DESIGN AND IMPLEMENTATION OF PORTABLE SECURED DOOR STEP BANKING DEVICE

D.SHEKAR GOUD , JATROTH SRINIVAS, M. CHANDRA SHEKER, 4.N.MOUNIKA,. 5.B.SIVA KUMAR
Assistant Professor, Department of ECE Ellenki College of Engineering & Technology

ABSTRACT:
The main idea of handheld secured Electronic Doorstep Banking System is that the bank should employ special persons who are licensed as the business correspondents Banking device (BC) to carry a micro bank machine with them. Each BC will be allocated to a particular machine. The project and its security features along with the workflow will be described in a step by step manner in the following text. The customer who needs Bank service must call the customer care division of the bank and inform whether he wants to withdraw/deposit money. The bank server will choose the appropriate micro- bank unit and will send a query message to that. The micro-bank machine should reply with an acknowledge message when it sees the bank query. The server will then dispatch a message about the details of the customer including his account balance. The message also contains a One-Time Password (OTP) to the micro-bank machine that is allocated for that transaction. The same OTP is also sent to the customer mobile. The micro bank system is always connected to the central banking server using GSM communication.

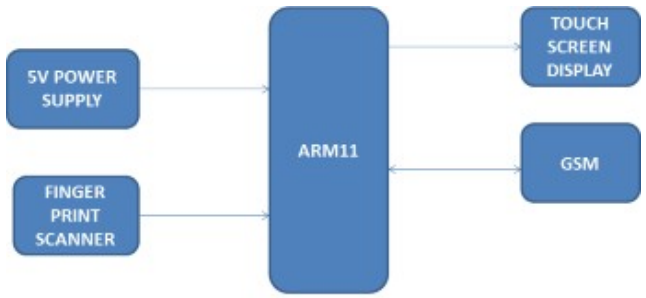
Keywords:-Raspberry pi, Touch Screen, GSM, Finger print module.

INTRODUCTION

Every people in rural areas have started using the banking system. Simple tasks like going to the ATM and withdrawing money make people in villages will miss their working hours and may lose a significant part of their daily wages as well. Hence there is a need to design a system that helps those rural area people who can't leave their business premises for banking transactions. The main idea of this mobile banking system is to provide door step banking in the rural areas. The bank should employ special persons who are licensed as the Business Correspondents (BC) to carry a micro bank machine with them. Each BC will be allocated to a particular area and they are provided a hand held banking device.

The customer who needs this micro bank service must call the customer care of the corresponding bank and have to inform whether he wants to withdraw/deposit money . The bank server will choose the appropriate BC. The server will send OTP to the customer. Once the BC reaches the customer he will cross check with it and after the verification, the transaction will be started.

SYSTEM ARCHITECTURE



Block Diagram

A) EXISTING SYSTEM

The existing system implemented a basic handheld machine to administer banking services like money withdrawals and money deposit whiles not the person ever aiming to a bank even in remote areas. The customer who needs micro-bank service must call the customer care division of the bank and inform

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whether he wants to withdraw/deposit money. The bank server will choose the appropriate micro-bank unit and will send a query message to that. The micro-bank machine should replywith an acknowledge message when it sees the bank query. The server will then dispatch a message about the details of the customer including his account balance. The message also contains a One-Time Password (OTP) to the micro-bank machine that is allocated for that transaction. The same OTP is also sent to the mobile to the customer.

B) DISADVANATAGE OF EXISTING SYSTEM

The implemented system has a low security feature and implemented on a single core processor which reduces the process speed and time of operation will be on higher side.

C) PROPOSED SYSTEM

In the proposed system, an advanced handheld multitasking device will be designed to administer banking services like money withdrawals and money deposit while not the person ever aiming to a bank even in remote areas wherever a GSM cellular association is possible. The planning may also be operated within and on the far side of the regular banking hours. Financial inclusion is delivery of banking services at an affordable cost to the vast sections of disadvantaged and low income groups. Mobile banking is simply application of mobile (Cell) phone dives as mean of banking via Wireless Application Protocol (WAP), GPRS and 3G technology and short message service (SMS) facilities. M-banking is cost effective way to provide banking services to the unbanked because there is no need to set up physical branches to facilitate customers it called as it is 'branchless banking'. It is branchless bank model includes enhanced ability to carry out limited banking transactions via mobile phone.

