

4D Experience for Blind and Handicapped persons

Prof. S.B. Dhonde, Ajay B. Kalamkar, Rushikesh G.Deokar, Sunny Y. Dabade

Abstract – The scope of this paper is to make the device which will ease the various things in the life of blind and handicapped persons easy. This device is an electronic Book for the blind. It is a design is to satisfy the needs of blind students, is robust and simple to control, and is activated by touch only. blind or handicap Children can choose activities by announcing the voice command . When the user announce the Menu, the device will interact with the student accordingly. Thus it is a design familiar for use with kids having no computer experience.

I. INTRODUCTION

The telecommunication technology has become the integrated part of our day today life. It has completely revolutionaries the way we communicate, especially long distance communication. It begins with the introduction of telegram, followed by telephones. Then it was overtaken by the advanced telephone systems using digital switching on various other services. Then came the age of mobile communication which facilitates a great deal to communicate on ago. Mobile cell phones are the milestone in telecommunication technology.

Despite of all these advancement in the telecommunication field, the physically impaired people have no access for these technologies. So as a step to bridge the gap between the blind people and the technological advancement in the telecommunication field we decided to design a speech recognizing system for them. We are designing a modular device which is accessible by blind person. For that we are using voice recognition as the basis of the project. Blind people use the Braille language for reading and writing purpose. Till date they conventionally use Braille books. But it is not an economical way to communicate now a day. It has limitation on the maximum number of words per page and pages per book.

So we are interfacing this device with the pc so that dual impaired person can have the access to the system. We are providing voice announcement system with it as extra feature.

Manuscript received at March 20, 2015.

Prof. S. B. Dhonde, Department of Electronic Engineering, Savitribai Phule Pune University, All India Shree Shivaji Memorial Society's Institute Of Information Technology, Pune(Maharashtra), India,

Ajay B. Kalamkar, Department of Electronic Engineering, Savitribai Phule Pune University, All India Shree Shivaji Memorial Society's Institute Of Information Technology, Pune(Maharashtra), India, 9405749669.

Rushikesh G. Deokar, Department of Electronic Engineering, Savitribai Phule Pune University, All India Shree Shivaji Memorial Society's Institute Of Information Technology, Pune(Maharashtra), India, 7709872685 .

Sunny Y. Dabade, Department of Electronic Engineering, Savitribai Phule Pune University, All India Shree Shivaji Memorial Society's Institute Of Information Technology, Pune(Maharashtra), India 8793101797.

II. EXPERIMENTAL PROCEDURE

A. Literature Survey

We have done the search for new ideas on the world wide web .We discussed the lots of ideas with our internal guide on speech processing based project. Then finally our friend Nikhil Patil who had suggest this project to us. He completed his BE in electronics and worked in Airtel 4G company which is at Swargate, Pune. Here he told us a lot of important information about speech signal processing. Also he guided us in improving our paper. He also helped in programming on MATLAB.

Vibha Tiwari[1] We also referred the paper published by Vibha Tiwari on MFCC and speaker recognition ,from electronics department at Gyan Ganga Institute Of Information Technology and Management,Bhopal,(MP).In that she used MFCC algorithm to recognize speaker.

B. Proposed Work

We are designing a system which will give the blind student a 4D real time experience. For this we are interfacing some Electrical appliances to the µprocessor. Such as Fan - Wind experience, Songs – entertainment ,Sauna belt- Desert experience, General Knowledge questions- infotainment. Through these reference points the blind student can access the menu. Here the Menu will be announce verbally via messages stored in SD card. After giving the answer the user will be announced with result in the form of audio. We have given an extra of password security to our project. Due to which the gadget only accessed after announcing a password .We have saved all the audio files in wav format in sd card which is interfaced to the microprocessor.

C. System architecture

a) SPECIFICATION OF THE SYSTEM

16/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 or HVQFN package.8/16/32 kB of on-chip static RAM and 32/64/128/256/512 kB of on-chip flash program memory. 128-bit wide interface/accelerator enables high-speed 60 MHz operation. In-System Programming/In-Application Programming (ISP/IAP) via on-chip bootloader software. Single flash sector or full chip erase in 400 ms and programming of 256 B in 1 ms .Embedded ICE RT and Embedded Trace interfaces offer real-time debugging with the On-chip Real Monitor software and high-speed tracing of instruction execution. 8-channel 10-bit ADCs provide a total of up to 16 analog inputs, with conversion times less. Single 10-bit DAC provides variable analog output.Two 32-bit timers/external event counters (with four capture and four compare channels each), PWM unit (six outputs) and watchdog .Low power Real-time clock with independent power and dedicated 32 kHz clock input. Multiple serial interfaces including two UARTs (16C550), two Fast I2C-

