Design and Development of Online web Based Self Learning Tool for Bisually Challenged Students in Information Technology and Computer Science Skills

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ABSTRACT

In this paper we are proposing a learning tool for visually challenged students in computer science and information technology skills. It is a self learning online web based software tool which mainly concentrates on core software areas like operating systems (windows,linux), office tools(Ms-office), internet technologies (webbrowser,html),programming(c,java),database management systems. We are mainly developing this tool with 4 phases.
1. Theory- audio based tutorial.
2. Practical- audio based tutorial+practice.
3. Practice- complete assistive technology based exercise.
4. Evaluation- Evaluating the total learning process.
This can be extended to certification that helps him to get employment and financial independence in his life. It is a work prescribed in DST project sponsored by DST-SEED wing.

Key work :
1. Database Management System.
2. Designing of Web pages.
3. Preparing of audio based tutorials.

1. INTRODUCTION

In this paper we are mainly concentrating on development of a learning module for visually challenged students on 6 basic IT based courses which are mainly useful for getting employment in IT industry.

The main reason for selecting these 6 courses is **Office tools** training is useful for jobs like data entry, banking sector where documentation is mostly important.

Linux training mainly provides system administration and network administration. once a blind student get this training he can be easily adaptable into IT industry.

C&DS tells him how to write the basic programming as well as it also creates awareness on data structures.

Java is most important IT industry requirement. If a person with visually enabled problem gets trained in this module he become eligible for IT jobs where java place the back end role in the development.

DBMS if a visually enabled person or a student can write his own queries and if he can create his own forms and reports he will be best suited for the IT industry.

Web Technologies if we train a visually challenged student in web technologies he become eligible as a technical office assistant and web programmer.

To prepare all these modules we follow 4 steps.

2. IMPLEMENTATION

Preparation of audio based tutorial for theoretical part :

Preparation of this module is done in the following steps. Once visually challenged student access this module he gets information about the chapters and main concept we are explaining in that chapter and the screen it will display on html page and the visually challenged student it will be available content in a step wise procedure. Once he selects the chapter the main topics in that chapter will be illustrated then he has to select the topic for which the illustration or explanation what he required .once he select the topic audio based explanation or illustration about that topic is presented to him in a step wise manner. He can move forward or backward to repeat the explanation or he reach to his expected point. once the student got the concept clarity he can go to the next topic or he can go to the previous topic. He can also go to the practical module to get familiarity of the concept in the module.

The preparation of this module consists of the following steps :

