methods for bank note recognition is require in many applications such as automatic selling-goods and vending machines. Extracting sufficient characteristics from the currency image is essential for accuracy and robustness of the automated system. This is a challenging issue to system designers .Automatic method for detection of fake currency note is very important in every country.

Currency is used as a medium of exchange for goods and services. Human error is huge concern in cases where large amount of cash transactions are conducted. Notes with the legal sanction of the government possess certain security features such as Intaglio printing, fluorescence and watermark as seen in fig.1.

Figure.1.Indian bank note with security feature marked.

A. Water Marking

Mahatma Gandhi watermark is visible in the left panel when seen against a light. This is detected using a white Backlight in the scanning system. The ROI of a counterfeit note will have a different mean pixel intensity as well as standard deviation than that of the reference values, indicating its validity.

B. Identification Mark

Each note has its special identification mark. There are different shapes of identification mark for different denominationsuch as Rs.100-triangle, Rs.200-H symbol, Rs.500-circle, Rs.2000-rectangle. The identification mark is present on the left of watermark. Older system were not reliable enough for fuel automation using currency detection technique. The mainaim of this project is to check to the currency and supply the fuel according to specific currency and display the status. The system brings the new quality in fuel automation:

- Time saving,
- Flexibility,
- Accuracy,
- Efficiency.

II. LITRATURE SURVEY :

After analyzing the requirements of the task to be performed, the next step is to analyze the problem and understanding its context. The first activity in the phase is studying the existing system and other is to understand the requirements and domain of the new system. Both the activities are equally important, but the first activity serves as a basis of giving the functional specifications and then successful design of the proposed system. Understanding the properties and requirements of a new system is more difficult and requires creative thinking and understanding of existing running system is also difficult, improper understanding of present system can lead diversion from solution. The proposed design involved the following research paper analysis:

A. "Design and Implementation of Paper Currency Recognition with Counterfeit Detection" in IEEE conference in Nov, 2016 consist of advancement of technology over the recent past has led to an increase in circulation of counterfeit notes in today's economy. To combat this issue, it is essential that there exists an efficient mechanism to detect fake banknotes. The main problem with current systems is the trade-off between speed and complexity. This paper proposes a system that can classify and subsequently verify Indian paper currency using fundamental image processing techniques. It uses the comparison between the input banknote and the calculated reference values for different parameters of original banknotes in a similar environment. This system maintains its simplicity while still having high accuracy of 100% for classification and 90% for validity verification.

B. "NFC Identification System for Fuel Dispensing Control on Petrol Station" in IEEE conference July, 2013 this paper presents the identification system for automation of company petrol stations. The system is based on NFC technology with Mifare 1K contactless cards as identifiers. The system facilitates control and optimizes fuel consumption of company vehicles. It is designed to facilitate recording and control of the process as well as allow filling without the presence of the operator. The system is realized and mounted at the petrol-station of the Ministry of the Interior, Republic of Montenegro.

C. "Automatic Recognition of Fake Indian Currency Note" in IEEE conference Dec, 2016 in this paper, the automatic system is designed for identification of Indian currency notes and checks whether it is fake or original. The automatic system is very useful in banking system and other field also. In India increase in the counterfeit currency notes of 100, 500 and 1000 rupees. As increase in the technology like scanning, color printing and duplicating because of that there is increase in counterfeit problem. In this paper, recognition of fake Indian currency notes is done by using image processing technique.

D. "Feature Extraction for Paper Currency Recognition", in IEEE conference Feb, 2007 this paper develop a new technique for paper currency recognition. In this technique, three characteristics of paper currencies including size, color and texture are used in the recognition. By using image histogram, plenitude of different colors in a paper currency is computed and compared with the one in the reference paper currency. The Markov chain concept has been employed to model texture of the paper currencies as a random process. The method proposed in this paper can be used for recognizing paper currencies from different countries. In this method, using only one intact example of paper currency from each denomination is enough for training the system. We tested this method on more than 100 denominations from different countries, and the system was able to recognize 95% of data, correctly.

