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# ACKNOWLWDGEMENT

First and foremost, we offer our sincerest gratitude towards the **Department of Electronics Communication, and Information Engineering, Kathmandu Engineering College, Kalimati** and **Institute of Engineering (IOE)** for providing us the wonderful opportunity to undertake this project. We would also like to show our gratitude to our Head of Department of Electronics and Communication, **Er. Rajan Lama** for providing us this opportunity to showcase our major project. We extend our gratitude to our Major Project Coordinator, **Er. Dipen Manandhar** for his support and helping us to tackle different problems faced in this project.

We would also like to send our regards to faculty members, teachers and individuals who helped us with their support and suggestions for the making of this report.

# ABSTRACT

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# Chapter 1: INTRODUCTION

## Background

A human being is a social animal and has the natural ability to see, listen, speak and interact with the external environment. Unfortunately, there are some people who do not have the ability to interact by speaking. The deaf and dumb population is a result of the physical disability of hearing and speaking. In the recent years, there has been a rapid increase in the number of hearing impaired and speech disabled victims due to birth defects, oral diseases and accidents. When a speech impaired person speaks to a normal person, the normal person finds it difficult to understand and asks the deaf-dumb person to show gestures for his/her needs. Dumb persons have their own language to communicate with us; the only thing is we need a translator in between.

Sign language is used by deaf and mute people and it is a communication skill that uses gestures instead of sound to convey meaning simultaneously combining hand shapes, orientation and movement of the hands, arms or body and facial expressions to express fluidly a speaker’s thoughts. But most of the time normal people find it difficult to understand this sign language. This presents a major roadblock for people in the deaf and dumb communities when they try to engage in interaction with others, especially in their educational, social and professional environments. Therefore, it is necessary to have an advance gesture recognition or sign language detection system to bridge this communication gap.

The people who cannot speak or have lost their ability to speak in some accident, it becomes difficult for them to convey their message within the society. To overcome this, a project called ‘SMART GLOVE’ has been designed. Giving a voice to the voiceless has been a cause that many have championed throughout history, but it’s safe to say that none of those efforts involved packing a bunch of sensors into a glove. The main objective of this project is to help deaf and dumb people by removing communication barrier so they are not restricted in a small social circle and are able to convey their feelings and emotions whenever they want.

Smart glove is based on the wearable technology. It is basically a device which has some specific wearable sensors with phenomenal temperature stability. All the sensors are fitted on a glove which measures the different analog parameters associated with the movement of fingers and orientation of the hand during any particular gesture. These sensors read those particular analog values and coding is done in the microcontroller according to these values to recognize the corresponding sign language. The goal of this project is to develop a portable communication system having multiple sensors for Sign Language Recognition and to translate these gestures into text and sound.

## 1.2 Problem Statement

Deaf and normal person communication is as same as two different persons from different countries using two different languages for communication without any common language which leads to problem in communication. Sign language is the only communication tool used by deaf people to communicate to each other. However, normal people do not understand sign language and this creates a large communication barrier between deaf people and normal people. In addition, the sign language is also not easy to learn due to its natural differences in sentence structure and grammar. Therefore, there is a need to develop a system which can help in translating the sign language into text and voice in order to ensure the effective communication can easily take place in the community.

1.3 Objective

The objectives of the project are

To build a glove embedded with sensors to read the sign language and convert it into text and speech.

Help to deaf and dumb people to communicate with normal people especially during emergency situation.

1.4 Scope or Application

The scope or application of the project are

For all deaf and dumb people

Institution for deaf and dumb people

1.5 Organization of report

Chapter 2: Literature Review

Enable Talk is a student project, whose main idea is to translate sign language into speech. The project was presented at the Microsoft Imagine Cup competition in 2012 at Sydney, Australia and won the first prize for software design competition [1]. The team was from country Ukraine with city Donetsk and school Computer Academy Step. The concept of the project consisted of two sensor embedded gloves and a mobile device, which entailed the recognition process.

Glove- based system is composed of an array of sensor, electronics for data acquisition or processing, power supply & a support for sensors that can be worn on user’s hand [2]. LED glove, data glove, Sayre glove, cyber glove are the different type of glove used here. Glove based system helps user for selecting a particular glove for particular application.

Glove Talk II is a system which translates hand gestures to speech, which is based on the gesture to format model developed by Sidney Fels and Geoffrey Hinton, Department of Computer Science of University of Toronto [3]. Neural networks were used to implement an adaptive interface, called Glove Talk II, which contains hand gestures to control the parameters of a parallel format speech synthesizer to allow a user to speak with his hands. It is used to implement an artificial vocal tract. Glove-Talk-II is a system which translates hand gestures to speech through an adaptive interface. Hand gestures are mapped