1.   We will create the audio files for the each topic.

2.   Then we will combine all these topics to a specific concept.

3.   And we will assign a chapter name and number to the specific concept.

4.   We will prepare indexes for the audio files based on chapter

5.   Name and number as well as based on topic name and number.

6.   The subject name place in the menu as the first access point.

7.   In that the subject menu indexes the index and the next sub menu indexes the topic wise index.

8.   The corresponding audio file will be placed with every topic index.

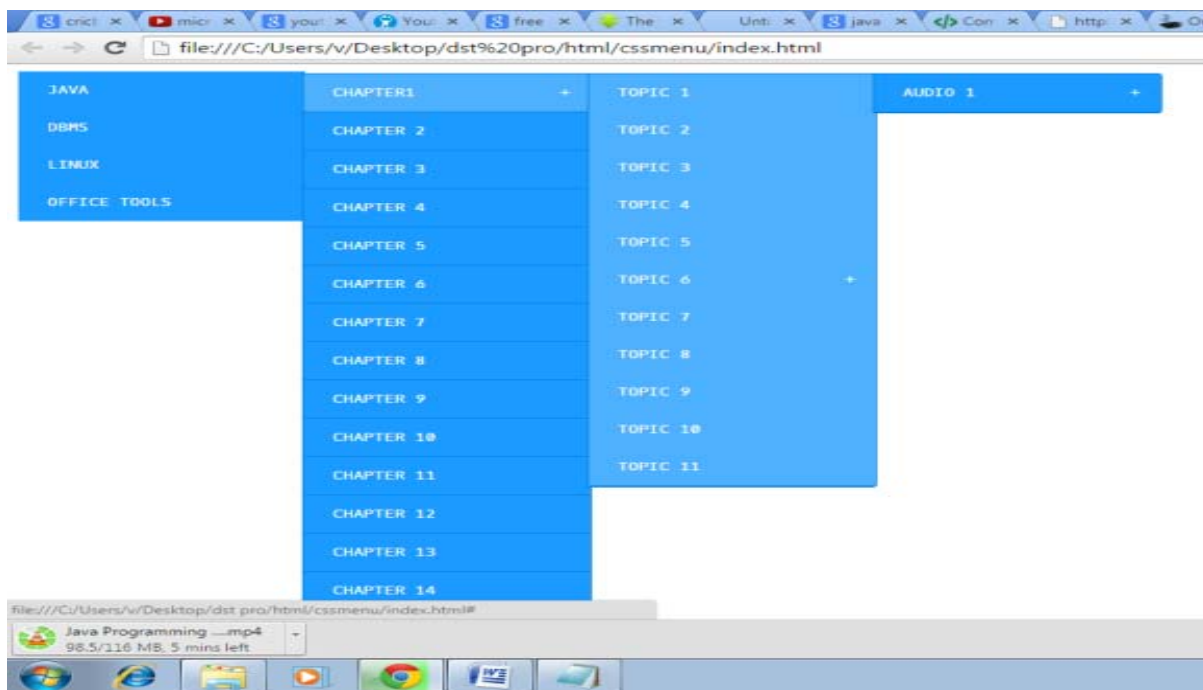9.   In preparation of this module we use html programming, css, java script.

Figure 1.

Audio based tutorial for the practical module:

Once student got the concept clarity then he will go to the tutorial for the practical part. In this practical module we have the example programs for the each and every concept. Once student selects the chapter and the topic here we have the example programs tutorial. He has to select the example program for the practice when he select the example program automatically a text window will open with example program code. First listen program what he selected after that we have 3 buttons bottom of the page save, compile, and execute. When he clicks the save button automatically program will stored into their own hard disk.

NOTE : For the program compilation and execution he need to install or maintain JDK software.

When he clicks the compile button automatically program will compile if any errors occurred in that program errors will be displayed in errors window NVDA screen reader will read all those errors. If any errors occurred in the program first listen the errors then go back for the program window and edit the program where we got the errors then compile the program. These steps will be in the exercise module because in

that module he will write his own program so errors may be occurred in that program but this is a practical tutorial no need of code writing no errors in that program. After compilation next step is execution of the program when he selects execution button automatically output will displayed in output window it is in the right side of the text window or program window NVDA screen reader will read all the output. When he clicks the execute button he will get the output then check whether the output is correct or not.

Preparation of this module consists of the following steps :

1.   Create the audio file for the topic wise example programs.

2.   Combine the programs in the specified topic.

3.   Combine these topics in a specified chapter.

4.   Then create html page for this tutorial for the practice module.

5.   Create menu bar for the chapters and topics.

6.   Create 3 text windows for the program window, error window and out put window.

7.   Create 3 buttons for the save, compile, execute.

8.   Create 2 buttons for next, back.

For preparation of this module we use html, css, javascript.

Algorithm for the audio based tutorial for the practical module:

