isrjournals
International Journal of Advanced Research in Computer Science Engineering and Information Technology
Volume: 6, Issue: 3,Special Issue: 1 ,Apr,2021 ,ISSN_NO: 2321-3337

HUMAN ACTIVITY AND SIGN LANGUAGE RECOGNITION FOR NON-DEAF VISUALLY IMPAIRED PEOPLE

Bharathi G P & Pravin R
Student of Nehru institute of
engineering and technology, Coimbatore.
Anna University affiliated

Mr. G. Jeevanantham
Asst. professor of Nehru institute of
engineering and technology, Coimbatore.
Anna University affiliated

Abstract- **The recognition of human activity is one of the active areas of research in computer vision for various contexts such as safety surveillance, health care, and humans. In this project, Human Activity Recognition is generally developed for recognizing human activities, using HAR for blind people is a very crucial thing. HAR aims to recognize activities from a series of observations on the actions of humans and inform the humans and their actions to blind people by earphones. HAR also aims to recognize the sign language of deaf people and translate that language to human language. By integrating recognition of human action and recognition of sign language will help visually impaired people. Blind people may sense the people's moving in front of them but they can sense only a limited distance of area, for overcoming these issues, using HAR they can sense the human and their action preciously. The main objective is to recognize and translate human activity. The framework provides a helping hand for speech-impaired to communicate with the blind and the rest of the world also. This results in the elimination of the intermediary who usually acts as a means of translation. By integrating HAR and SLR, the integrated interface is named HASLR** ***Keywords—sign language recognition, smartphone, human activity recognition, integrated interface***

I. Introduction

This Project is designed to facilitate visually impaired people with human activity and sign language recognition, it will help the non-deaf visually impaired people to recognize the human activity and sign language with the help of smartphones. By this project, they can able to sense what's happening in front of them and easily recognize sign language without a third party or intermediate people.

This project is purely android based application, this will capture the series of actions that are happening in front of the non-deaf visually impaired people and deliver the output to the visually impaired people. The mandatory datasets for sign language are created and stored which will help to recognize the sign language preciously. Human Activity Recognition is generally for recognizing human activities, using HAR for blind people is a very crucial thing. HAR aims to recognize activities from a series of observations on the actions of humans and inform the humans and their actions to blind people by earphones.

Sign language is a very important communication medium for persons who are deaf-mute. In gestural language, each movement has a specific meaning. So, therefore, complex meanings can be explained with the help of a combination of various basic elements. Sign language is a gesture-based language for the communication of deaf and dumb people. It is essentially nonverbal language that is usually used by deaf and mute people to communicate more effectively with each other or with normal people. Sign language contains special rules and grammar for expressing effectively. Basically, there are two main sign language recognition approaches image-based and sensor-based. But lots of research is going on image-based approaches only because of the advantage of not need to wear complex devices like Hand Gloves, Helmet, etc. like in the sensor-based approach.

HAR also aims to recognize the sign language of deaf-dumb people and translate that language to human language. By integrating recognition of human action and recognition of sign language will help visually impaired people.

This HASLR project providing an interface to the blind people to detect the actions of the human and understand their sign language. It should also act as a one-way intermediate between deaf people and visually impaired people. It interacts with the preprocessed dataset for human activity recognition and sign language recognition.

This project recognizes human activities and delivers the kind basic of activities that are performed by the people who are in front of the visually impaired people, the output will be delivered in the form of audio by using earphones.

This project will recognize the sign language of deaf people and translates that to the equivalent text in the format of audio and text which should deliver to visually impaired people. The software aims to introduce a real-time hand gesture recognition system based on the detection of certain shape-based features such as orientation, Centre of mass centroid, fingers status, thumb in positions of raised or folded fingers of the hand.

The gestural recognition system offers us an innovative, natural, and user-friendly means of communication with the computer, more familiar to humans. Taking into consideration the similarities of the shape of the human hand with four fingers and a thumb.

