SIGNL - A SIGN LANGUAGE LEARNING APP

[1]Roshna Raveendran, [2]Adish D Kumar,
[3]Adwaid M, [4]Ajay Shankar M, [5]630Jimin Dev
[1]Asst.Prof
[1,2,3,4,5]Dept of CSE College of Engineering Thalassery
[1]roshnaraveendran7376@gmail.com, [2]adishkvs@gmail.com, [3]adwaidmk123@gmail.com
[4]ajaysachu6@gmail.com, [5]jimindev9@gmail.com

Abstract: Muteness/mutism or the inability to speak is considered to be a true disability. There are number of ways in which they can communicate and one such way is using sign language. Sign languages are full-fledged natural languages with their own grammar and lexicon. It is currently the most commonly used and effective communication language for hearing and speech impaired people. One should learn sign language to interact with them. Learning usually takes place in peer groups. There exist very few study ma terials for sign learning. Because of this, the process of learning sign language learning is a difficult task. The main focus of this work is to find means to ef- fectively deal with the above mentioned issue by cre- ating a live interactive learning platform using Machine Learning algorithms.

SignL is designed as a Video game-based web application that helps to learn signs with help of mini video games, where the inputs of the games are hand gestures itself.

1 Introduction

There are around 466 million people worldwide with hearing loss and 34 million of these are children. 'Deaf' people have very little or no hearing ability. They use sign language for communication. In de- veloping countries there are only very few schools for deaf students. Unemployment rate among adults with hearing loss are very high in developing coun- tries World Health Organization (WHO) "factsheet" states that teaching sign language will benefit chil- dren with hearing loss. Signs in sign languages are the equivalent of words in spoken languages. Although sign languages are rooted in manual gestures, they are not iconic in nature. But learners in the initial stages of SL learning use iconicity as a mnemonic aid to remember new signs. But the lack of iconicity makes it difficult to learn new signs for those who learn SL as a new language.

Sign Learning is very difficult for a beginner with- out the help of trained sign language practitioner. Learning through books is not effective as it is not easy to represent signs in a book using pictures. Though technology based tools exist for sign lan- guage learning, they do not provide any feedback on signs produced by the user. This makes it difficult to learn signs without any external help. Human re- sources in this field is very less. Figures from India states that there are only 250 interpreters ie, roughly one for every 20284 deaf people. Difficulty in un- derstanding spoken language and its written forms, limited sign language proficiency of the teachers and the high expense parents incur in educating their deaf child are factors that negatively affect sign language learning . Apart from deaf people, parents, teachers, social workers and researchers need to learn signs. It is difficult for them to attend training programmes for learning signs. For hearing and speaking parents of deaf children, lack of learning mechanism coupled with their speaking ability makes them favor lip read- ing instead of using sign language. This makes it difficult for the child to communicate properly. Like many spoken language varieties, sign language has many regional variations. This is a problem for com- munication within deaf community itself. Our sign learning application helps to tackle that problem by helping to learn same standardized sign irrespective of the

location of the participant. Major highlight of this application is that, user can learn signs without any external help

SignL is designed as a Video game-based web appli- cation that helps to learn signs without any external help. It is designed to work from any web browser so that users can access it without installing any new application. SignL consist of two section a digital dictionary section and a practice section. Dictionary section consist of images and video lectures of par- ticular sign, the practice section consist mini games where you can practice hand signs with the help of videos games

2 Existing system

Technology based tools exist for both sign language learning and learning new concepts through sign lan- guage, but amount of interactivity provided by these tools vary Though there exist tools that utilize Au- tomatic Sign Language Recognition (ASLR) they re- quire costly extra sensors for working. Large number of mobile based multimedia dictionaries exist for sign learning. Other than predictive searching and sign categorization they provide little interactivity Virtual reality-based mechanisms were also explored for sign language-based teaching/learning.

3 Proposed system system

SignL is designed as a Video game-based application that helps to learn sign language. It is a web appli- cation it is designed to work from any web browser so that users can access it without installing any new application. SignL consist of two section a digital dictionary section and a practice section.

Dictionary section

Dictionary section consist of images and video(no au- dio) representation of particular signs. The user can learn to sign a particular alphabet with the help of images and videos .This section also host video lec- tures for non-deaf people (like parents, siblings and friends of the deaf and people who are interested in learning sign language) where they can learn about the sign language more detailed

Practice section

The practice section consist mini games where you can practice hand signs with the help of engaging mini video games

In this section signs(alphabets) are divided into set of 5, user can select a set of 5. Based on the set selected mini games are played. Before entering the mini game a small introduction is given on the set of sign to how to sign them or user can always check on this in the middle of the game by pausing the game

4 System architecture

A client-server application is a distributed system consisting of both client and server software. The client process initiates a connection to the server, while the server process always waits for request from any client, when both client and server processes are running on the same computer

The major components of the architecture are: Browser, Database, model, Admin, Users

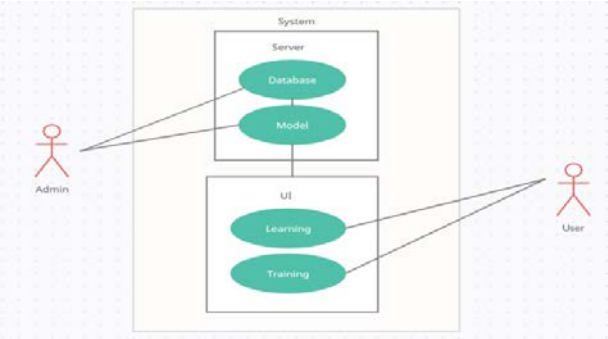

Figure 1: An image of a galaxy

5 System working

The user has to first sign up into the web application which registers the user onto the central database and thereafter the user can log onto the web application

After login user has given two option learning and training. By clicking on learning user will be directed to the dictionary section from where user can learn about signs. Another option is the training option by clicking on user will be directed to practice section where user can select the learning sign set and start the mini games for practice

In the practice section SignL uses machine learning model detect the hand sign produced by the user and based on sign detected by the model inputs for the video games are produced

6 Conclusion

This paper presents SignL, a Video game based web application for learning sign language making use of Deep Neural Networks (DNN). SignL application can easily be used by both deaf and non-deaf people. Ease of use, availability, low cost of operation, engaging are the features that make SignL a useful application for learning sign language .

7 References

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