HARDWARE

A) RASPBERRY Pi (ARM 11)

The system is developed using an ARM 11 processor based Raspberry pi board, the Raspberry Pi is based on the Broadcom BCM2835 system on a chip (SoC), which includes an ARM1176JZF-S700 MHz processor, Video Core IV GPU, and was originally shipped with 256 megabytes of RAM, later upgraded (models B and B+) to 512 MB. The system has Secure Digital (SD) (models A and B) or Micro SD (models A+ and B+) sockets for boot media and persistent storage. The Raspberry Pi is a credit-card sized computer that plugs into your TV and keyboard. It is a capable for little projects, and for many of the things that your desktop PC does, like spreadsheets, word-processing and games. It also plays high-definition videos Raspbian is a free operating system based on Debian optimized for the Raspberry Pi hardware. An operating system is the set of basic programs and utilities that make your Raspberry Pi run. However, Raspbian provides more than a pure OS: it comes with over 35,000 packages, pre-compiled software bundled in a nice format for easy installation on your Raspberry Pi.

B) GSM

A GSM modem is a wireless modem that works with a GSM wireless network. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHzGSM modems support an extended set of AT commands. These extended AT commands are defined in the GSM standards.

C) TOUCH SCREEN

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The handheld ordering terminal implements human computer interaction by 3.2 inch Resistive Touch Screen TFT LCD. There is a high performance LCD Controller integrated on chip. CPU transfers pixel data to LCD screen. Supports Raspbian Operating System, with SPI interface.

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Touch Screen

D) FINGER PRINT

Biometrics refers to authentication techniques that rely on measurable physiological and individual characteristics that can be automatically verified. In other words, we all have unique personal attributes that can be used for distinctive identification purposes, including a fingerprint, the pattern of a retina, and voice characteristics. Biometrics refers to the automatic identification of a person based on his or her physiological or behavioral characteristics. This identification method

Raspberry Pi Board

is preferred over traditional methods involving passwords and PINs (personal identification numbers) for several reasons, including the person to be identified is required to be physically present at the point of identification and/or identification based on biometric techniques obviates the need to remember a password or carry a token. This is an optical biometric fingerprint reader/sensor (R305) module with TTL UART interface for direct connections to a microcontroller UART. The user can store the finger print data in the module and can configure it in 1:1 or 1: N mode for identifying the person. Fingerprint processing includes two parts, fingerprint enrollment and fingerprint matching (the matching can be 1:1 or 1:N). When enrolling, user needs to enter the finger two times. The system will process the two time finger images, generate a template of the finger based on processing results and store the template. When matching, user enters the finger through optical sensor and system will generate a template of the finger and compare it with templates of the finger library. The module itself does all complex tasks behind reading and identifying the fingerprints with an on-board optical sensor and fingerprint algorithm. All you need to do is send it simple commands, and the fingerprint scanner can store different fingerprints. Although a number of fingerprint reader/sensor modules with slight variations are available now, most have a 4-pin external connection interface. By way of the serial interface, fingerprint reader/sensor module can communicate with a microcontroller .

SOFTWARE

Qtopia (Qt)

Qtisa cross-platform application framework that is widely used for developing application software that can be run on various software and hardware platforms with little or no change in the underlying codebase, while having the power and speed of native applications. Qt is currently being developed both by the Qt Company, a subsidiary of Digia, and the Qt Project under open-source governance. Qt is used mainly for developing application software with graphical user interfaces (GUIs); however, programs without a GUI can be developed, such as command-line tools and consoles for servers. Qt uses standard C++ with extensions including signals and slots that simplifies handling of events, and this helps in development of both GUI and server applications which receive their own set of event information and should process them accordingly. Qt supports many compilers, including the GCC C++ compiler and the Visual Studio suite. Qt can be used in several other programming languages via language bindings. It runs on the major desktop platforms and some of the mobile platforms. It has extensive internationalization support. Non-GUI features include SQL database access, XML parsing, JSON parsing, thread management and network support.

Raspbian Operating System:

