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Sixth Sense on Personal Assistance

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ABSTRACT- This paper mainly focuses on dealing with the problems faced by the deaf and the dumb community in India in using the future technologies mainly personal assistance tools, may it be Alexa home or Amazon echo. We propose to make use of the standard Indian sign language as well as the sign language dictionary to create a manual entries of sign languages to a user interface which makes use of these sign language dictionary to convert the signs shown by a speech or noise impaired person by taking inputs from digital cameras or the laptop cameras in order to convert them into speech and made useful to the personal assistance tools that just takes audio voice as inputs. It is built by using machine learning tools which includes a TensorFlow library package. The whole project is user made to be user friendly to the community that will make use of it the most as well as easily understandable by the personal assistance tools in use worldwide. The project promises to ease the work of a speech disabled individual may it be through easy conversion of sign languages for a video call which helps the receiver get written transcripts of the signs displayed by the individual on the other end. However the main purpose of the project is with the purpose of helping such individuals make use of personal assistance tools which poses as an essential tool in the future to come.

KEYWORDS- TensorFlow, Sign Language Dictionary and Indian Sign Language.

I. INTRODUCTION

Over 2 lakh Indians make use of personal assistant tools like amazon echo, Alexa etc. in India. Hence providing a large markets for their sales in the further years to come. The main input to these tools are audio or speech through which they take commands and do as per the orders given to them. But it is also noticed that over 16 lakh Indians have a disordered speech hence making it hard for them to use such tools.

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Hence we have come up with a project that helps their sign language actions are taken as input through cameras and are to be converted into speech by the devices which later are heard by the personal assistance tools to be worked up as the request by the individual. These cameras would be able to detect the actions of the individual who may not be able to speak and then sends audio inputs to the personal assistance tools. It is seen that all home appliances may be connected to the internet may it be an air conditioner or the bulbs at our home. Everything could be controlled by the internet. Hence making it easier to the disabled community to be able to use the internet over such tasks. We make use of manual entries of the sign languages with the help of various sign language dictionaries in order to make a clear understanding to the user interface about its users. The algorithm works on detecting signs shown by each individual hence needs manual entries of over 30 gestures to have an easy understanding of the hand signs later. It provides output accuracy depending on the training of all the gesture samples to the system. With the help of custom training feature, it must be made available to all sign languages even outside of the Indian Standard Sign Languages.

II. LITERATURE SURVEY

Communication is the most important aspect of everybody's life in order to be able to let one understand or be understood. There has been rapid increase in the number of deaf and dumb victims due to birth defects, accidents or oral diseases. Ashish [2] has proposed on a smart glove which can be convert sign language to speech output. But the use of these gloves at all places could be hefty and might not be useful in detecting gestures of other parts of the body including face reactions. Hence we could make use of cameras instead in order to detect gestures. Bhavsar Swapnal [5] claims that an efficient human computer interaction is required when we deal with situations in which the dumb community needs to communicate. This is only possible to them by the motion of their hands and their expressions. None of the approaches used to communicate with the dumb have actually been able to speak out the voice made by the dumb. It is noted that the hand gloves used were very much hardware and hard to relocate. According to Aruljothy [3] hand gesture recognition system provides us an innovative, natural, user friendly way of interaction with the computer which is more familiar to the human beings. . This project mainly represents various methods of hand gesture and sign language recognition through which output audio file is generated and fed into the personal

assistance tools as a speech support for blind and dumb person.

III. SYSTEM IMPLEMENTATION

The Implementation model includes several steps starting from loading the user interface that we have designed into the web, loading all the main class functions that require permissions for the webcam as well as for different training modules. In the second phase, we teach the machine with different ways of representing a gesture that gets stored in the datasets. Once all the gestures are trained successfully, they are loaded into KNN classifier function using the squeeze.net library. The webcam is then allowed to recognize all the gestures thrown at it which is then predicted by the system. The predicted output is converted to audio and fed into the personal assistance tools as input. System Implementation is the stage where the theoretical design is converted into a working system, the new system may be totally new, replacing an existing manual, or automated system or it may be a major modification to an existing system The system is implemented using Bootstrap, Node.js, Visual Studio Code as IDE, HTML, TensorFlow for model building , and JavaScript. The design part of the project includes giving a user interface to enter hand signs custom which may be stored in the database for a longer run. The datasets use machine learning algorithms such as KNN for clustering different signs as per the requirements. The output of the system is in the form of text in the first phase which is later converted into an audio file and fed into the personal assistance tools. Ref. Fig 1. The principle component analysis algorithm (PCA) as explained by Abhishek Jain [1] is found to have a much lesser accuracies from the hand sensors and being difficult to be worn all the time whenever needed, hence we have come up with a much more simpler version using web cameras to detect hand gestures. We make use of the database to store all different hand gestures similar to the ones implemented by V. Padmanabhan [4] which can be useful for storage of hand gestures in the system database for a longer period of time until the user creates a separate manual gestures.