bus (400 kilobits/s), Serial Peripheral Interface and SSP with buffering and variable data length capabilities. On-chip integrated oscillator operates with external crystal in range of 1 MHz to 30 MHz and with external oscillator up to 50 MHz. Power saving modes include Idle and cpu down mode operating voltage range of 3.0 V to 3.6 V ($3.3 \text{ V} \pm 10 \%$) with 5 V tolerant I/O pads.

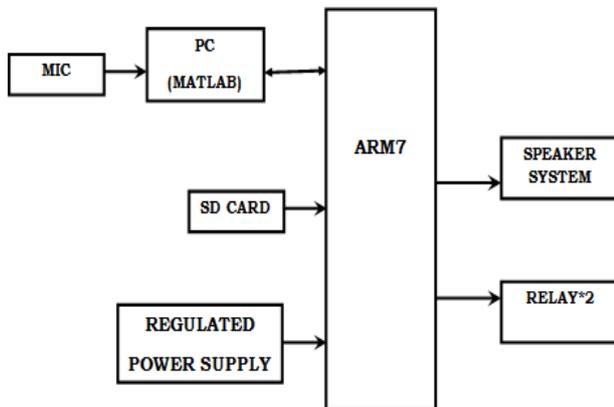


Figure 1: Block Diagram Of The System

b) *Description of block diagram*

ARM7:

The ARM7 is a general purpose 32-bit microprocessor, which is having very low power consumption rating and high performance. The ARM architecture is based on Reduced Instruction Set Computer principles, and the instruction set and related decode mechanism are much simpler than those of micro programmed Complex Instruction Set Computers (CISC). This simplicity results in a high instruction throughput and impressive real-time interrupt response from a small and cost-effective processor core. Pipeline techniques are used to all parts of the processing and memory systems can operate continuously. When one instruction is being executed, its successor is being decoded, and a third instruction is being fetched from memory. The ARM processor also uses a unique architectural strategy known as Thumb, which makes it ideally suited to high-volume applications with memory restrictions, or applications where code density is an issue. This is because of Thumb is that of a super-reduced instruction set. The ARM7TDMI processor has two instruction sets:

The standard 32-bit ARM set

,A 16-bit Thumb set.

The Thumb set's 16-bit instruction length allows it to approach twice the density of standard ARM code while retaining most of the ARM's performance advantage over traditional 16-bit processor using 16-bit registers. This happens due to Thumb code operates on the same 32-bit register set as ARM code. About 65% is provided by thumb of ARM, and 160 % of the performance of an equivalent ARM processor connected to a 16-bit memory system. The implementation of flash in the LPC2141/42/44/46/48 allows for full speed execution also in ARM mode. It is recommended to program performance critical and short code sections ,such as interrupt service routines and DSP

algorithms in ARM mode. The code size will be minimal but the speed can be increased by 30% over Thumb mode.

RELAY AND RELAY DRIVER CIRCUIT:

Relay is an electromagnetic switch which consisting of a coil, 1 common terminal, 1 normally closed terminal, and one normally open terminal.

The relay's switch connections are commonly named as COM, NC and NO:

COM = Common, always used to connect to this, which is the movable part of the switch

NC = Normally Closed, COM is connected to this when the relay coil is off.

NO = Normally Open, COM is connected to this when the relay coil is on.

Relays used to one circuit to switch a second circuit, which may be completely separate from the first. For a low voltage battery circuit we can use a relay to switch a 230V AC mains circuit. There is no electrical connection in the relay between the two circuits; the link is magnetic and mechanical.

DRIVER CIRCUIT FOR THE RELAY:

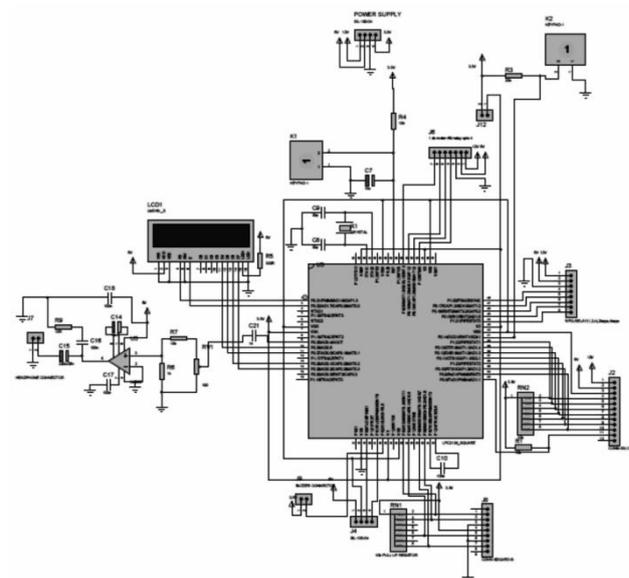
In our project two SPDT Relays (Single Pole Double Throw Relay) are used. Relay is run by the micro controller as per system requirements .One of them is used to cut off the power supply when balance goes to zero and other relay is for off hook or on hook notification to MSEB.

Advantages of relays: Relays can switch AC and DC, transistors can be used only to switch DC. Relays can be used switch high voltages but transistors cannot be used. Relays are better for switching large currents ($> 5\text{A}$). Relays can switch many contacts at once.

SD CARD:

SD card is basically is used as a storage device which will required to store the required data. The database of system can be used to store in SD card in the form of .wav file and can be accessed from that whenever it is required. SD card is interface is done using a protocol called Serial Peripheral Interface protocol.

CIRCUIT DIAGRAM OF PROJECT:



III. ADVANTAGES

- 1) Less time delays
- 2) Quick response time
- 3) Fully automated system
- 4) Robust system
- 5) Low power requirement ratings

IV. APPLICATIONS

In the schools for blind and handicapped students for education. Also, can be used for the entertainment of affected personnel. In improving the social life of blind and handicapped persons. This device can also prove its importance in industrial life of such personnel.

V. CONCLUSION

Handicapped persons cannot travel to places such as desert ,they are not able wander in open air. They become homesick which is not good from social point of view. To reduce such problems the device is milestone . Also the education they gain can make them independent.

VI. FUTURE SCOPE

For better security we can give thumb impression password Explore assistive technology for individuals with disabilities (any item, piece of equipment, or product system whether acquired commercially off the shelf, modified or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities).

REFERENCES

- [1]Vibha Tiwari Deptt. of Electronics Engg., Gyan Ganga Institute of Technology and Management, Bhopal, (MP) INDIA "MFCC and its applications in speaker recognition" International Journal on Emerging Technologies 1(1): 19-22(2010)
- [2] Conrad F. Sabourin Computational Speech Processing: "Speech Analysis, Recognition, Understanding, Compression, Transmission, Coding, Synthesis ; Text to Speech Systems, Speech to Tactile Displays, Speaker Identification, Prosody Processing ": BIBLIOGRAPHY, by Conrad F. Sabourin, 1994, 2 volumes, 1187p, ISBN 2-921173-21-2, INFOLINGUA inc., P.O. Box 187 Snowdon, Montreal, H3X 3T4, Canada. See also: <http://gomer.mlink.net/infolingua.html>
- [3]Joseph Picone Institute for Signal and Information Processing (ISIP) at Mississippi State University has put the course notes for "Fundamentals of Speech Recognition" on the WWW. The course covers background probability and phonetics/acoustics, speech signal analysis, dynamic programming, dynamic time warping, hidden Markov modelling, language modelling, neural networks, etc. The WWW sites provides the syllabus and lecture notes. WWW: http://www.isip.msstate.edu/publications/1996/ee_8993/

ABOUT THE AUTHORS



Prof. S.B. Dhonde. Assistant Professor
Department of Electronics Engineering, SavitribaiPhule Pune University.
All India ShriShivaji Memorial Society's Institute of Information
Technology.Pune. B.E.(E&TC), M.E. (Electronics) ,Phd (pursuing)
Specialization in Electronics.Having Industrial - 4 Years Teaching – 9
Years



Ajay B .Kalamkar, Final year B.E. Electronics student of SavitribaiPhule Pune University, All India ShriShivaji Memorial Society's Institute of Information Technology, Pune.



Rushikesh G. Deokar, Final year B.E. Electronics student of SavitribaiPhule Pune University, All India ShriShivaji Memorial Society's Institute of Information Technology, Pune.



Sunny Y. Dabade, Final year B.E. Electronics student of SavitribaiPhule Pune University, All India ShriShivaji Memorial Society's Institute of Information Technology, Pune.