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# Conversion of Sign Language to Speech with Human Gesture

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**ABSTRACT:** People in the world have lots of disabilities but there are some of the disabilities that are considered as most important and those disabilities can overcome by some methods of communication one such way of communication is sign language .Sign language is very common language known to many peoples with the disabilities like deaf and dumb many peoples who are deaf and dumb also does not know how to properly speak in sign language .But that is mandatory for the people with deaf and dumb to learn that language. After learning that language they can speak through sign language but they can easily. Communicate with the people who knows sign language but, there are many common peoples who does not know any sign language. Now if a person who is deaf and dumb wants to convey some information to the common people the just convey their information with the sign language but the common people who does not knows the sign language will not know anything what the person was speaking to overcome that difficult situation some of the techniques are founded. Compared to the existing methods, the proposed design provides a user-friendly experience and does not consider any specific parameter from the end user, this makes it a generalized band which can be worn by anybody. This would result in cost minimization when produced in large scale. The compactness of the design aims to provide more ease of usage. Finally, our project is user friendly, very useful for the other peoples and to understand the sign language. In the same way the peoples who are all deaf and dumb can also easily able to communicate with all by using the hand gestures to audio conversion format.

**KEYWORDS:** Machine Learning, DSP Algorithm, Sign language

## I. INTRODUCTION

Sign language is a system of communication using visual gestures and signs, as used by deaf and dumb people. There are various categories in the sign language like ISL (Indian Sign Language), ASL (American Sign Language), BSL (British Sign Language) and etc... But none of the sign languages are universal.

A person should know the sign language to understand the language; this becomes complicated when a person who has inability to speak or hear wants to convey something to a person or group of persons, since most of them are not familiar with the sign language. In the fast-moving world, providing an equitable life for the differently abled people are still stands as a challenge to the world. The advanced technology provided us a platform to explore and design a wristband which could translate the electrical impulses into speech. The electrical impulses are generated by the various signs of the fingers. That is the hand gestures some people know sign language but some people don't know sign language to overcome this we have created a project that is even the sign language is understandable for all the people who don't even know about the sign language.

## II. RELATED WORKS

Sign language is a Sytem of communications using visual gestures and signs as used by deaf and dumb people. At present lots of techniques and modulations are being introduced and are under research to minimize or simplify the complexity in sign language to speech. The paper is been proposed in the aim of minimizing all those complexions and to attain maximum accuracy in conversion of sign language to speech with human gestures. Human gestures are an important sign of human communication and an attribute of human actions informally known as the body language. A lots of methods are being in use to track human gestures. To get maximum accuracy and to bring out the system unique a lots of methods are attempted and best case is user defined actions to control the system.

### III. MACHINE LEARNING

Machine learning is a growing technology which enables computers to learn automatically from past data. Machine learning uses various algorithms for building mathematical models and making predictions using historical data or information. Currently, it is being used for various tasks such as image recognition, speech recognition, email filtering, Facebook auto tagging, recommender system, and many more.

A Machine Learning system learns from historical data, builds the prediction models, and whenever it receives new data, predicts the output for it. The accuracy of predicted output depends upon the amount of data, as the huge amount of data helps to build a better model which predicts the output more accurately.

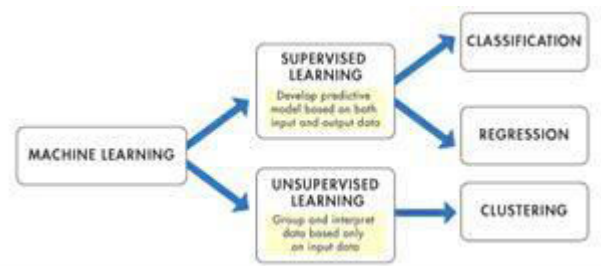


fig ( 1.1)UML diagram

**Supervised learning** is a type of machine learning method in which we provide sample labeled data to the machine learning system in order to train it, and on that basis, it predicts the output. The system creates a model using labeled data to understand the datasets and learn about each data, once the training and processing are done then we test the model by providing a sample data to check whether it is predicting the exact output or not. The goal of supervised learning is to map input data with the output data. The supervised learning is based on supervision, and it is the same as when a student learns things in the supervision of the teacher. The example of supervised learning is spam filtering.

**Unsupervised learning** is a learning method in which a machine learns without any supervision. The training is provided to the machine with the set of data that has not been labeled, classified, or categorized, and the algorithm needs to act on that data without any supervision. The goal of unsupervised learning is to restructure the input data into new features or a group of objects with similar patterns. In unsupervised learning, we don't have a predetermined result. The machine tries to find useful insights from the huge amount of data.

### IV. PROPOSED SYSTEM

The proposed work is producing speech/ voice to sign language with simple human gestures and motion sensing technology with the help of Microsoft's Kinect sensor. This paper started its initiation in the vision to successfully minimize the human machine interaction and to take up the Natural User Interface at the forefront. The initial phase of the project began in controlling a simple PowerPoint presentation with gestures like moving hands from left to right or moving from right to left to move between PowerPoint slides. The outputs from the sensor systems are sent to the Arduino microcontroller unit. In Arduino microcontroller unit, data derived from the sensor output is then compared with the pre-defined values. The corresponding gestures (matched gestures) are sent to the text-to-speech conversion module in the form of text. The output of text-to-speech synthesis system is heard via a speaker. The main features of this system include its applicability in day-to-day life, portability and its low cost.

V. SYSTEM ARCHITECTURE



Fig (1.2) System Architecture

VI. CONCLUSION

Evolving technology and the creative minds have scattered to various human needs. The Centre of this evolution is machine learning and wearable computer technology. Previous works majorly utilized hardware such as flex sensors which made the smart glove technology bulky and unviable for practical application. Our proposed methodology eliminates the use of flex sensors, instead we smart band equipped with IMUs and sensor suite. Two smart band are worn on two wrists of the user, the further advancement of the same could be to calibrate two bands and form an in-sync communication between them. This would enable the conventional sign language to be more effective.

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