This project will overcome the disadvantages of the existing system and providing an easy and portable mobile interface that will be very helpful to those who don't know sign language.

In the Existing System, these two recognitions are separate applications. For providing a helpful application to visually

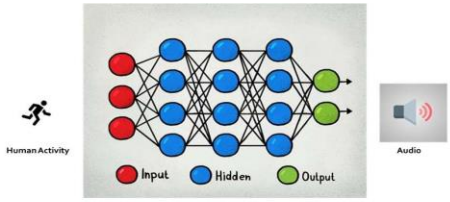
isrjournals
International Journal of Advanced Research in Computer Science Engineering and Information Technology
Volume: 6, Issue: 3,Special Issue: 1 ,Apr,2021 ,ISSN_NO: 2321-3337

impaired people, we need to integrate these two kinds of recognizers into one interface and that interface is the mobile interface. Most of the existing systems are for desktop, this project will be the first integrated solution to visually impaired people.

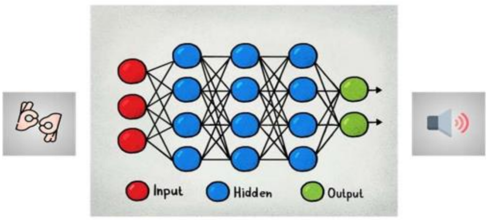
This should provide the result accurately with the different datasets for sign language recognition offline.

Due to this covid-19, communication between deaf-dumb people and visually impaired people does not happen physically. Because touching people is not advisable while pandemic, at that specific time this interface will help full to recognize real things.

There is a need for android applications to recognize human activity and sign language recognition. There is only a limited number of applications for recognizing sign language even those apps are only for American sign language and British sign language but not for Indian sign language. There is a need for common recognition of signs throughout the world, this project will provide the common sign language recognition for ASL, BSL, ISL. This application will be offline, so there is no need for internet.



1.1 HAR Neural Network



1.2 SLR Neural Network

II. The Proposed Approach

In our proposed system, providing dedicated integrated interface by integrating HAR and sign language recognition. This system detects the signed language preciously and clearly intimates the receiver with the help of earphones. This system detects the human activities preciously and classify the human action based on the supervised data, finely inform the sequence of actions that are performed by the humans.

Training the system by using different data set for recognizing the sign language. This is an interesting machine learning python project to gain expertise. The typical neural networks for HAR are SLR are shown below.

III. Hardware and Software Specifications

The proposed integrated system Table I.

TABLE I. Hardware and Software Information

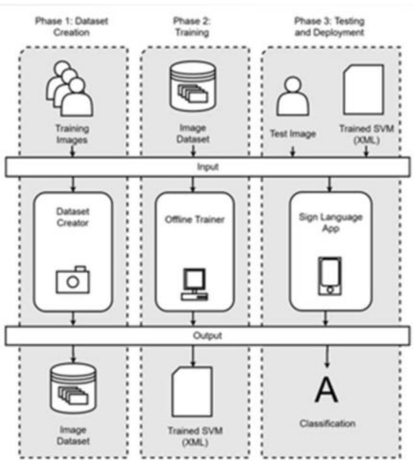
Software	Hardware
Android Studio	Mobile phone with Accelerometer sensor, Gyroscope sensor, Camera
Python 3.8, OpenCV, Keras, NumPy	Processor with clock speed 2 GHTZ, RAM: 4 GB

IV. Databases and Performance Measures

We create the dataset for recognizing the sign language. These datasets will be converted into the offline data for the interface. That's the one of the features of this system. Initially understanding the three set of human sign language which are American sign language ASL, British sign language BSL and Indian Sign Language ISL.

1.3 ASL

Training the system is very difficult, we trained our system with our own datasets and with some pre-invented datasets. Finely we convert that dataset to the XML file.