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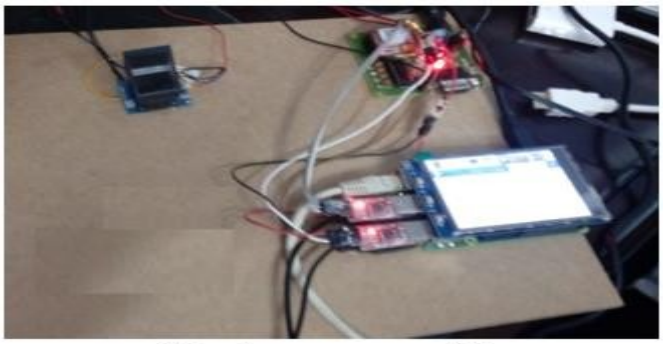
Raspbian is a free operating system based on Debian optimized for the Raspberry Pi hardware. An operating system is the set of basic programs and utilities that make your Raspberry Pi run. However, Raspbian provides more than a pure OS: it comes with over 35,000 packages, pre- compiled software bundled in a nice format for easy installation on your Raspberry Pi.The initial build of over 35,000 Raspbian packages, optimized for best performance on the Raspberry Pi, was completed in June of 2012. However, Raspbianis still under active development with an emphasis on improving the stability and performance of as many Debian packages as possible. The Raspberry Pi primarily uses Linux kernel- based operating systems Raspbian (recommended) – Maintained independently of the Foundation; based on ARM hard-float (armhf)-Debian 7 'Wheezy' architecture port, that was designed for a newer ARMv7 processor (or one with Jazelle RCT/ThumbEE, VFPv3 and NEON SIMD extensions built- in) whose binaries would not work on the Rapberry Pi, but Raspbian is compiled for the ARMv6 instruction set of the Raspberry Pi making it work but run more slowly. It provides some available deb software packages, pre- compiled software bundles. A minimum size of 2 GB SD card is required, but a 4 GB SD card or above is recommended. There is a Pi Store for exchanging programs. The Raspbian Server Edition is a stripped version with other software packages bundled as compared to the usual desktop computer oriented Raspbian.

WORKING PRINCIPAL

The handheld device is designed using Arm 11. It has Raspberry pi controller. The GSM, SD card, touch screen controller and TFT LCD Display are connected to the GPIO pins. The bank has to appoint a BC who will have this handheld device. When the customer wants to withdraw or deposit amount he should intimate to the bank immediately. Then the customer will receive OTP. Once the BC reaches the customer he verifies the OTP. the fingerprint will be verified and then the money transaction will takes place. In this process the option whether to deposit money or withdrawal must be selected. Then, the amount of money to be deposited or withdraw must be entered. Then the security pin must be entered by the BC and the custom.

EXPERIMENTAL RESULTS

The device is equipped with a Linux Based single board computer holding arm 11 processor, which runs the Raspbian operating system. A finger print module is interfaces to the serial port of the processor to perform the finger print authentication of the user; a touch screen display is connected to view the GUI. Using external serial port the GSM Module is connected to transfer the data to and fro between the server and board. a secured handheld doorstep banking industry referred to as Micro-bank machine is intended to grant service to the purchasers in rural areas and remote places such as villages. The planning may also be operated within and on the far side of the regular banking hours. The main aim of the handheld machine is to administer banking services like money



Hardware assembly

Withdrawals and money deposit while not the person ever aiming to a bank even in remote areas wherever even a GSM cellular association isn't possible.

Thus this device can be used in very rural or hill areas also. In the offline mode, the transaction details are stored in the SD card that can be retrieved later. The Fig 3 shows the fingerprint verification. In this stage, initially the fingerprint of the customers stored in the

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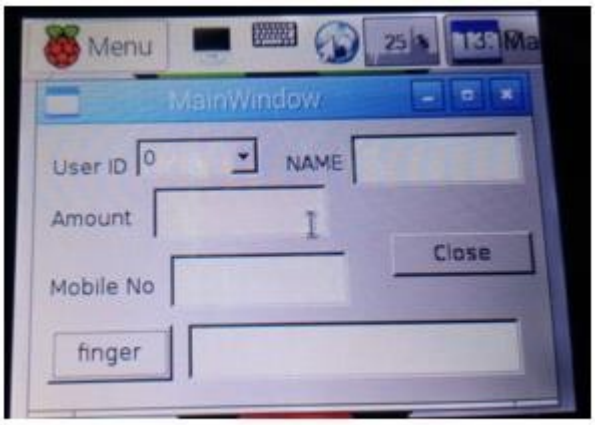
Main screen

config mode itself. These are processed and stored as template already. During the transaction process the finger print of the customer is got and if it matched with the saved template further access is allowed or else the transaction will be cancelled.In the above



User registration screen

Screenshot, the fingerprint will be verified and then the money transaction will takes place. In this process the option whether to deposit money or withdrawal must be selected. Then, the amount of money to be deposited or withdraw must be entered. Then the security pin must be entered by the BC and the customer. After money transaction an SMS will be sent

CONCLUSION

In this paper, we have proposed a secure Thus the handheld device is easy and reliable to use and can be used anywhere not only in rural areas but also in cities. Since this device has a fingerprint scanner and pin security, the unauthorized persons cannot misuse the device. Thus this device will help the rural area people to withdraw or deposit amount easily so that their precious time won't be wasted.

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