



## Sri Lanka Institute of Information Technology

### PROJECT REGISTRATION FORM

(This form should be completed and submitted on or before 11.55 PM, Friday 17<sup>th</sup> January 2020)

The purpose of this form is to allow final year students of the B.Sc. (Hon) degree program to enlist in the final year project group. Enlisting in a project entails specifying the project title and the details of four members in the group, the internal supervisor (compulsory), external supervisor (maybe from the industry) and indicating a brief description of the project. The description of the project entered on this form will not be considered as the formal project proposal. It should, however, indicate the scope of the project and provide the main potential outcome.

**PROJECT TITLE**  
(As per the accepted topic assessment form)

Sign Language to Text & Speech Conversion using Machine Learning & Image Processing

**RESEARCH GROUP**  
(as per the Topic Assessment Form)

Artificial Intelligence & Machine Learning

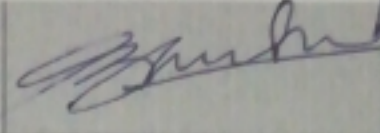
**PROJECT NUMBER**

2020-077 (will be assigned by the lecturer in charge)

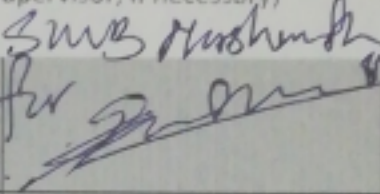
**PROJECT GROUP MEMBER DETAILS:** (Please start with group leader's details)

	STUDENT NAME	STUDENT NO.	CONTACT NO.	EMAIL ADDRESS
1	D. Manoj Kumar	IT17143950	0767601447	it17050272@my.sliit.lk
2	G. M. A. S. Bastiansz	IT17143950	0762998847	it17143950@my.sliit.lk
3	S. Thavananthan	IT17068192	0779304653	it17068192@my.sliit.lk
4	K. Bavanraj	IT17032766	0779797753	it17032766@my.sliit.lk

**SUPERVISOR Details**

<b>Mr.Buddhika Harshanath</b>		16/10/2020
Name	Signature	Date

**CO-SUPERVISOR Details** (will be assigned by the Supervisor, if necessary)

Jesuthasan Alosius		16/10/2020
Name	Signature	Date

**EXTERNAL SUPERVISOR Details** (if any, maybe from the industry)

Name	Affiliation	Contact Address	Contact Numbers	Signature/Date

**ACCEPTANCE BY CDAP MEMBER**

Name	Signature	Date

## PROJECT DETAILS

Brief Description of your Research Problem: (extract from the topic assessment form)

Sign languages are used by people who are vocally challenged and deaf people to communicate with each other. There are many types of sign languages that are practice in the world such as American Sign Language (ASL) and British Sign Language (BSL) etc. But in the Sri Lankan context, we have the local sign language that is in practice within the local community of vocally challenged and people with impaired hearing.

When it comes to their communication with people who can speak or hear normally, it is often misunderstood or requires prior knowledge (or experience) in speaking and interpreting sign languages. This results in poor communication between parties and such challenged people cannot engage in socio-cultural activities as well.

There are many solutions for converting, translating and interpreting the mostly used American and British Sign languages but when it comes to the local sign language, there are no such well-implemented solutions for detecting and interpreting them. This community is set aside just because of their inabilities and cannot contribute to the empowerment of the society, economy and eventually, the empowerment of the country.

The main goal of conducting this research is to identify and detect the sign languages and translating them into readable and audible formats in all the local languages.

Description of the Solution: (extract from the topic assessment form)

As a solution, we have decided to develop a comprehensive application using Machine Learning, Image Processing & Natural Language Translation which breaks the communication barrier of verbally challenged & deaf people.

Our group will be creating an application that will be detecting the local sign languages through the camera and verifies it through the pre-trained models. Then convert the identified sign into voice format or text format according to the user's preference.

The proposed application comprises of the following components.

- **Sign Language Detection**
  - ✓ This takes the camera input & processes the combination of fingers & parses into the next component
- **Sign Language Classification & Verification**
  - ✓ This component identifies the input that is taken from the previous component & classifies among the pre-defined set of models for local sign language

- **Translation Engine**
  - ✓ This component takes the identified text & translates to all three languages for presentation
  
- **Presentation Engine**
  - ✓ This engine uses the translated (if necessary) & the original text to present it visually & to be heard (Auditory format). In this way, the ideas could be expressed both as text & audio (in two languages).

Main expected outcomes of the project: (extract from the topic assessment form)

Identifying the local signs which is used by vocally challenged and deaf people for communication purposes & convert those signs into a natural language format which can easily understand by any person who is not familiar with sign language.

**WORKLOAD ALLOCATION (extract from the topic assessment form)**

(Please provide a brief description about the workload allocation)

MEMBER 1	D. Manoj Kumar (IT17050272)
<p><b>Data acquisition and image processing</b></p> <p><i>The aim of this component is converting the image which captures from the camera into more meaningful input. And also, to make easy to analyze the image correctly. In this stage, the system will divide the image into multiple segments which helps to locate the objects &amp; boundaries in the image into the binary form.</i></p>	
MEMBER 2	G.M.A.S. Bastiansz (IT17143950)
<p><b>Feature extraction</b></p> <p><i>Normally, people always use upper body parts such as head, shoulder, hands &amp; elbows to present a sign. Therefore, most of the time the lower body parts will remain as they are. In this stage, the system will filter out the body parts which use to present the sign by considering the "Region Of Interest" (ROI) of the image. In the end, the system will be able to get a clear output of the sign after discarding all the unwanted parts of the image</i></p>	
MEMBER 3	K. Bavanraj (IT17032766)
<p><b>Sign recognition and translation</b></p> <p><i>This stage is used to convert the identified sign into the natural language which uses by normal people. After getting the clear format of the sign from the previous stage, the system will compare the sign with the database which contains all the pre-defined signs until it meets a similar format. After the system gets a similar format, then the sign will convert into the natural language using concepts in machine learning.</i></p>	

MEMBER 4

S. Thavananthan (IT17068192)

**Text – voice assistant**

*The main aim of this component is presenting the result to the user who uses the system. To get the final result user gets two options namely text form & speech format.*

*If a user prefers 'text-format':*

*As a default, the system will translate the result into the text format after converting the sign into the natural language. Here the user gets another 2 options namely Sinhala & English to view the result. Whatever option the user chooses, he/she can view the converted result of the sign from the language he/she selects.*

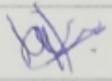
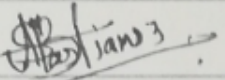
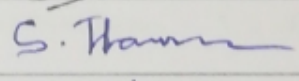
*If a user prefers 'speech-format':*

*Here, the system will convert the text format to waveforms that can be output as sound. In here also, the user gets 2 options namely Sinhala & English. Therefore, finally user will be able to hear the converted result as a speech in a selected language*

## DECLARATION

"We declare that the project would involve material prepared by the Group members and that it would not fully or partially incorporate any material prepared by other persons for a fee or free of charge or that it would include material previously submitted by a candidate for a Degree or Diploma in any other University or Institute of Higher Learning and that, to the best of our knowledge and belief, it would not incorporate any material previously published or written by another person in relation to another project except with prior written approval from the supervisor and/or the coordinator of such project and that such unauthorized reproductions will construe offences punishable under the SLIIT Regulations.

We are aware, that if we are found guilty for the above-mentioned offences or any project related plagiarism, the SLIIT has right to suspend the project at any time and or to suspend us from the examination and or from the Institution for a minimum period of one year".

	STUDENT NAME	STUDENT NO.	SIGNATURE
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