**SYNOPSIS**

INTRODUCTION:

Sign Language is developed as a language to meet the need of the Deaf to communicate with each other. According to WHO (2018) data, the prevalence of hearing impairment (HI) in India is around 6.3% (63 million people suffering from significant auditory loss). The estimated prevalence of adult-onset deafness in India is 7.6% and childhood-onset deafness is 2%.

To address the needs of deaf and mute community our team is introducing ***“signGuru” ,*** it is an education portal specially designed to arm normal people with the knowledge of sign language enabling them to converse with deaf and mute people with relative ease.

PROJECT CONCEPT:

**1.Abstract:**

This project proposes the recognition of Indian sign language gestures using a powerful artificial intelligence tool, convolutional neural networks (CNN). Different CNN architectures will be designed and tested with our sign language data to obtain better accuracy in recognition. Three different pooling techniques namely mean pooling, max pooling and stochastic pooling will be implemented and best pooling will be determined for our case. Dataset that will be used to train our CNN models are taken from Kaggle as well as our own dataset will be added to make our models more robust.

**2.Objectives:**

* Education portal with tutorials and lessons on Indian sign language with the support for evaluation of the learned skills and addition of fun learning activities for more engaged user experience.
* UI should be plain and simple so as to be friendly to non-traditional users.
* Increasing the model accuracy for efficient sign language recognition.

**3.Literature Review:**

* <https://opensource.com/article/18/4/flask> - An introduction to the Flask Python web app framework.
* <https://medium.com/analytics-vidhya/building-full-stack-webapp-using-js-flask-postgres-firebase-heroku-7b3ec622a345> - Building Full stack WebApp using Flask + Firebase + Heroku.
* <https://ieeexplore.ieee.org/document/8316344> - Deep convolutional neural networks for sign language recognition.

**4.Problem Definition:**

Designing an education portal offering knowledge and training about sign language and how to use it in real life to communicate with people who cannot speak or listen in order to make this world a familiar place for the deaf and mute. The portal will have tutorials and quizzes on sign language basics, which include English alphabets and numbers. The learner's evaluation will be done through a real-time online examination which will test the learner's ability to follow the on-screen instructions and perform the various sign language basics. Upon passing, the learner will be granted a certificate of completion on his/her email id.

**5.Scope:**

We aim to create awareness in the society about using sign language to help in interacting with the deaf and mute people. Initially our project aims to get the best performance we can manage on Indian sign language following which we can upgrade our portal to support other sign languages such as the American sign language.

Image Processing can be improved so that the background filtering is better and our models can work on any background. Accuracy of model can be significantly improved by stacking models for specific characters for whom we are getting less accuracy in the initial stages.

**6.Technology Stack:**

* + Programming Language: Python
  + Image Processing Library : OpenCV
  + DL Model : Tensorflow2.0, Keras
  + Web Development framework : Flask
  + User Authentication :Firebase
  + Hosting Platform : Heroku/Netlify

**7.Benefits for environment and society:**

The problems faced by deaf and mute people at present time and the difficulties they have communicating with normal people sparked our interest and led us to try to find a solution to their problems and to minimize them as much as possible. So, our project aims to bridge this gap by enabling communication between deaf/mute people, on the one hand, and normal people, on the other hand, by introducing an education portal which will educate normal people in sign language and, in turn, make communication possible between a normal person and a deaf/mute person.