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SMS Alert System using Biometric

K Prasad Babu, N Vinod Kumar
Associate Professor, Department of Electronics & Communication Engineering
Dr KVSubbareddy Engineering College for Women
Affiliated to JNTUA, INDIA

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Abstract:

Now-a- days the field of education aims at solutions that provide multiple points of digital attendance for students and the intimation of student status to the parents. In this paper the scanner sense around 100 students biometrics using KY-M6 algorithm and the SMS is forwarded automatically to the Parents through GSM module using Raspberry Pi.

Keywords: *Fingerprint Scanner, KY-M6 algorithm, Raspberry Pi, Biometric, Embedded System.*

I. INTRODUCTION

An embedded system is a combination of micro controller and microprocessor and its design for special tasks to be execute. Very first embedded system was the Apollo Guidance Computer developed by Charles Draper and his team. Embedded systems are using various areas like the military, medical sciences and the aerospace and automobile industries. Commercial areas of equipments such as MP3 players, cell phones, PDAs, digital cameras, camcorders, home entertainment systems and so on. Household appliances like microwaves, washing machines, televisions then on. Mission-critical systems such as satellites and flight control. The main factors that differentiate an embedded system from a desktop computer: They are cost sensitive. Most embedded systems have real time constraints.

Types of Setup

Embedded systems normally have a setup that includes a host which is generally a personal computer, and a target that actually executes all the embedded applications. Many of various types of host/ desktop architectures are used in embedded systems.

Linked Setup

This setup, target and the host are permanently linked together using a physical cable. The link is typically a serial cable or an Ethernet link. One of main property of setup is that no physical hardware memory device is being transferred between the target & host.

Operating Systems

An embedded system, when there is only a single task that is to be performed, and then only a binary is to loaded into the target controller and is to be executed. However, when there are multiple tasks to be executed or multiple events to be handled, then there has to be a program that handles and prioritizes these events. This program is the Operating System (OS), which one is extremely conversant in , in desktop PCs.

Various Operating Systems

Embedded Operating Systems are classified into two categories:

Real-time Operating Systems (RTOS)

Real Time Operating Systems are those are guarantee responses to each event within a defined of time. This type of OS is mainly used by time-

January-February 2020
ISSN: 0193-4120 Page No. 12418 - 12422

critical applications such as measurement and control systems. Some commonly used RTOS for embedded systems are: Vx Works, OS-9, Symbian, RT Linux.

Non-Real-time Operating Systems

Non-Real Time Operating Systems don't guarantee defined respective of times. Real time systems are mostly used multiple applications. Non real time systems are a wide range of motivations for choosing Linux over a traditional embedded operating system.

The following criteria's are preferred for Linux:

Quality and Reliability of Code

Quality and reliability are subjective measures of the level of confidence in the code that comprises software such as the kernel and its applications that are provided by distributions. Some properties are professional programmers expect from quality codes.

Hardware Support

Broad hardware support means Linux supports differing types of hardware platforms and devices. Although variety of vendors still don't provide Linux drivers, considerable progress has been made and more is predicted. Because an outsized number of drivers are maintained by the Linux community itself, you'll confidently use hardware components without worrying that the seller may at some point discontinue driver support for that product line. Linux also provides support for dozens of hardware architectures.

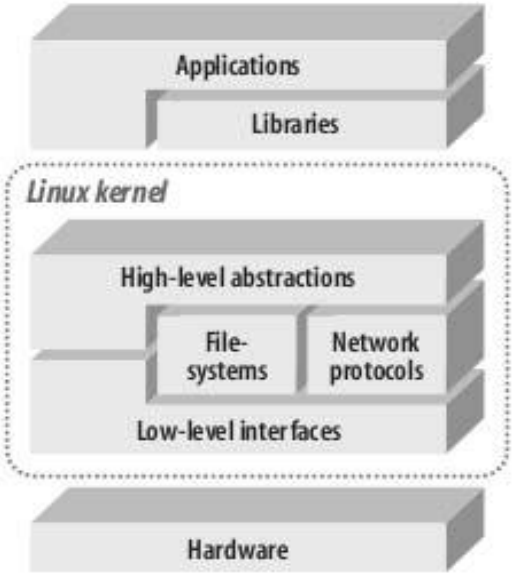

Fig.1 Architecture of an Embedded Linux system.

