IDEA-15-IC-01
Idea Lab Project ID-Project Title

Submitted By

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DEPARTMENT NAME

INSTITUTE OF TECHNOLOGY

NIRMA UNIVERSITY

AHMEDABAD-382481

May 2016

IDEA-15-IC-01

COMMUTER IDENTITY VERIFICATION SYSTEM

Idea Lab Project

Submitted By

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Under the mentorship of

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Declaration

We do hereby declare that the technical project report submitted is original, and is the outcome of the independent investigations/research carried out by us and contains no plagiarism. The research is leading to the discovery of new facts/techniques/correlation of scientific facts already known. This work has not been submitted to or supported by any other University or funding agency.

We do hereby further declare that the text, diagrams or any other material taken from other sources (including but not limited to books, journals and web) have been acknowledged, referred and cited to the best of our knowledge and understanding.

Date:

Place:

_____	_____	_____	_____
Jwalant Bhatt (12bic005)	Deep Patel (12bic012)	Prof. Harsh Kapadia	Prof. Alpesh Patel

NIRMA UNIVERSITY

INSTITUTE OF TECHNOLOGY

IDEA LAB

INSTRUMENTATION & CONTROL Section, EE Department

Final Report of the work done on the Idea Lab Project.

1. Idea Lab Project ID: IDEA-15-IC-01

2. Project Title: Commuter Identity Verification System

3. Period of Project: October 2015 to May 2016

4. (a) Name of Student (Roll No.): Jwalant Bhatt (12bic005)

   Department: Instrumentation & Control Section, Electrical Department

   (b) Name of Student (Roll No.): Deep Patel (12bic012)

   Department: Instrumentation & Control Section, Electrical Department

   (c) Name of Mentor: Prof. Harsh Kapadia
   Prof. Alpesh Patel

5. Project Start Date: October 2015

6. (a) Total Amount Approved: Rs. 10,000/-

   (b) Total Expenditure: Rs. 8,699/-

   (c) Report of the work done:

   i. Brief objective of the project: To use the barcode available on the backside of the I-card for checking the payment of bus fees in bus. Can also be extended for check in purpose anywhere around the campus.

   ii. Work done: Developed a verification system using a Raspberry Pi and its accessories like Pi Touch Screen Display and a commercial barcode scanner.

   iii. Results: We achieved the given application by interfacing the Raspberry pi microcontroller with a barcode scanner and a Pi Touchscreen display. The Raspberry pi board was booted with Android OS and the application

was developed in Android SDK. Also a second version was developed on the Raspbian using Python language.

iv. We have achieved all the objectives except integrating it with the format of University database as it was no accessible to us.

v. Technical Difficulties: Integrating the application with the database. Touch Screen Interfacing

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Contents

1.1 Introduction

The Idea of this project is to develop a portable device that can be used for the verification of the commuters in college bus. To achieve this we are using the already available barcode on the backside of every student's I-card. The verification happens with the help of database available with NERF.

To make this portable device we have used the Raspberry Pi microcontroller with a barcode scanner. The brain of the device is loaded with an Android OS, the Raspdroid. We are transferring the roll no of the student from the barcode scanner serially via a USB connection. We have developed an android application that reads a database file that contains the roll no of students who have paid fees and compares it with the I-card's roll no.

1.2 Major Objectives Proposed

The main objective of this project was to develop a portable device that can be used for the verification of the commuters in college bus. To achieve this we are using the available barcode on the backside of every student's I-card. The verification happens with the help of database available with NERF. The system pledges to give zero fare evasion. Every commuter carries an I-card making the checking procedure least cumbersome and most authentic. A large amount fare evasion can be avoided by implementing this system.

Moreover this system is not limited to verification of commuters it can be also used for other applications like check-in purpose around campus, pass-check during navaratri, night events and for purchasing coupons in the canteen.

1.3 Objectives Achieved

We achieved the given application by interfacing the Raspberry pi microcontroller with a barcode scanner and a Pi Touchscreen display. The Raspberry pi board was booted with Android OS and the application was developed in Android SDK. Also a second version was developed on the Raspbian using Python language.

The verification is easily performed using this method. Using microcontroller with a barcode scanner makes the device portable and less costly as it is designed for the given specific purpose only. Using this simple existing technology in our customized form efficiency and authentication in the checking is highly increased.

1.5 Objectives Not Achieved

We have achieved all the objectives except integrating it with the format of University database as it was no accessible to us.

