Image Processing based Automatic Museum Ticketing System of Note to Note Exchange

Saoli Chatterjee[1] Santosh Rathod[2] Sakshi Kaipilyawar[3]
[1,2,3]Department of Computer Engineering
[1,2,3]MIT College of Engineering, India

Abstract— this paper presents an automated system for ticket controlling in the Museum System which is based on note recognition process. This is a user friendly, secured and time saving process. Through IR sensor particular amount of notes will be detected which will be already programmed on the system. On addition of it fake note recognition method have been proposed with the use of MATLAB, feature extraction with HSV color space and other applications of image processing. A fixed amount of ticket is always available on the museum. Total number of tickets is given as an input through the keypad. Through the note placing unit the notes will be entered in this system and calculating through GPS the total amount of fares will be deducted from the given inputs. The remaining amount will be returned through note dispensing unit. On LCD and a particular app available on the pc it is shown about the ticket confirmation.

Key words: IR Sensor, Bluetooth Module, GPS, LCD, MATLAB Algorithm

I. INTRODUCTION

Earlier as every person's life turns to busier to compete with the challenging world; it is not preferable to them to waste their valuable time in purchasing the ticket standing in a queue. Exchanging a ticket from the ticket counter is not always convenient to the passengers due to lack of man force power and as well as proper use of the machine in this system. The security of the whole manual ticketing system is not often guaranteed. Sometimes the passengers have to face the fake note exchange problem which makes the process too much complicated.

The person can also book the tickets by online services, but sometimes the network connections may be down or the services may not be uploaded very often. Though the e-ticketing system process is useful for producing a reduction of the associated economic costs and time intervals, it is not always secured fully and therefore users can be traced and their profiles of usual movements can be created. So for better improvement with more secured process hereby in this project automatic ticketing real-time system is going to be implemented which is associated with time saving method and also undergone fake note detection technology.

II. FAKE NOTE DETECTION UNIT

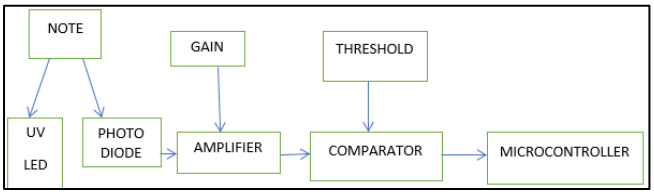

Fig. 1: Fake Note Detection Unit

Fake note detection process is one of the main parts of our projects. The main characteristics of Indian currency is that its reality can be detected using UV light. The real note can absorb the UV light whereas if the note is fake it will reflect the light. Fake note detection unit consists of UV LED, photodiode, amplifier and comparator. The UV LED source transmits UV rays and it falls on the note. If the note is real it will absorb some amount of the transmitted light and reflects the remaining and if it is fake the whole amount of UV light gets reflected from the surface of the note to the photodiode. The output of the photodiode is given to the amplifier. After amplification output is given to the comparator block where the output light wavelength and intensity is compared with threshold value. The output value is given to the input part of the microcontroller.

- Image Acquisition: Image acquisition is the creation of digital image of note from its physical image. The image is generally captured by digital camera (webcam) and the acquired image is then stored for further processing.
- Edge Detection: In image processing method edge detection process is used for feature detection and extraction which helps to identify various points in digital image with the change in its brightness.
- Feature Extraction: Through feature extraction technique analyzation and identification of the unique and distinguishing features of each notes under various condition such as old notes, worn out notes also under different background condition.

III. NOTE EXCHANGING UNIT

For note to note exchange method in the system we are going to use note placing and dispensing unit. Through note placing unit after fake note detection note will be given to the system and on the output side through note dispensing unit remaing fare will come out from the system.

A. Note Placing Unit

It is made up of mechanical relays to accept the notes from the user. It is capable of accepting the particular noteswhich are going to give as an input. It is driven by dc motor which takes 12v from the supply and runs at 10 rpm.3 relays and 2 dc motors are used to accept and identify the no. of notes given by the user. This information is then sent to the microcontroller for further procedure.

B. Note Dispensing Unit

Once the ticket is charged the µC will calculate the remaining amount and return the amount using Note dispensing unit. There will be 3 dc motors to dispense the notes, each working on 12V D.C. Supply and running with the speed of 10rpm.

IV. EXISTING SYSTEM

In railway station a particular card which is rechargeable is used for swiping in the machine and confirmed ticket will be displayed in a particular app available on the mobile.

In playground, multiplex and hotel booking system most of the time we follow online booking system which are not always confirmed and the audiences can face problems if the server becomes down.

In the museum ticketing process through manual process ticket is available to the visitors which is time consuming and also not user-friendly.

So to have an end of such as problems already faced by the visitors or audiences our project is going to be implemented on these aspects. In this project instead of manual process automatically ticket will be confirmed and the whole process including given data of the users remain confidential between the visitors and the institution. It is note recognition method instead of swiping the card.

V. METHODOLOGY

The main focus of this work is to 'control the museum ticketing system on automatic way' through 'note recognition system'. UV sensor along with image processing technique is used for fake note recognition in the system. DC motor is used for note dispensing process. Input will be given to the system through keypad and the process is controlled through microprocessor. The ticket confirmation process will be displayed on the pc.