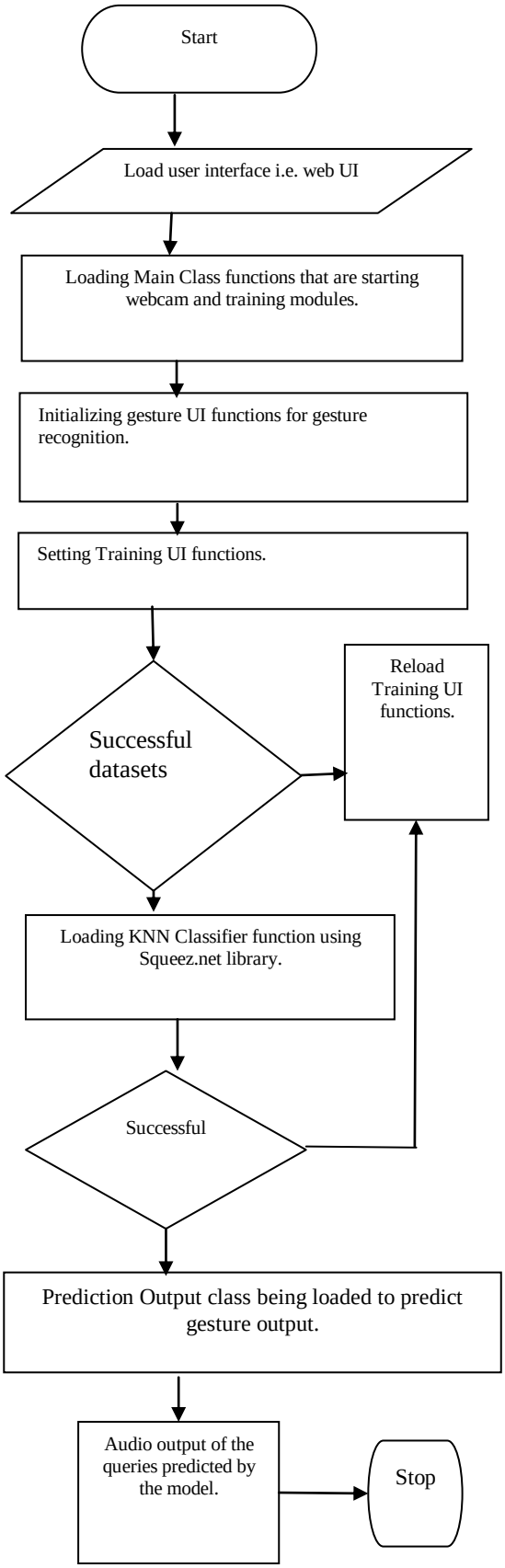

Fig 1: System Implementation

IV. EXPERIMENTAL RESULT

The system is being designed and following outputs have been obtained as results. Moreover, the system is in prototype stage, the results are promising but to improve accuracy, we ensured the required conditions are met. Figure 2 shows the training of start and stop gestures, which plays the role of a delimiter, telling the system that the input query is being started and ended using respective gestures at the start and end of prediction. This could be further used as signs to either start a particular query such as "ok Google" or to end the speech with a particular gesture. Once these gestures are set, we move on to train the sample sets of gesture by giving words from the sign language dictionary to these signs.