III. THE SYSTEM DISCRIPTION :

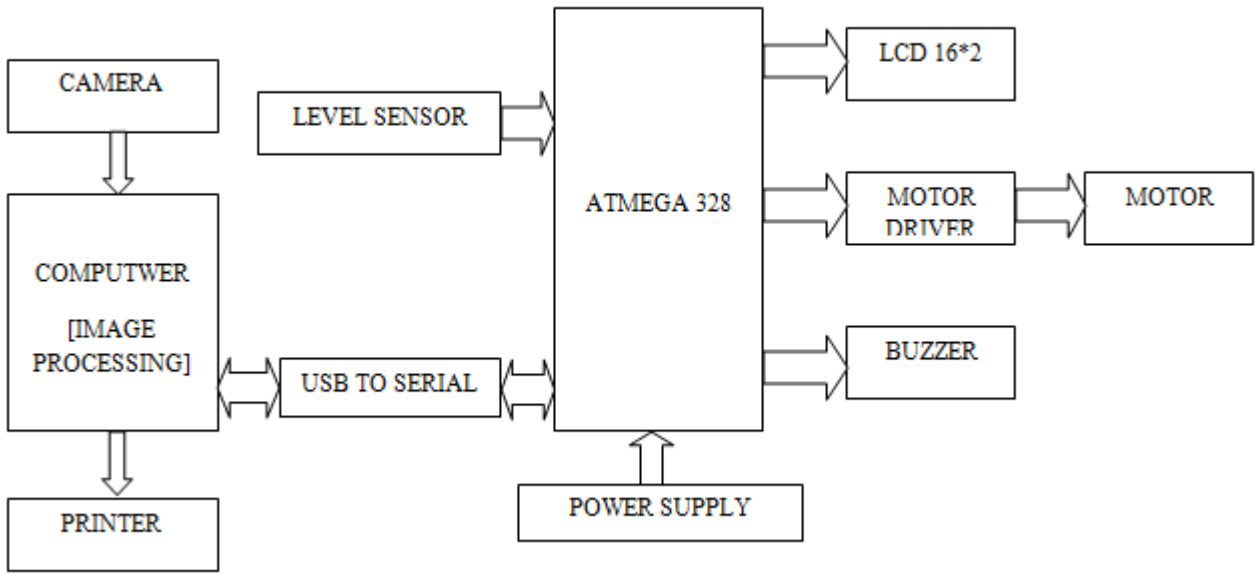

Figure 2. Block diagram of fuel automation system using currency recognition.

The system consists of:

Camera:-

A camera is an optical instrument for recording or capturing images, which may be stored sequences of images constituting videos or movies.In our case camera is connected with the PC via USB interface.

Printer:-

In computing, a printer is a peripheral device which makes a persistent human-readable representation of graphics or text on paper or similar physical media. In our case this printer action will be controlled via MATLAB interface. It will be used to print the receipt for the fuel transaction.

ATmega328 MCU:-

The Atmel 8-bit AVR RISC-based microcontroller combines 32 KB ISP flash memory with read-while- write capabilities, 1 KB EEPROM, 2 KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6- channel 10-bit A/D converter, programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughputs approaching 1 MIPS per MHz

In our case this microcontroller will communicate with the PC with regard to the currency value and its fake nature and control the timings of fuel motor, buzzer and it will also display the status to LCD display via its Digital interface

LCD Display:-

LCD 16 x 2 display module which including 16 characters by 2 lines.This module is having built in controller with 5V power supply default 4/8-bit parallel interface mode. There are yellow LED back light available in this module. This LCD will be used to display the currency value and live transaction status.

Motor Driver:-

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal. This higher current signal is used to drive the motors.

L293D contains two inbuilt H-bridge driver circuits. In its common mode of operation, two DC motors can be driven simultaneously, both in forward and reverse direction. The motor operations of two motors can be controlled by input logic at pins 2 & 7 and 10 & 15. Input logic 00 or 11 will stop the corresponding motor. Logic 01 and 10 will rotate it in clockwise and anticlockwise directions, respectively.

Enable pins 1 and 9 (corresponding to the two motors) must be high for motors to start operating. When an enable input is high, the associated driver gets enabled. As a result, the outputs become active and work in phase with their inputs. Similarly, when the enable input is low, that driver is disabled, and their outputs are off and in the high-impedance state.

Motor:-

This motor will be used to control the fuel dispense from the tank. This will be controlled via microcontroller using motor driver. It works on 12 Volt and 1 amp. The type of motor will be DC.

Buzzer:-

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. In our case it will be activated in case the currency is fake for the multiple times. Initially the currency is captured using camera then it is given to the PC in which we are using image processing for currency detection. Level sensor is used for measuring the level of fuel. For communication between PC and hardware, USB to serial converter is used. LCD is used to display the notification of currency whether it is real or fake. If real then motor driver drives the motor for the fuel supply for specific currency and this receipt is given by printer and if currency is fake then buzzer continuously beeps.