Hardware

Linux normally requires a minimum of a 32-bit CPU containing a memory management unit (MMU).A sufficient amount of RAM must be available to accommodate the system. Minimal I/O capabilities are required if any development is to be administered on the target with reasonable debugging facilities. The kernel must be ready to load a root filing system through some sort of permanent storage, or access it over a network.

Linux Kernel

Immediately above the hardware sits the kernel, the core component of the OS . Its purpose is to manage the hardware during a coherent manner while providing familiar high-level abstractions to user-level software. It is expected that applications using the APIs provided by a kernel are going to be portable among the varied architectures supported by this kernel with little or no changes. The low-level interfaces are specific to the hardware configuration on which the kernel runs and supply for the direct control of hardware resources employing a hardware-independent API.

Higher-level components provide the abstractions common to all or any UNIX systems, including processes, files, sockets, and signals. Since the low-level APIs provided by the kernel are common among different architectures, the code

January-February 2020
ISSN: 0193-4120 Page No. 12418 - 12422

implementing the higher-level abstractions is nearly constant, no matter the underlying architecture. Between these two levels of abstraction, the kernel sometimes needs what might be called interpretation components to know and interact with structured data coming from or getting to certain devices. File system types and networking protocols are prime examples of sources of structured data the kernel needs to understand and interact with in order to provide access to data going to and coming from these sources.

Applications and Libraries

Applications don't directly operate above the kernel, but believe libraries and special system daemons to provide familiar APIs and abstract services that interact with the kernel on the application's behalf to obtain the desired functionality. The main library employed by most Linux applications is that the GNU C library, glibc. For Embedded Linux systems, substitutes to the present library that are much less in size than glibc are preferred.

II. LITERATURE SURVEY

With embedded systems fast expanding its reach, subject matter related to this field is available in abundance. While working on this project we have studied matter from various sources such as books, online articles and reference manuals. The knowledge gained from this activity has been of great help to us in understanding the basic concepts related to our project and has ignited further interest in this topic.

"Linux for Embedded and Real time Applications", by Doug Abbott has been of great help in providing an introduction to the process of building embedded systems in Linux. It has helped us understand the process of configuring and building the Linux kernel and installing toolchains.

We understood the preponderance of the ARM processors in the field of embedded systems and the features of ARM processors from the document "The ARM Architecture by Leonid Ryzhyk. The ARM architecture is a confluence of many useful features that makes it better than other peer processors. Being small in size and requiring less power, they prove useful in providing an efficient performance in embedded applications.

III. IMPLEMENTATION

The main goal of this paper is to develop an embedded system to maintain attendance of students using Fingerprint technology , Fingerprint Attendance of students maintained, and also incoming time are stored in database. According to Ancient Greek scripts BIOMETRICS means study of life. Biometrics studies commonly include fingerprint, face, iris, voice, signature, and hand geometry recognition and verification. Many other modalities are in various stages of development and assessment. Among these available biometric traits, Finger Print proves to be one among the simplest traits providing good mismatch ratio and also reliable. The present scenario to work a bank locker is with locks which are having keys. By this we can't say that we are getting to provide good security to our lockers. To provide perfect security and to form our work easier, we are taking the assistance of two different technologies viz. EMBEDDED SYSTEMS and BIOMETRICS.

This module has in-built ROM, DSP and RAM. In this, we will store the fingerprints of up to 100 users. This module can operate in 2 modes i.e., Master mode and User mode. We will be using Master mode to register the fingerprints which can be stored within the ROM present on the scanner with a singular id. In this paper mainly 2 modes will be there, admin mode and user mode. In admin mode we store the data of the students in system and user mode is the access mode for taking attendance.. In this system attendance finalize switch will be there that can be operated by the admin person, once admin wanted to finalize the attendance he/she has to press that key, the moment that key pressed, absentees parents will get intimation SMS from this system.