Fig 2: Initial training gesture

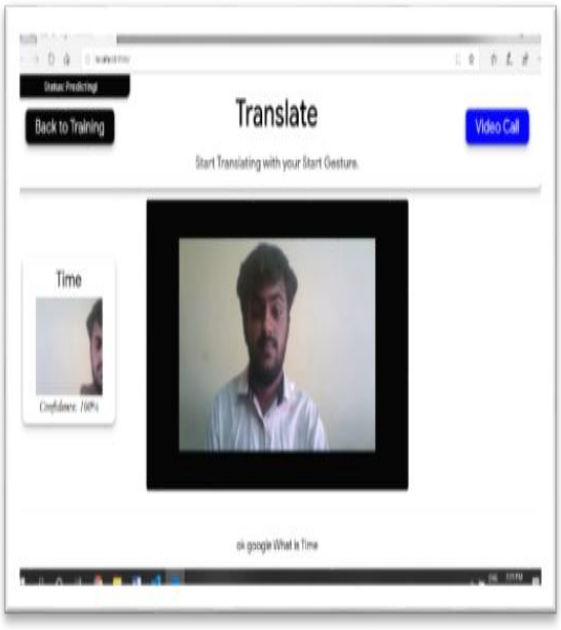

Fig 3: System prediction mode.

The figure 3 shows the system predicting the query for already trained datasets i.e. the system recognizes the gestures presented and gives text output of all the signs detected. The text that is on the bottom of figure 3 are the signs that were actually predicted by the users. The system provides option for custom training of datasets i.e. sign gestures which forms an important role in cases such as different panic signs that might be useful to detect as shown in Figure 4. It can also be told that custom gesture settings helps in place of a situation Where the user is one handed or uses a different sign language dictionary instead of the standard ISL.

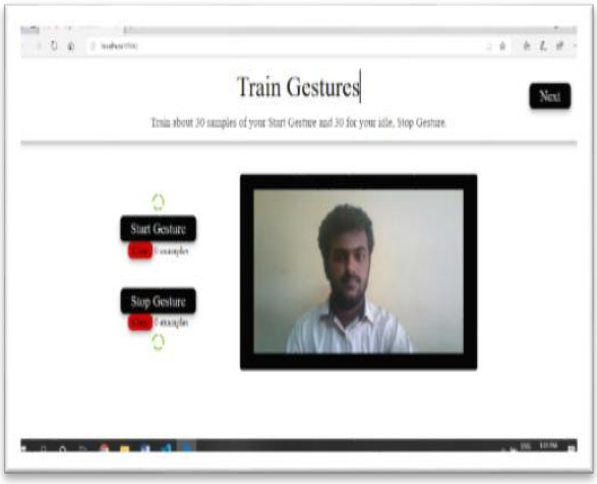

Fig 4: Custom gesture training mode.

V. CONCLUSION AND FUTURE SCOPE

The project has been able to identify the problems faced by the dumb in pursuit of the innovative future especially the ones including personal home assistant tools. We propose to create a web application platform to let them interact with these tools via sign languages. It gives a platform to the dumb to manually give sign instructions for different known sign languages in order to get accurate results based on similar gestures used in a regular basis. The project showcases a perfect example of how much the future generation of the dumb community would make use of the personal assistant tools. It could further be added with features such as conversion of sign languages into text and speech during an ongoing video call which would make it easier for the receiver to listen to the speech rather than going through the whole process of sign language dictionary learning. It could also be noted that this system uses an external machines which may be an audio device used in order to speak out the sign languages. To overcome the use of a hardware speaker, collaborations with the personal assistant tool development team could be done in order to make the tool understand these signs by itself without any audio inputs.

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ABOUT THE AUTHORS

Thanush V Shetty studying Computer Science engineering in Srinivas Institute of Technology, Mangalore have written this paper looking at different problems being faced by speech disabled individuals. I have been amazed by the technologies that have helped disabled community in the US to overcome their disability and have come up with useful technologies for our own nationalities. The project would aim at solving several problems of these individuals. I have been a member of the Computer Society of India (C.S.I Student Chapter) and being the working president of the Department of Computer Science of my institution.

Sujith S Department of Computer Science and Engineering, Srinivas Institute of Technology, Mangalore, objective of this paper is to help the deaf and dumb people to overcome the deficiency by providing them with the feature of communication so that they can communicate with other people easily. This web app allows users to interact with real world with the sign language recognition feature. It allows user to train their custom made as well as standard sign language gestures to interact with the personal assistant to do day to day tasks.

Shilpa P Department of computer science and engineering, Srinivas Institute of Technology, Mangalore. The idea is evolved based on the latest and trending technology and as a very good scope in future advancements. This process of publication with an intention of doing project that would help deaf community in some way. With the increase in voice assistant technologies many developments are leaving the deaf sign language users behind. So this project has scope for some imaginative solutions to deaf people.