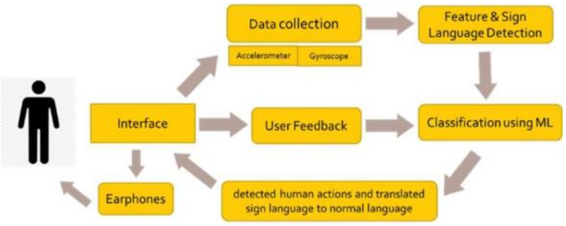


1.4 trained data

isrjournals
International Journal of Advanced Research in Computer Science Engineering and Information Technology
Volume: 6, Issue: 3,Special Issue: 1 ,Apr,2021 ,ISSN_NO: 2321-3337

It will recognize the sign gestures and delivers the output in the format of audio and text that might be helped the non-deaf visually impaired people.

The trained Xml file will be incorporated into the android interface which we have created. The typical system architecture diagram is shown below.



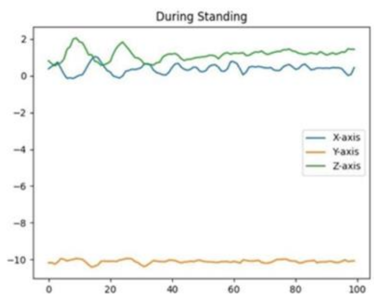
1.5 System Architecture

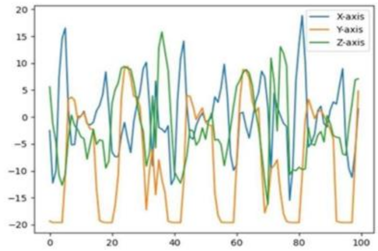
This interface is purely service oriented and this will be open source. While launching this interface in mobile phone, firstly it will open the launcher page which is present in the android application setup file. Then the secondary page will be opened which is called welcome info activity. This page will contain the welcome note to the user. This application is mainly used for recognizing the human activities and sign language.

This system will capture the series of actions that are happening in front of the non-deaf visually impaired people and deliver the output to the visually impaired people. The mandatory datasets for sign language are created and stored which will help to recognize the sign language preciously. Human Activity Recognition is generally for recognizing human activities, using HAR for blind people is very crucial thing. HAR aims to recognize activities from a series of observation on the actions of humans and inform the humans and their actions to the blind people by earphones.

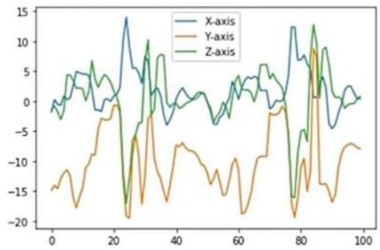
V. Experiments

After developing the interface, we checked with our sample data, which predicts the sign language alphabets correctly. This is the visualization of the predefined dataset for human activity recognition.



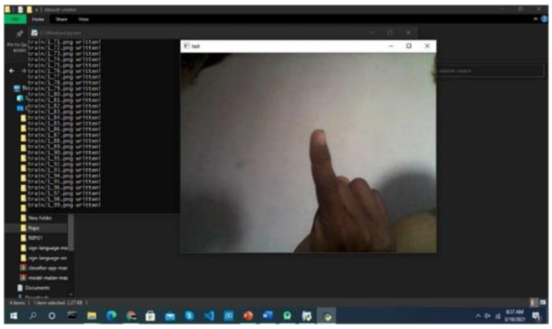


<matplotlib.legend.Legend at 0x229c47c5400>

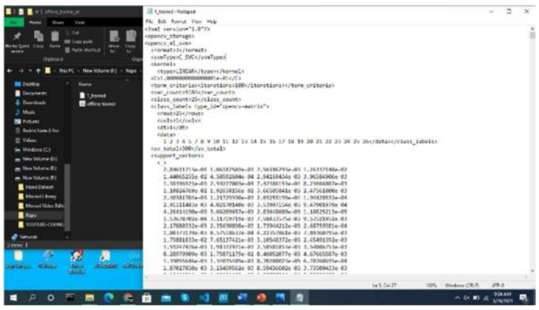


These are the typical visualization of the preprocessed data for human activity recognition but for sign language recognition we generated the trained xml and the xml will be looks like as follows

We have to create our own dataset like as in the trained data diagram. Firstly, we have to create the data for that we write a code to capture the gesture.



