**Hand gesture recognizer for mute people**

**Introduction**

The primary goal of the undertaking is to assist the hard of hearing and quiet individuals with speaking with the world in their everyday exercises . It is hard for quiet individuals to pass on their message to normal individuals. Since normal individuals are not prepared close by gesture based communication, the correspondence turns out to be new individuals correspondence with close by individuals or passing on a message turns out to be exceptionally troublesome. Here we propose a keen talking framework that assist quiet with peopling in passing on their message to ordinary individuals utilizing hand movements and signals. The framework utilizes a hand movement perusing framework outfitted with movement and flex sensors alongside a speaker unit. This framework is controlled by a battery fuelled hardware to run it. A raspberry pi is utilized for handling the information and working the framework. The framework comprises of around 10 put away messages like "need assistance", "where is the washroom, etc that assist quiet with peopling pass on essential messages. The framework peruses people hand movements for various varieties of hand development. It likewise comprises of a trigger sensor so as to indate that the individual wishes to enact the framework and talk something. This guarantees the framework doesn't talk when the individual is simply automatically making hand movements. The raspberry pi processor continually gets input sensor esteems and afterward measures it. Presently it looks for coordinating messages for the arrangement of sensor esteems. When it is found in memory this messages is recovered and is stood up utilizing text to discourse handling through the interfaced speaker. Along these lines we have a completely useful savvy talking framework to assist quiet with peopling speak with ordinary individuals utilizing a basic wearable framework. We build up this task to comprehend their language and help the quiet individuals to share their considerations and thoughts

**Why: Problem statement**

Deaf and mute individuals are discovering challenges to impart their plan to the world. Despite the fact that they have one of a kind plans to share, they won't have the option to pass on in a phase to make it justifiable.

#### How: Solution description

We developed the hardware which will be more useful for them to communicate and share their ideas. The recent innovation for the deaf and mute people is that Amazon Alexa updated its Artificial Intelligence software that would understand the sign language and reply to them as a speech output.

For the implementation of this system, we require different hand gestures and a web camera is required for capturing the gestures. The person would be placing different gestures in front of the camera. When the user makes the gesture of a symbol while implementing system there are different modules.

1. Generation of Database: First of all while processing the images, it is necessary to prepare a proper database of 5 images of each symbol. A total of 40 images are captured to increase the accuracy of identification of images.

2. Image pre-processing and segmentation: Pre-processing consists of image acquisition, segmentation, and morphological filtering methods. Then the segmentation of hands is carried out to the separate object and the background. PCA algorithm is used for segmentation purpose. The segmented hand image is represented by certain features. These features are further used for gesture recognition.

3. Feature extraction: It is a method of reducing data dimensionality by encoding related information in a compressed representation. The selection of which features to deal with are centroid, skin color and principal component analysis as the main features.

4. Sign Recognition: It uses principle component algorithm analysis to identify the image from the database. The PCA algorithm involves two phases viz., Training phase and Recognition phase. In training mode, each gesture is represented as a column vector. Then PCA finds the eigenvectors of the covariance matrix of gestures and then they are multiplied by each of their gesture vectors to obtain their gesture space projections. In the recognition phase, a subjected gesture is projected onto gesture space and the Euclidean distance is computed between this projection and all known projections.

5. Sign to voice conversion: The identified image is converted into voice or speech signal using APR 9600 and speaker.

#### Who are our customers

The people with deaf and mute disabilities are the customers of this project.

#### Project Phases and Schedule

**Phase 1:** Collected the sign language details from an organization.

**Phase 2:** Analysed the hardware products needed for this project.

**Phase 3:** Developed the Project.

#### Resources Required

**Hardware’s required:**

**Software required:**

* Arduino IDE,