

Tulexia: Tutor for Dyslexics

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Abstract— This paper introduces a software for dyslexic patients. Dyslexia is a brain condition in which people face problems in detecting words, reading sentences. They cannot read words aloud and they get confused in similar alphabets and numbers. This problem can be cured but it requires proper attention and training to dyslexic people. Training is given like word detecting practices, character visualization, practicing similar alphabets, teaching phonics. This software is based on artificial intelligence and virtual reality. It will try to help dyslexic people and will improve their condition. This software will also contain some animations to reduce the frustration level of dyslexics.

Index Terms—About four key words or phrases in alphabetical order, separated by commas.

I. INTRODUCTION

The proposed software will be used in the future to train people with dyslexia, by helping them in reading, recognizing and writing alphabets. This software will provide character visualization and other animations in virtual reality to keep them attentive and avoid their frustration.

One of the problem faced by dyslexics is difficulty in recognizing symmetric alphabets like b and d, p and q, m and w etc. This application generates random words on screen and provides a practice session to recognize all the alphabets in word displayed. This is created using a gaming platform Unity-3D and Virtual Reality. It also provides a digital brush functionality in 2D to practice writing. Together with this application, personal attention is required to these people.

II. RELATED WORK

There are many applications in market which uses technology like Reading apps: Since reading is very important part of today's life, people with dyslexia can be frustrated with difficulties in reading and understanding the words written. There are many applications that can read pdf documents aloud for users, apps that convert pictures of text to readable text through optical character recognition (OCR). Eg: KNFB Reader (99.9\$), Natural Reader, Learning Ally, Google Play Books (free).

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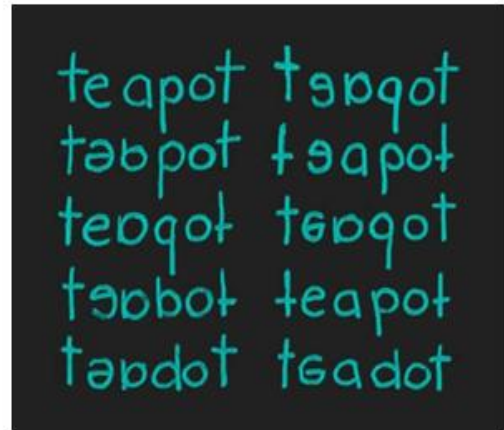


Fig. 1. Problem with alphabets faced by dyslexics

Writing apps: Writing can be challenging for normal people too but it can be more problematic and frustrating part for people with dyslexia. Written expressions are usually hampered by difficulties in spelling, applying correct grammar principles, and remembering desired vocabulary. For portable devices there are apps that utilize word and vocab prediction, dictation of word, contextual spelling and grammar checking and word retrieval tools and techniques to make writing process much easier. Eg: Ginger page, Google keyboard, iWordQ(24.95).

III. METHODOLOGY

The proposed system includes four modules shown in Fig. 2 . This system is implemented using Unity 3D, Virtual Reality and C#.