Step 1 :   create audio files for the example programs.
Step 2 :   combine all the example programs in to the topics and combine all the topics in to a chapter.
Step 3 :   create a html page by using frames, text windows, buttons, and menu bar.
Step 4 :   Select chapter in that chapter select one topic in that select one example.
Step 5 :   Example program will display in the text window that is program window.
Step 6 :   First listen that program when the student got clarity in that program then go to the next step.
Step 7 :   Save that program by clicking the save button the program will store in to his own pc for this we use html and java script code.
Step 8 :   Next step is compilation in this compilation process errors will display in the error window.
Step 9 : After compilation next step is execution in this step output will display in the output window.
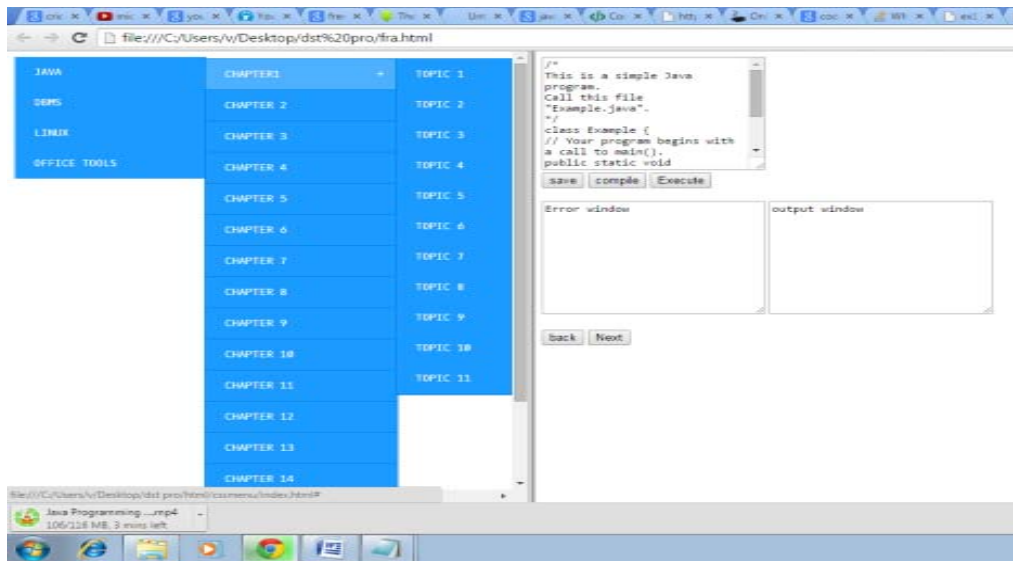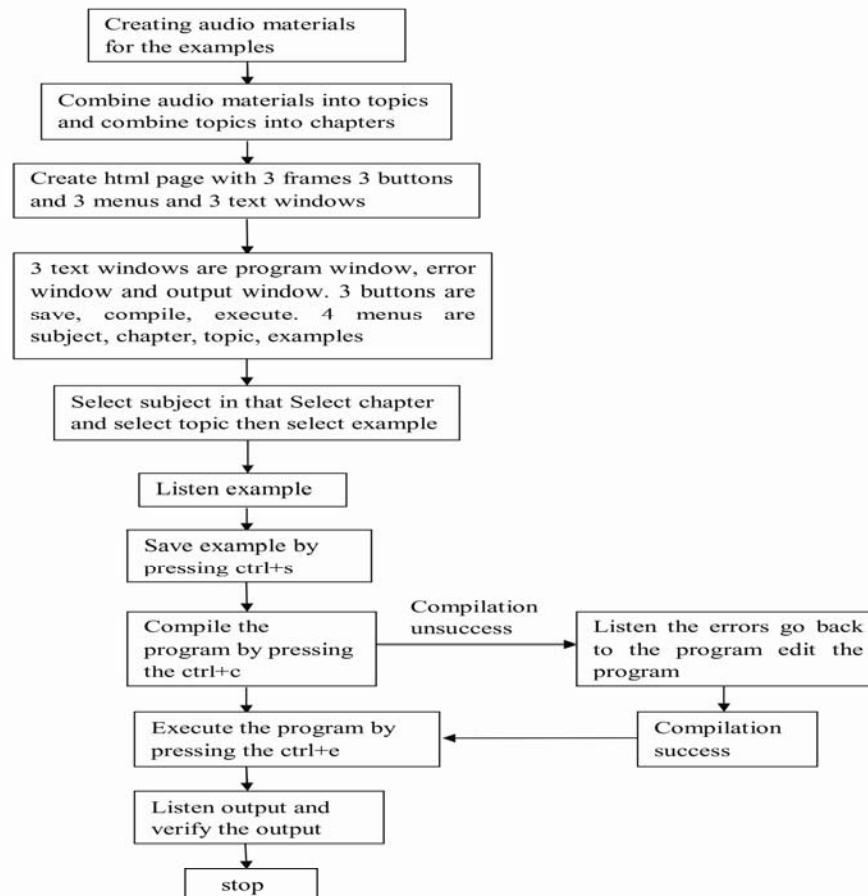Step 10 :   They need to go to next program click next button.