1.6 Technical Difficulties Faced

- Integrating the application with the database.
- Touch Screen Interfacing.

1.7 Experimental Setup and Results

- **DESIGN**

Components Used:

1. Raspberry Pi

	Model B+
Processor Chipset	Broadcom BCM2835 ARMv6 SoC full HD multimedia applications processor
RAM	512 MB SDRAM @ 400 MHz
Storage	MicroSD

USB 2.0	4x USB Ports
Power Draw / voltage	1.8A @ 5V
GPIO	40 pin
Ethernet Port	Yes

- The **Raspberry Pi** is a series of credit card-sized single-board computers developed in the UK by the Raspberry Pi Foundation

2. Barcode Scanner(Argox AX-8000)

A CCD barcode scanner is used which communicates serially via USB a connection.

3. Micro SD Card (8GB)

This facilitates the memory recquired for the Android Operating System, Our Android Application and the Database file.

4. 5 inch HDMI TFT LCD Touch Screen Shield (800 x 480) for Raspberry Pi.

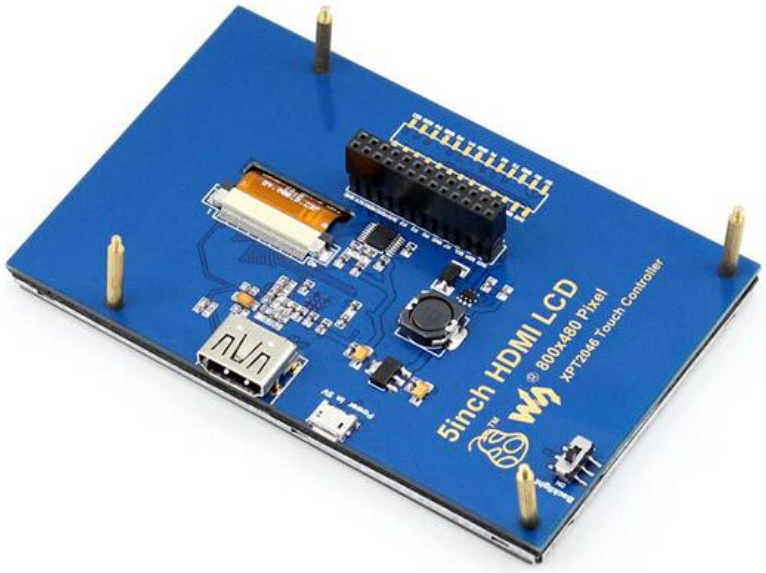
Features：

- A good solution for those seeking for a bigger resolution display
- Provides much better touch response, larger viewing angle, faster response time
- Provide the customized raspberry and Banana pro/pi raspbian and Ubuntu image, Beaglebone black Angstrom and Android 4.2.2

Specifications:

- 5.0-inch TFT Resistive touch screen display, 800x480 Resolution
- HDMI input
- USB touch and power
- Powered by USB， 5V@1A
- Supports Raspberry Pi, BB Black, Banana Pi / Banana Pro
- Not only for mini-PCs, it can work as a computer monitor just like any other general HDMI screen (touch function is unavailable in this case)