After creating our dataset we have to transfer the datasets to be available for offline.

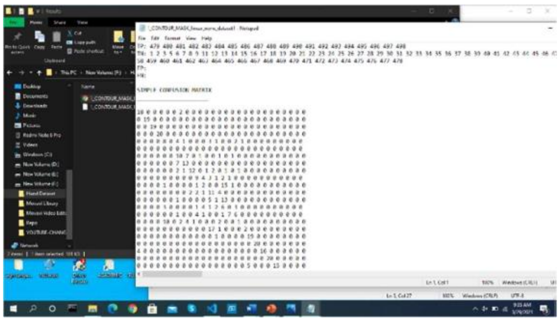


isrjournals

International Journal of Advanced Research in Computer Science Engineering and Information Technology

Volume: 6, Issue: 3,Special Issue: 1 ,Apr,2021 ,ISSN_NO: 2321-3337

The artifacts will contain the confusion matrix and that confusion matrix will be helped to recognize the sign gesture recognition.



The trained xml is looked like as follows which will contains the preprocessed dataset

CONCLUSION

HASLR will recognize human activities and delivers the kind of activities to the visually impaired people in the form of audio by using earphones and also recognize sign language of deaf people and translated that to the equivalent text and audio. The final output of this application is successful recognition of sign language and human activity which will help for blind people definitely.

Human action recognition is made more reliable without manual annotation of relevant portion of action of interest. Dense trajectories are used as local features to represent the human action. It is finer grained. Action localization is made by learning the temporal and spatial extents of video. This method of action recognition outperforms several states.

The system processes the signs in a real time to produce grammatically correct words. When several samples are considered for feature extraction, the class tag is allocated to extract features and finally produce text. The proposed approach results in higher recovery accuracy compared to the conventional processing system. This system provides results in a lower descriptive characteristic with less processing frames, it therefore obtains the objective of higher precision and lower processing overhead. The system can be further upgraded by reducing processing time and the high recognition rate, by applying a different technique.

This project also helpful those who did not know the sign language, they can also use this application to recognize the language. It reduces the intermediate people between deaf people and blind people. It helps the visually impaired people in terms of recognizing what's happening in front of them.

ACKNOWLEDGMENT

We owe grateful and significant thanks to our Head of Department, Computer Science and Engineering, DR. A. SUBHASREE who has given constant support and encouragement throughout the completion of my course and my project work.

We owe grateful and significant thanks to our internal guide, Computer Science and Engineering, MR. G. JEEVANANTHAM who has given constant support and encouragement throughout the completion of my course and my project work.

REFERENCES

[1] Deep Analysis for Smartphone-based Human Activity Recognition Chew Yong Shan; Pang Ying Han; Ooi Shih Yin2020 8th International Conference on Information and Communication Technology (ICoICT)Year: 2020 | Conference Paper | Publisher: IEEE

[2] Towards Multilingual Sign Language Recognition Sandrine Tornay; Marzieh Razavi; Mathew Magimai.-DossI CASSP 2020 - 2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)Year: 2020 | Conference Paper | Publisher: IEEE

[3] Oscar Koller, Necati Camgoz, Hermann Ney, and Richard Bowden, "Weakly supervised learning with multi-stream cnnlstm-hmms to discover sequential parallelism in sign language videos," IEEE Transactions on Pattern Analysis and Machine Intelligence, 04 2019.

[4] S. M. Lee, S. M., Cho, H., & Yoon, "Human Activity Recognition From Accelerometer Data Using Convolutional Neural Network," IEEE Int. Conf. Big Data Smart Comput. (BigComp)., vol. 62, pp.131–134, 2017.

[5] Y. Chen, K. Zhong, J. Zhang, Q. Sun, and X. Zhao, "LSTM Networks for Mobile Human Activity Recognition," no. Icaita, pp.50–53, 2016.