**Machine Learning – IT4060**

**Assignment II**

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**B.Sc. (Hons) in Information Technology Specializing in Software Engineering**

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# **Introduction**

A normal person with a hearing threshold of 20db or greater in both ears is considered as a person without any hearing disabilities, anyone having a lesser hearing threshold is considered as a person with a mild, moderate, severe, or profound hearing loss. Persons ranging from mild to severe hearing impairments are categorized as ‘Hard of Hearing’. They communicate through spoken language and with the help of hearing aids. Persons with profound hearing loss is categorized as ‘Deaf’. Deaf people have extremely weak hearing or rather no hearing at all and they communicate using sign language.

Graphical user interface

Description automatically generatedSign language is a non-verbal communication medium which consists of facial expressions, hand signals, gestures, and body language. According to the World Health Organization over 5% of the world’s population are affected by hearing loss and deafness. This includes approximately 430 million adults and 34 million children. Even though hearing disability is a familiar topic in the society, there is less awareness regarding the difficulties faced by this community.

The main dilemma faced by the hearing-impaired community is the prevailing communication barrier between them and the people who communicate with spoken languages. Majority of the persons without any hearing disabilities lacks sign language knowledge. This situation makes the lives of the hearing-impaired community much more complicated as they are unable to effectively interact with the society to fulfil their needs and wants.

The proposed solution is a minor attempt to bridge the prevailing communication barrier between the two communities. We have implemented a model using machine learning techniques which is capable of recognizing sign language gestures that represent letters of the English alphabet. Any sign gesture representing a letter of the English alphabet can be presented in front of a camera and the corresponding letter would appear on the screen of the user. This solution can be used by both communities for communication as well as for educational purposes.

# **Dataset**

The model was trained using a dataset that was downloaded from Kaggle which contains images of the English alphabet relevant to the American sign language. The images have been separated into 29 different folders representing various classes. The dataset has been categorized as ‘Training’ and ‘Testing’ data. The training dataset comprises of images representing the 26 letters of the English alphabet and 3 other gestures representing ‘Delete’, ‘Nothing’ and ‘Space’. Each class comprises of over 7000 elements. The testing dataset consists of 29 images that can be used to test the speed and accuracy of the model.

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# **Methodology**

The proposed model is capable of accurately identifying the alphabetical letter represented by the sign gesture. VGG 16 algorithm has been used to create this model.

# **Individual Contributions**

# **References**