- LCD driver IC: ILI9486L
- Refresh rate：60HZ
- LCD Size ：143mm*83mm

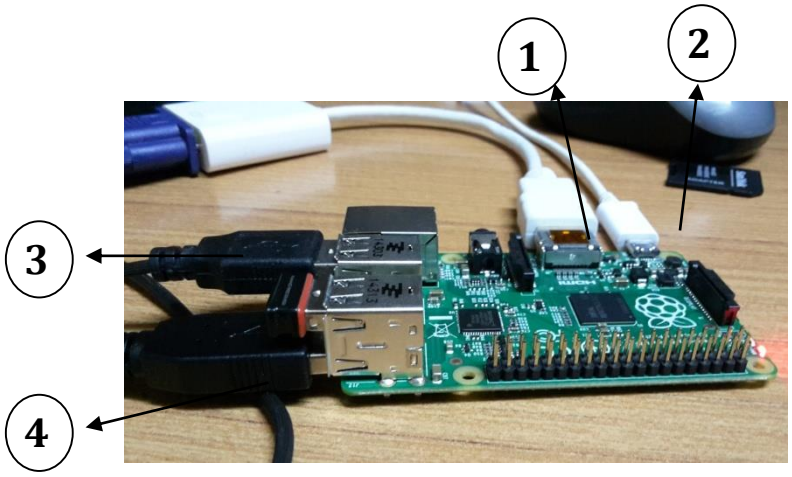


5. Case i.e. The CIVS Enclosure

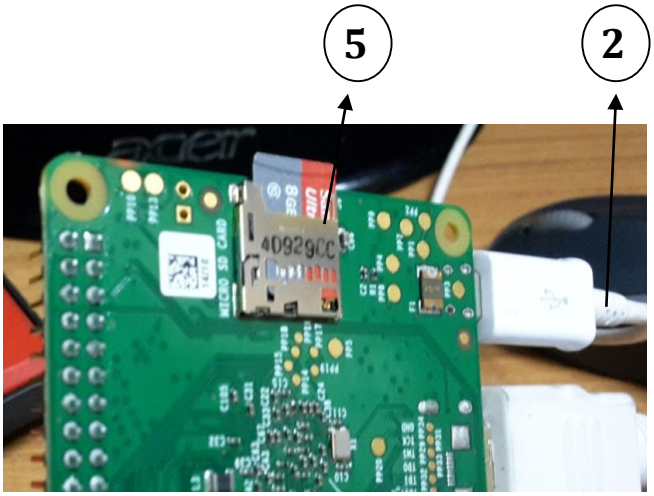
➢ CONNECTIONS

The connections for the system to be put under operation are to be made as follows:

- Connect HDMI cable to port 1.
- HDMI cable is connected to the HDMI to VGA converter which in turn is connected to the monitor for display.
- The Supply is given using a microUSB port, port 2.



- The Barcode Scanner is connected at port 3.

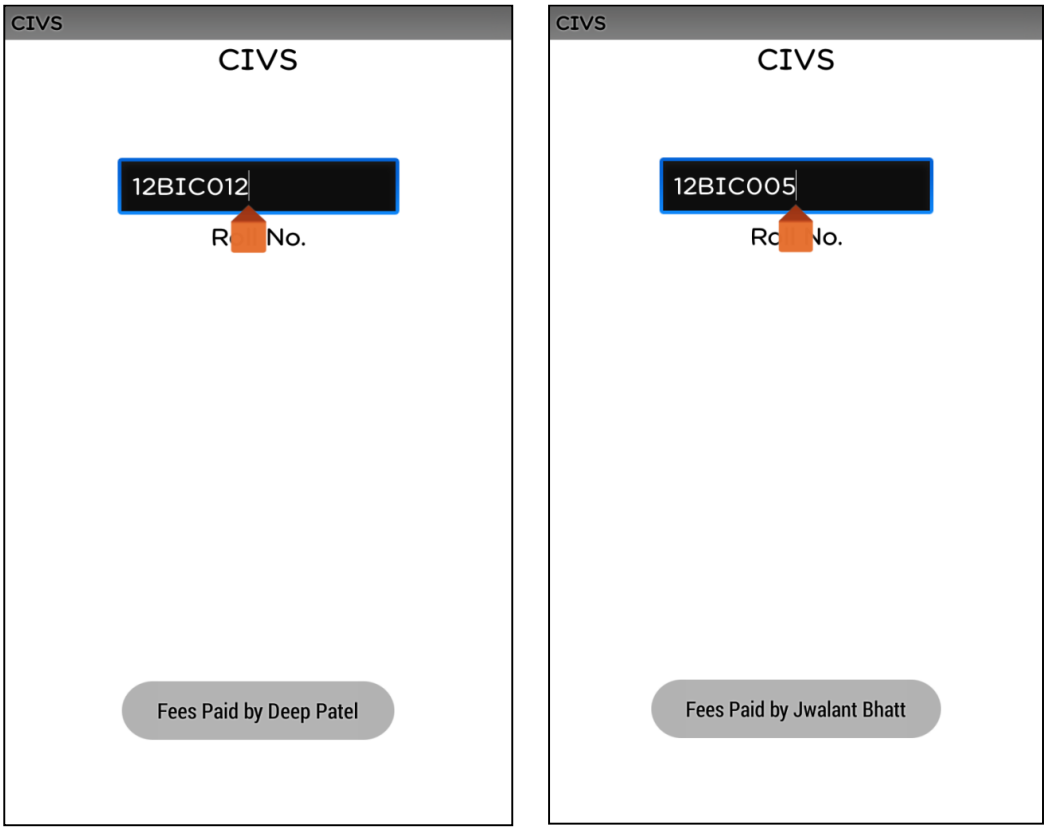


- Accessories like keyboard/Mouse can be connected to port 4.
- Last, but the most important, the memorycard is inserted in the slot, numbered 5 which is on the back side of the board.