IV. FLOWCHART

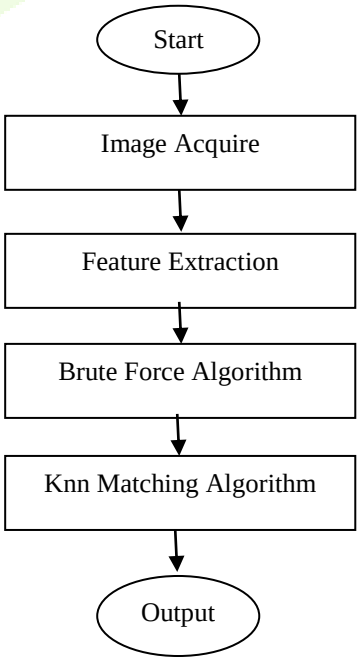

Figure 3. Flowchart for Currency Recognition

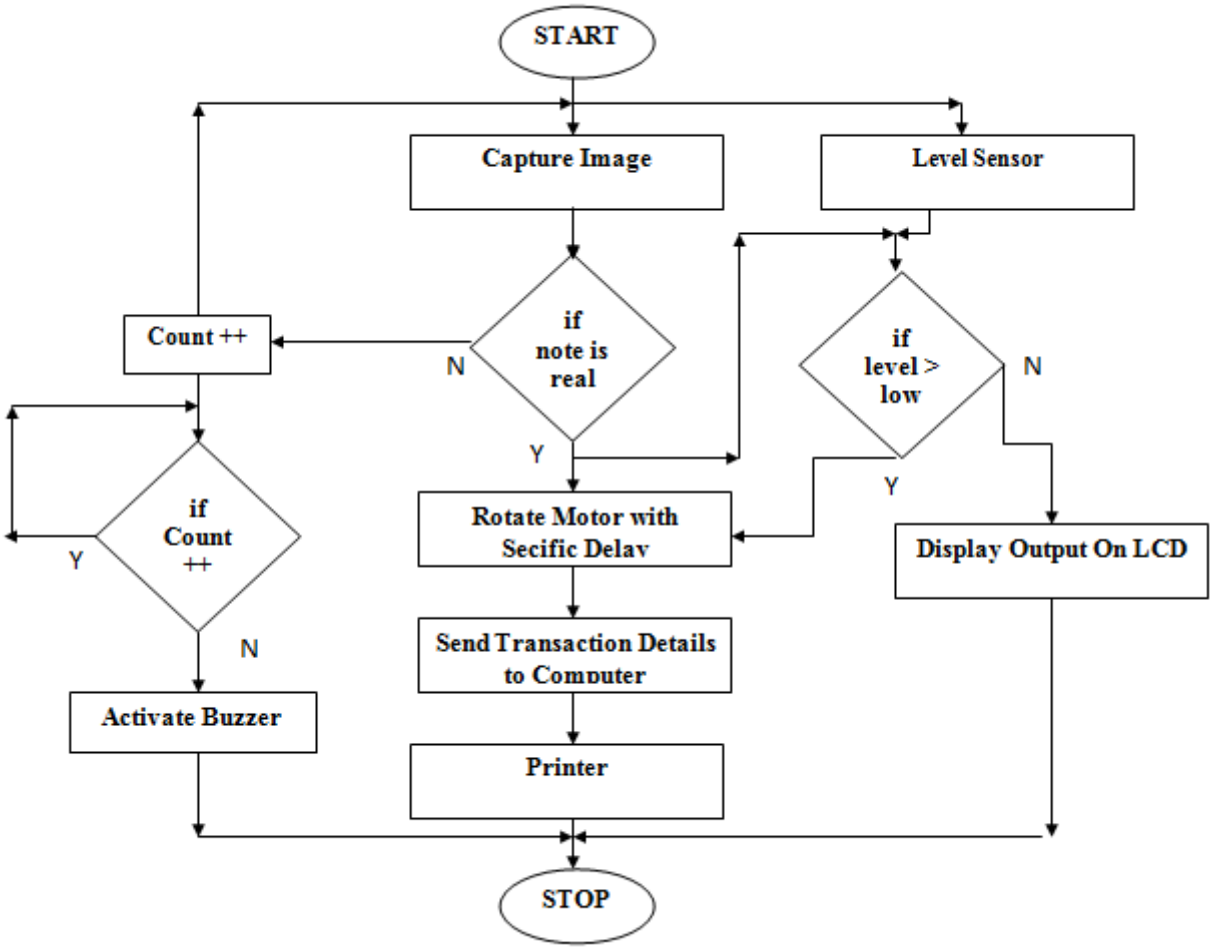

Figure 4. Working of the Prototype

V. Result:

In this project, detection of fake Indian currency note is done by using image processing principle. This is the low cost system. The system works for denomination of Indian currency. The system also provides accurate and valid results. The process of detection of fake note is quick and easy. In this system input is taken by CCD camera and output is displayed on PC and then according to currency fuel is dispensed.

VI. CONCLUSINON

This paper describes a system for automation in petrol station .Counterfeit currency recognition systems have become an important part of the Fuel Dispersion System. The proposed methods to classify denomination and identify counterfeit notes have high accuracy of 100% and 90% respectively, while still maintaining low system complexity. As systems to take pictures of both the obverse and reverse of the note already exist, using them in conjunction with the proposed algorithm allows for the time taken for computation to be low. As the techniques used have the advantage of low processing time, low intricacy and reliability, it is suitable for real time applications. At the end of paper further improvements are done.

VII. REFERENCE:

[1] Sahana Murthy, "Design and Implementation of Paper Currency Recognition with Counterfeit Detection" in IEEE conference in Nov, 2016:

[2] NedjeljkoLekic, S, "NFC Identification System for Fuel Dispensing Control on Petrol Station" in IEEE conference July, 2013:

[3] Sonali R. Darade, "Automatic Recognition of Fake Indian Currency Note" in IEEE conference Dec, 2016:

[4] H. Hassanpour, "Feature Extraction for Paper Currency Recognition", in IEEE conference Feb, 2007: