Electronics Dictionary for Students with Visual Disabilities
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Abstract—There is a great need in society to ensure the innovative technology like electronic dictionary, which enables human beings with visual disabilities while accessing learning research systems to fulfill above need in this project. Braille Keyboard is used for interfacing between human and ARM processor. ARM processor process and fetch the appropriate answer from the memory. And at last correct answer transferred to text to voice transformer. This converts answer into the voice.

Key words: Visual Disabilities, ARM processor

I. INTRODUCTION
In today's world every human needs to study. The students who can see they will easily learn and increase their knowledge. But in this world there are many students they can't see. So the main problem for those students they can't see. Because of they cannot learn new things.

They cannot get the perfect meaning. For solving above problem we are working on the project named "electronics dictionary for students with visual disabilities." In this paper basic concept is that the blind student will type a word in the keyboard. That keyboard is specially designed for the blind students. This keyboard has the Braille stickers on the keyboard by that the students can feel the dots and they will type the word. The pre programmed ARM processor will search the word into the memory. If the word matches than the actual meaning will come out from the memory to LCD. And show on the LCD model. And then after the correct meaning will goes to text to speech module. This module will simply converts that text into voice. For the voice output loudspeaker is useful. The main reason for using the loudspeaker is that the blind students cannot see. So by they can hear that voice and learn the perfect meaning with the help of our electronics dictionary.

II. SYSTEMOVERVIEW
This system has many parts like, LPC 2148, text to speech module, Keyboard, loud speaker, LCD module.

The simple keyboard is not useful because the blind students cannot see. For that the Braille sticker will provide on the keyboard. The internal memory of LPC 2148 will help full to store word. In that memory maximum 800 words with its meaning can store. Another problem is that, blind students cannot see so if the output comes from the loud speaker then they will get the perfect meaning.

The basic block diagram of above concept is given in Fig. 1 for better understanding.

III. HARDWARE DESCRIPTION
The description of all hardware is given below

A. Text-To-Speech Module
It’s converts digital text into sounding speech output. It is unconstrained voice converters. It is using the DEC talk to speech engine. It is works on command based simple interface. [4]

1) Features
- It is good speech synthesis for English.
- It has good pitch control
- It has pre-programmed voice style
- It has 3.5mm audio jack on the board.
- It is using the DEC talk to speech engine.
- It has simple interface.

2) Key Specifications
- It operates on the -10 to 70°C.
- It works on +5 volts
- It has width 1.25” W, length 1.5” L, and height 0.37”

Fig. 2: Text to speech module [4]
3) Pin Function
- Ground: System ground.
- 5V: 5 VDC input.
- SOUT: Serial output to host.
- SIN: Serial input from host.
- SP-: Differential audio amplifier output.
- SP+: Differential audio amplifier output.

All above are the basic functions and the working procedure of text to speech module.

Below given is the basic circuit model of text to speech module with all pins and power supply.

![Text to Speech Module](image)

Fig. 3: Text to speech module 2 [4]

### Table 1. Pin Description of LCD

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vss</td>
<td>Ground</td>
</tr>
<tr>
<td>2</td>
<td>Vdd</td>
<td>+5 V power supply</td>
</tr>
<tr>
<td>3</td>
<td>Vee</td>
<td>Power supply to control contrast</td>
</tr>
<tr>
<td>4</td>
<td>RS</td>
<td>RS = 0 to select command register</td>
</tr>
<tr>
<td>5</td>
<td>R/W</td>
<td>RS = 1 to select data register</td>
</tr>
<tr>
<td>6</td>
<td>E</td>
<td>R/W = 0 for write</td>
</tr>
<tr>
<td>7</td>
<td>D0</td>
<td>R/W = 1 for read</td>
</tr>
<tr>
<td>8</td>
<td>D1</td>
<td>Bit 1</td>
</tr>
<tr>
<td>9</td>
<td>D2</td>
<td>Bit 2</td>
</tr>
<tr>
<td>10</td>
<td>D3</td>
<td>Bit 3</td>
</tr>
<tr>
<td>11</td>
<td>D4</td>
<td>Bit 4</td>
</tr>
<tr>
<td>12</td>
<td>D5</td>
<td>Bit 5</td>
</tr>
<tr>
<td>13</td>
<td>D6</td>
<td>Bit 6</td>
</tr>
<tr>
<td>14</td>
<td>D7</td>
<td>Bit 7 MSB</td>
</tr>
</tbody>
</table>

B. LPC-2148

LPC-P2148 is microcontroller with USB 2, it has RAM up to 40 Kb.

1) Board Features
- It is 16/32 bit ARM7TDMI
- It has 512 kb program flash and 42kb RAM
- It has two buttons
- Two LED that shows different status. It can connect with USB.
- Power supply required is 6 V

C. 16*2 LCD

A 16*2 LCD screen come with two lines each containing 16 characters.

![Pin Configuration of LCD](image)

Fig. 5: Pin configuration of LCD [3]

IV. Concept

The basic concept of this system is to help the blind students to learn new thing. If the student wants to know the meaning of any word then they will search the word in this dictionary. The LPC 2148 can store 800 words in its internal memory. Through keyboard input is provided and then that word is searched by processor into internal memory. If the spelling is correct than the meaning will be displayed on the LCD. But the blind students can’t able to see it, so the meaning come from loudspeaker than the student can listen the meaning. When the ARM processor will send the output to the text to speech module than the module will convert the text into speech. That speech come out from loud speaker and student will listen the meaning. By that the proper meaning can found.

V. Results

Here “active” word was searched then it is displayed on the LCD panel and meaning of word “active” was heard through the loud speaker. It is also possible to hear the meaning via headphones by connecting it through 3.5 mm jack in text to speech module.

![Hardware with Result Displayed on LCD](image)

Fig. 6: Hardware with result displayed on LCD

VI. Conclusion

This system provides great help to the people with visual disabilities, feeling helpless to find proper meaning of unknown word through reading. This system provides the proper meaning of particular word without more time consumption or any physical hurdles.
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REFERENCES