Let us understand some parts of this project.

A. IR Sensor

IR sensor is an electronic instrument which is mainly used for obstacle detection transmitting infrared rays whose frequency range is between visible rays and microwave rays. IR sensor is of two types of Passive IR sensor and active IR sensor. This sensor is worked based upon three laws of Planck's law, Stephen-Boltzman law and Wien's displacement law. Depending upon these three laws whenever IR ray is transmitted from IR transmitter it gets obstacled by the objects and from the surface of it gets back to the opposite direction to reach IR receiver.

IR transmitter consists of LED as a IR ray source which emits invisible rays of particular wavelength and on the other side IR receiver acts as IR detector consisting of photodiode. Emitted rays by transmitter side when after reflection gets detected by the photodetector of the receiver intensity of the light varies and measuring the intensity of the light the presence of the objects can be understood whether it is near IR sensor or not. Hereby we are going to use TSOP1738 as IR sensor because of its high sensitivity and as its working requirement +5V is used which is convenient in this project purpose.

B. Webcam

A webcam is a video camera that captures its image in real time or through computer network. After capturing the image through computer it is automatically saved, watched or sent to other computer networks via internet and emailed as an attachment. A webcam connects with the system by a USB cable, or any other similar cable and sometimes it is inbuilt into computer (laptop) hardware. It has low cost, high flexibility and higher resolution. Besides of these is also used for security and privacy purpose. Webcam is generally used for video calling, recording social videos, security purpose making computer as videoconference station.

C. Keypad

The keypad is also standard 4x4 which has 8 pin connector. The 4x4 keypad has the layout like the table shown below. BK is backspace while entering the password. EN is enter and is used do enable/disable menu item or enable the system.

1	2	3	ˆ
4	5	6	ˇ
7	8	9	BK
	0		EN

Keyboard plays a vital role as an input device to the controller. At the lowest level, keyboards are arranged in matrix form of rows and columns. The CPU accesses both rows and columns through ports: therefore, with two 8-bit ports, an 8 X 8 matrix of keys can be connected to microcontroller. When a key is pressed, a row and a column make a contact: otherwise, there is no connection between them.

VI. BLOCK DIAGRAM

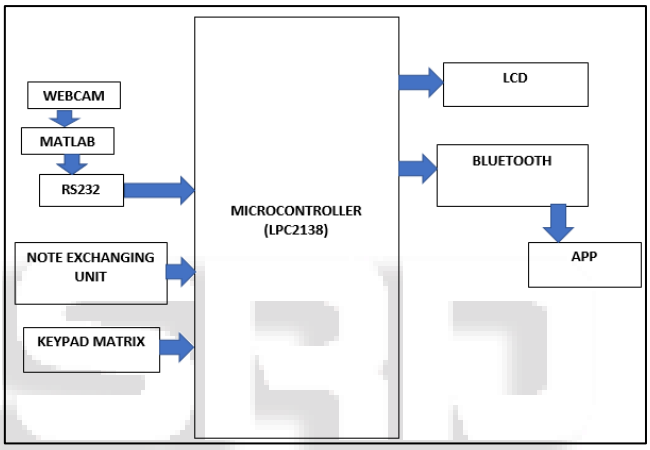

Fig. 2: Block Diagram

VII. HARDWARE REQUIREMENTS

- DC motor
- Relay
- UV LED
- LCD
- Microcontroller
- Bluetooth

VIII. CONCLUSIONS

This system hopefully becomes very much useful to common people day by day as it is an automated system. It is a real time process and the people can also recognize the fake notes analysing the digitized image of it passing it through image processing technique controlled by MATLAB. On addition of it note will be dispensed after generating the ticket. Though this project limitation is up to museum or playground institute it can also be used in the bus or railway system for further step as this process will be helpful for passenger and as well as ticket collector.

IX. FUTURE SCOPE

For getting ticket confirmation message on the phone we can also provide individual's mobile number as an input to the machine. The limitation of the machine of accepting the notes

can also be increased beyond 500 analysing its use on this particular domain. For future use we can also implement the design for restoring some identification data of the passengers as a security purpose of the institution. We can include other sensors for improving its service to the passengers depending on its popularity. This automatic note to note exchange method with fake note detection can also be launched in the transport system based upon its ease of acceptance of the passengers.

ACKNOWLEDGMENT

This research was supported by [MIT College of Engineering, Pune]. We thank our colleagues from [MIT College of Engineering, Pune] who provided insight and expertise that greatly assisted the research, although they may not agree with all of the interpretations/conclusions of this paper.

REFERENCES

[1] International Research Journal of Multidisciplinary StudIES & SPPP's, Karmayogi Engineering College, Pandharpur Organize National Conference Special Issue March 2016 Vol. 2, Special Issue 1, March, 2016
[2] International Journal on Recent and Innovation Trends in Computing and Communication ISSN 2321 – 8169 Volume: 1 Issue: 3
[3] International Journal of Advance Foundation and Research in Science & Engineering (IJAFRSE) Volume 2, Special Issue, Vivruti 2016. Impact Factor: 1.036, Science Central Value: 26.54