January-February 2020
ISSN: 0193-4120 Page No. 12418 - 12422

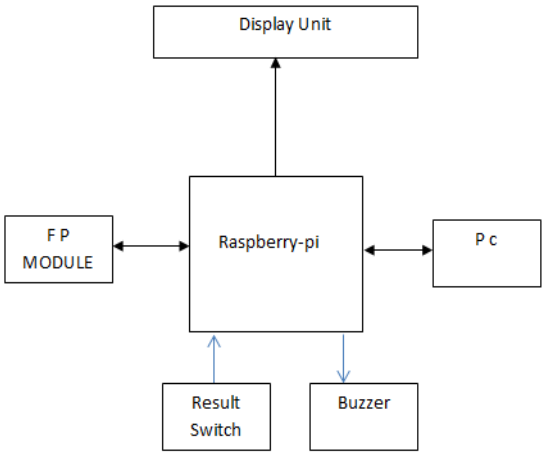

Fig 2 Block Diagram of Attendance Module

KY-M6 Fingerprint Sensor Module is in a position to conduct fingerprint image processing, template generation, template matching, fingerprint searching, template storage, etc. Compared with similar products from other suppliers, KY-M6 proudly boasts of following features. Proprietary property Optic fingerprint enrolment device, KY-M6 hardware also as fingerprint algorithm are all developed by Key Power Security. Wide Application Range of Fingerprints with Different Quality Self-adaptive parameter adjustment mechanism is used within the course of fingerprint enrolment. This ensures good image quality for even dry or wet fingers, thus it's wider application range.

Fig 3 Finger Print Scanner

Immense Improved Algorithm KY-M6 Fingerprint algorithm is specially written consistent with optic imaging theory. The algorithm is sweet for low-quality fingers thanks to its excellent correction and tolerance features. Easy to Use and Expand it's not necessary for user to possess professional knowledge within the field of fingerprint verification. User can develop powerful fingerprint verification application systems with the command set provided by KY-M6.

Low Power Consumption Sleep/awake control interface makes KY-M6 suitable for occasions that need low power consumption. Different Security Levels User can set different security level consistent with different application environment. Application KY-M6 are often used on all fingerprint verification systems, like Safety cabinet, door lock, Complicated door-guard system, Fingerprint IC card Identification Terminal, Fingerprint identification and verification system associated With PC.

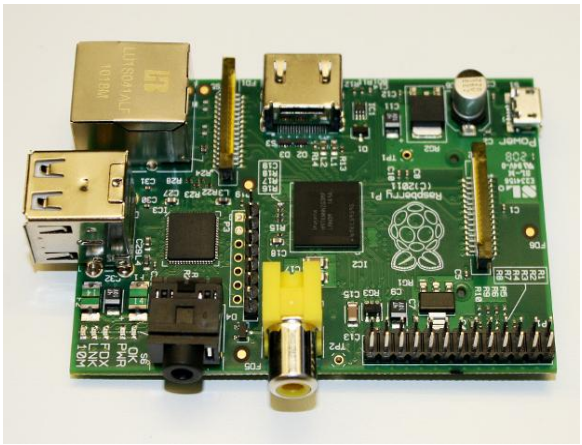

Fig 4 Raspberry Pi Board

The Raspberry Pi features a Broadcom BCM2835 system on a chip (SoC), which incorporates an ARM1176JZF-S 700 MHz processor, VideoCore IV GPU, and was originally shipped with 256 megabytes of RAM, later upgraded (Model B & Model B+) to 512 MB. It doesn't include a built-in hard disc or solid-state drive, but it uses an SD card for booting and protracted storage, with the Model B+ employing a MicroSD.

The Foundation provides Debian and Arch Linux ARM distributions for download. Tools are available for Python because the most programming language , with support for BBC BASIC (via the RISC OS

January-February 2020
ISSN: 0193-4120 Page No. 12418 - 12422

image or the Brandy Basic clone for Linux), C, Java and Perl.

IV.CONCLUSION & FUTURE SCOPE

The prototype has been successfully designed and tested. It has been developed by integrating features of all the hardware components and software used. Presence of each module has been reasoned out and placed carefully thus contributing to the simplest working of the unit. Secondly, using highly advanced Raspberry pi board and with the assistance of growing technology the project has been successfully implemented. If any student continuously absent we can send SMS for class teacher, 3-D scanner using.

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