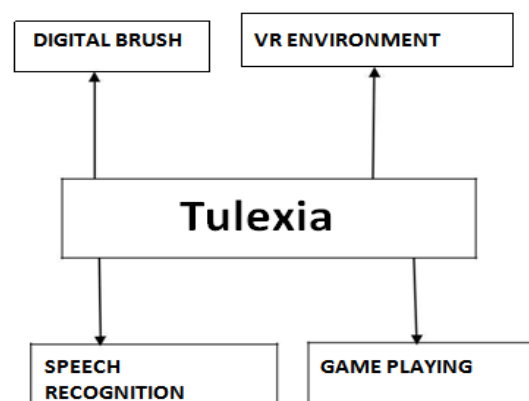


Fig. 2 Modules



Fig. 3. Brush Strokes

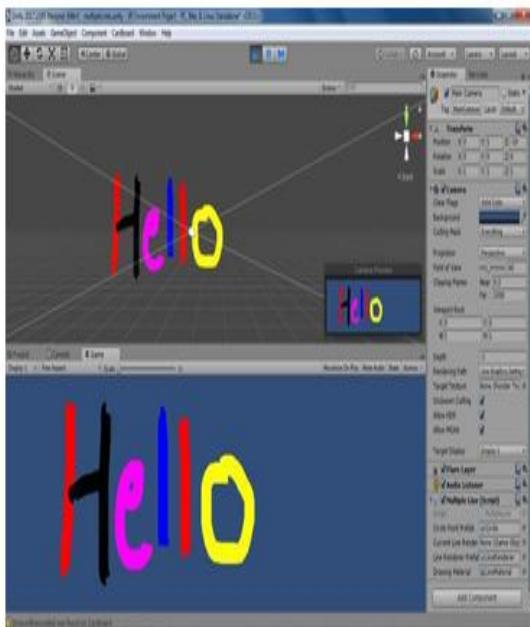


Fig. 4 2D digital brush

A. DIGITAL BRUSH

It is created using Unity 3D gaming platform. Using Digital brush users can write words in 2D interface. With the help of pattern recognition, we can provide practice to users of writing.

The concept of digital brush is very simple. A digital brush is made up of a number of brush tip impressions painted at a number of points. Along each stroke these brush tips or impressions are painted at fixed intervals. This interval is known as spacing. If the spacing between points is very small the brush implementation will be inefficient. If the spacing between points is very large it will be visible that the stroke is made up of individual.

B. CREATING VR ENVIRONMENT

VR environment is created using Google VR sdk. It will provide user new environment and learning in interactive way rather than old traditional way.

C. SPEECH RECOGNITION

To check their fluency in speaking words, we have to use speech recognition script of Windows. A random word will be generated and user has to pronounce the word correctly. If user pronounce it correctly then score would be awarded and next word would be generated, else user has to try it until he get it correctly.

To get good quality result, a good quality of microphone would be required. Sometimes it makes the difference between success and failure. Microphone used should be accurate, robust, comfortable, minimize interference from external noise. Proof reading, especially from a computer screen is difficult for dyslexic people.

To spot these errors and provide practice this module of application would reward marks or score for correct reading and pronunciation of word generated by computer. If there is any error, it will not move forward to next word until user pronounce it correctly. This is of great interest to dyslexic people. It improves reading and speaking skills of them.

D. GAME PLAYING

The major issue with dyslexics is frustration. They get frustrated with the black and white old style of reading and writing very fast. To attract them and make them attentive colorful graphics are used. This module of application is actually game playing created using Unity3D and Virtual environment that contains learning.



Fig. 5 VR environment of game playing

In this module random words are generated usually words that contains symmetric letters like b and d, p and q, m and w, etc. Blocks of letters will fall down and user has to go towards the block and select letters sequentially to make that word. If the user is successful then another words is generated and if not then computer will warn them about errors using a cross mark or something and they again have to select letters to make correct word.

This module of application will definitely improve their spelling power, word power and most importantly their confusion of symmetric letters would be cleared.

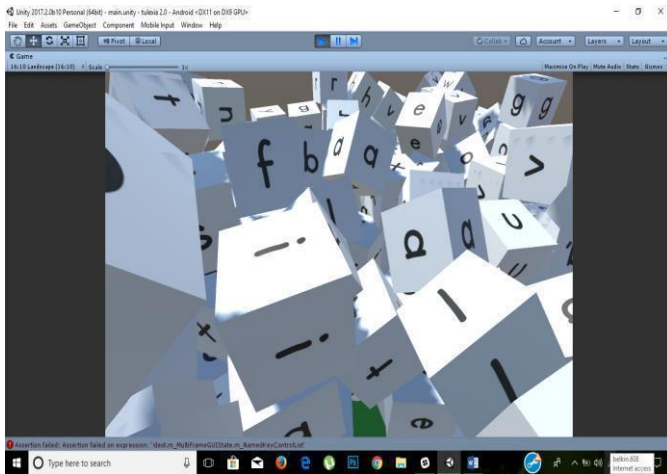


Fig. 6 . blocks of letters

IV. CONCLUSION AND FUTURE WORK

This paper presented speech recognition, implementing digital brush to write alphabets and creating virtual reality environment to help dyslexics in curing their problems. In the future we will try to trace the alphabets, numbers and words in a interactive way (with musical background). We will try to add animations to make Tulexia more interactive. To increase attention span of user we will try to add

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