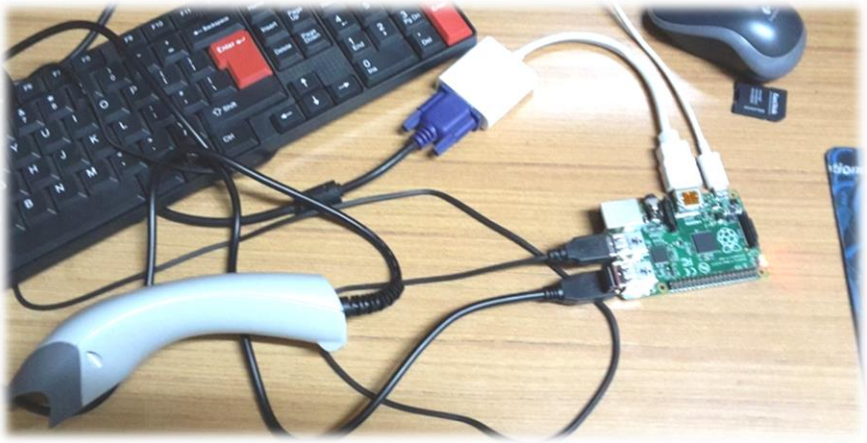
➢ WORKING

- First and the foremost, we need to know that the Raspberry pi is an advanced controller which is more closer to a tiny sized computer that can handle i/p, o/p from peripherals such as mouse, keyboard, etc. and also support a display screen for visual output. Therefore it needs an OS similar to the desktop computers though small in size.
- Also it does not have an internal memory, hence we need some external storage.
- For the purpose we use a microSD card.
- Some of the OS available for Rpi are:
    - ✓ Raspbian
    - ✓ OpenELEC
    - ✓ Pidora (Fedora Remix)
    - ✓ Puppy Linux[71]
    - ✓ Raspbmc[72] and the XBMC open source digital media center[73]
    - ✓ RISC OS[74] – is the operating system of the first ARM-based computer.
    - ✓ Windows 10
    - ✓ RaspDroid

- Here the operating system used is RaspDroid, which is android 3.2 for RaspberryPi.
- The image is mounted on the microSD card using win32 Disk Imager.
- It is then configured via Putty, which establishes a connection through a router using an SSH connection to a remote computer(Only if wireless connection is required).
- The major and one of the most important part of the project, an Application for the CIVS has to be developed for reading the output of the barcode scanner and verifying the identity.
- The app is developed using an IDE called Eclipse and SDK called Android SDK.



- The barcode scanner uses a laser source, focussing optics and a CCD array which detects the barcode pattern. It is then converted to the equivalent ASCII code which is transferred to the Rpi serially.
- The application reads the string(Student Roll No.) received serially via USB and then starts the verification process.
- The identity of the student is checked against the roll no and whether the student has paid the fees or not against the records stored in the local database.
- The database is an SQL database and managed using the SQlite Browser.
- A message is flashed as “Fees Paid by XYZ” if the student has paid complete transport fees for the semester else “Fees Not Paid by XYZ” is displayed.
- Thus the conductor/in charge person can easily check for the payement of bus fees at the click of a button without any hustle.



1.8 Budget Analysis

1. Budget Sanctioned: Rs. 10,000/-

2. Budget Utilized: Rs. 8,699/-

Serial No.	Name of Product	Amount	Bill No.	Date	Consumable/ Nonconsumable	Dead Stock Number (if any)
1	RaspberryPi Touchscreen Display + Portable Power Supply	6399/-	RI-15-16/1071	12/2/2016	Non-Consumable	NA
2	Case Fabrication	2300/-	25/02/16	56	Consumable	NA

3. Budget Unutilized: Rs. 1,301/-

1.9 Conclusion and Future Work

The verification is easily performed using this method. Using microcontroller with a barcode scanner makes the device portable and less costly as it is designed for the given specific purpose only. Using this simple existing technology in our customized form efficiency and authentication in the checking is highly increased.

This Idea can save large amount of capital and decrease the ambiguity in checking. Also it can be implemented in areas like canteen for prepaid coupon system, attendance system, etc. We hope that this system is implemented as soon as possible in our college campus.

Bibliography

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