Figure 2.

Flow chart for the audio based tutorial for the practical module :

Practice module:

Once student got clarity on programming then he will go to the practice module in this practice module student will try to write his own program. Once student selects the chapter in that selects the topic here we have the example programs tutorial.

In this example programs tutorial student will write his own code for the exercise programs. He will enter his own code for the excersice program then save that program by pressing the save button. Then program code will save automatically into the hard disk then the next step is program compilation. After saving the program next step is compilation for the compilation he or she needs jdk software in his/her own system.

After that click the compile button automatically error window will appear in that page. NVDA screen reader will read all the errors and come back to the program rectify the errors again compile the program check the errors upto no errors in that program. After successful compilation execute that program for that click the execute button then automatically output window will appear then check weather the output is correct or not.

If you want to go to next exercise click next button or go back click back button.

Preparation of this module consists of the following steps :

1.   Create the exercises file for the topic wise programs.

2.   Combine the programs in the specified topic.

3.   Combine these topics in a specified chapter.

4.   Then create html page for this practice module.

5.   Create menu bar for the chapters and topics.

6.   Create 3 text windows for the program window, error window and out put window.

7.   Create 3 buttons for the save, compile, execute.

8.   Create 2 buttons for next, back.

For preparation of this module we use html, css, javascript.

Evaluation module:

The main objective is to give multiple choice questions one at a time in sequence and grade them at the end of the exam. once student got clarity on tutorial and practice module then he will go to the evaluation module. First question will appear on the

screen it will be converted as audio by NVDA and answers will be expressed to him in a/b/c/d choices. He will listen questions as well as 4 choices for answers. He will enter the choice which he feels as answer(a/b/c/d) by pressing key on keyboard/tab. The system will pronounce whether the answer is correct /wrong. It will also pronounce the total marks scored upto now. Then it requests him to goto next question when he press enter next question will be displayed on the screen.
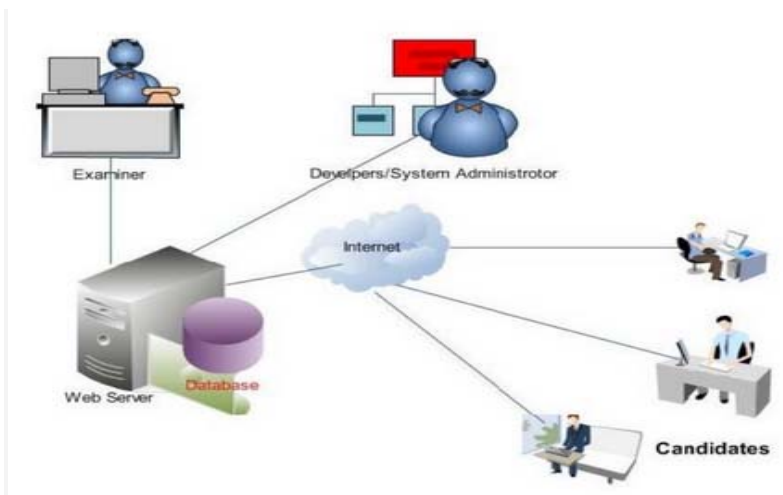

Figure 3 Examination system.

Figure 4.

3. RESULTS

Training programs conducting for visually challenged students in 2 blind schools in Guntur district.

4. CONCLUSION

Generally the visually challenged students are facing critical problems in accessing of IT relevant courses and they struggle to learn. All the physically enabled candidates have a chance to learn the employment based courses like java, dbms, Web technologies etc by using online web based self learning tool. These tools are useful for the people who are interested to work in IT industry and who are interested to learn new technologies. Audio based tutorials for the theoretical part , Practical part and the practice exercises are illustrated. This is efficient tool for the visually challenged students.

After this tool we will provide the tutorials for the new technologies not only in the IT industry but also in the different sectors. Further we will develop an APP for the smart services and also we will simplify the pattern.

5. ACKNOWLEDGEMENTS

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