Jyothi Engineering College
NAAC Accredited College with NBA Accredited Programmes*
Approved by AICTE & affiliated to APJ Abdul Kalam Technological University
A CENTRE OF EXCELLENCE IN SCIENCE & TECHNOLOGY BY THE CATHOLIC ARCHDIOCESE OF TRICHUR
JYOTHI HILLS, VETTIKATTIRI P.O, CHERUTHURUTHY, THRISSUR. PIN-679531 PH : +91- 4884-259000, 274423 FAX : 04884-274777
NBA accredited B.Tech Programmes in Computer Science & Engineering, Electronics & Communication Engineering, Electrical & Electronics Engineering and Mechanical Engineering valid for the academic years 2016-2022. NBA accredited B.Tech Programme in Civil Engineering valid for the academic years 2019-2022.

Talk2Mute

Department of CSE

Jyothi Engineering College

Thrissur

January 21, 2021

Vision of the Department

- Creating eminent and ethical leaders in the domain of Computational Sciences through quality professional education with a focus on holistic learning and excellence.

Mission of the Department

- To create technically competent and ethically conscious graduates in the field of Computer Science and Engineering by encouraging holistic learning and excellence.
- To prepare students for careers in Industry, Academia and the Government.
- To instill Entrepreneurial Orientation and research motivation among the students of the department.
- To emerge as a leader in education in the region by encouraging teaching, learning, industry and societal connect.

GROUP MEMBERS

1. **Vincy Anto (JEC17CS104)**
2. **Neethuu N (JEC17CS074)**
3. **Sidharth U (JEC17CS095)**
4. **Sreehari (JEC17CS097)**

Group No:25

GUIDE: **Ms. Sajitha I (Assistant Professor)**

Project Repository Link: https://github.com/Vincy049/Group25.git

ABSTRACT

Communication is important for every human being. People who are deaf & mute needs a different way to communicate to others. One finds it hard to interact with them without a translator. We are proposing a tool that converts the sign language gestures to text and speech by recognizing the gestures and displaying the corresponding word.

PROJECT OBJECTIVE

- To make the deaf and mute interact with normal people in a more efficient way
- Help people understand and learn sign language in through text and audio output

EXISTING SYSTEM

- Translates Indian Sign Language gestures to its English language interpretation
- System have used HOG as feature descriptor and SVM used for classification
- Google's Text to Speech API for transforming SL into audio
- There is no translation of English text output to regional language text/audio

LITERATURE SURVEY

1. Sign Language Translator Using Machine Learning

Features:

- Image is processed with pose estimation algorithm in tensor-flow utility
- Captures both static and moving images of the objects
- Different people sign for same gesture to provide better data set for training

Advantages:

- System can provide proper results even when there are slight variations in gestures

Disadvantages:

- Since the whole body skeleton is taken, end points may differ and very computational intensive

2. Sign Language Converter

Features:

- Microsoft Kinect Sensor XBOX 360TM is used for capturing abilities and technical features of the system
- Open NI is used to form a standard API that enables communication with the sensors in the system
- The main linguistic characteristics used by the system are part of the Phonology section

Advantages:

- No need to wear any external hardware
- Can be used in schools, colleges, courts and briefly almost everywhere

Disadvantages:

- Do not recover missing joint locations

3. Conversion Of Sign Language To Text And Speech Using Machine Learning Technologies

Features:

- Combination of FAST and SURF algorithms with a KNN algorithm
- Interaction between image segmentation and object recognition in the frame work of FAST and SURF algorithms

Advantages:

- It produces 92% accuracy of supervised feature learning and 78% of unsupervised learning
- The pre-determination of the ROI of each image has demonstrated the ability of the proposed algorithm to limit image modeling to relevant region within the image

Disadvantages:

- Size of captured image and distance of the person from camera affect the output
- Require a lot of images to create the database

4. Conversion Of Sign Language Into Text

Features:

- Make use of 3D information of key elements of body parts
- Combination of volumetric and skeletal models
- Computational intensive approach

Advantages:

- No need to wear any extra hardware
- User independent feature extraction
- Enables more intricate gestures that involve moving individual fingers, wrist and hands allowing for more reliable, flexible and accurate gesture recognition

Disadvantages:

- Need more processing for feature extraction and noise reduction

PROPOSED SYSTEM

Two major tasks:

- To identify the sign which is shown to the web cam by the signer
- To get the output in text & audio in both English and Regional language

MODULES OF PROPOSED SYSTEM

1. **Data acquisition**
2. **Pre-processing**
   ii) Segmentation
   iii) Morphological Filtering
3. **Feature extraction**
4. **Sign Recognition**
5. **Translation of output text into regional language and audio**

SYSTEM REQUIREMENT SPECIFICATIONS

Functional Requirements:

- **User interface** : The user interface through which the signer will show the hand gestures
- **Performance requirements** : The system should identify the hand gestures and produce the text and audio output
- **Regional Language Translation :** Allows the user to change the language as per his/her choice

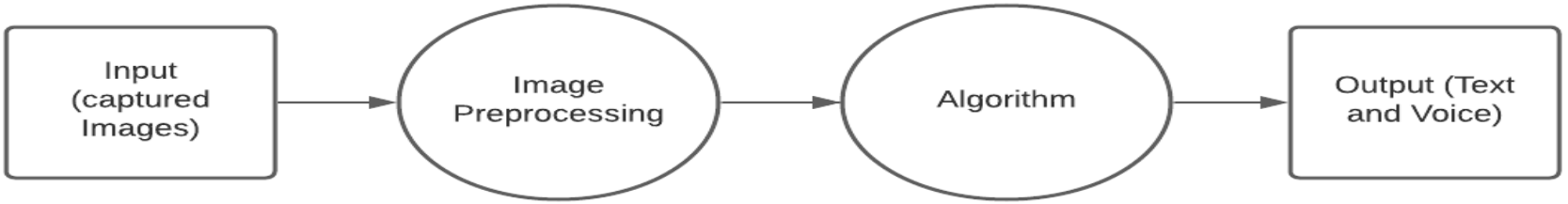
Non-Functional Requirements:

- **System Adaptability** : A website which can be accessed from different web browsers.
- **Extensibility:** The software shall be extensible to support future developments. It can be used as a learning platform to learn the fundamentals of sign languages. It should be extensible to allow face and various gesture recognition features to be added to system.
- **Security Requirements:** The database should be secure. No damage or crash must occur

DATA FLOW DIAGRAM

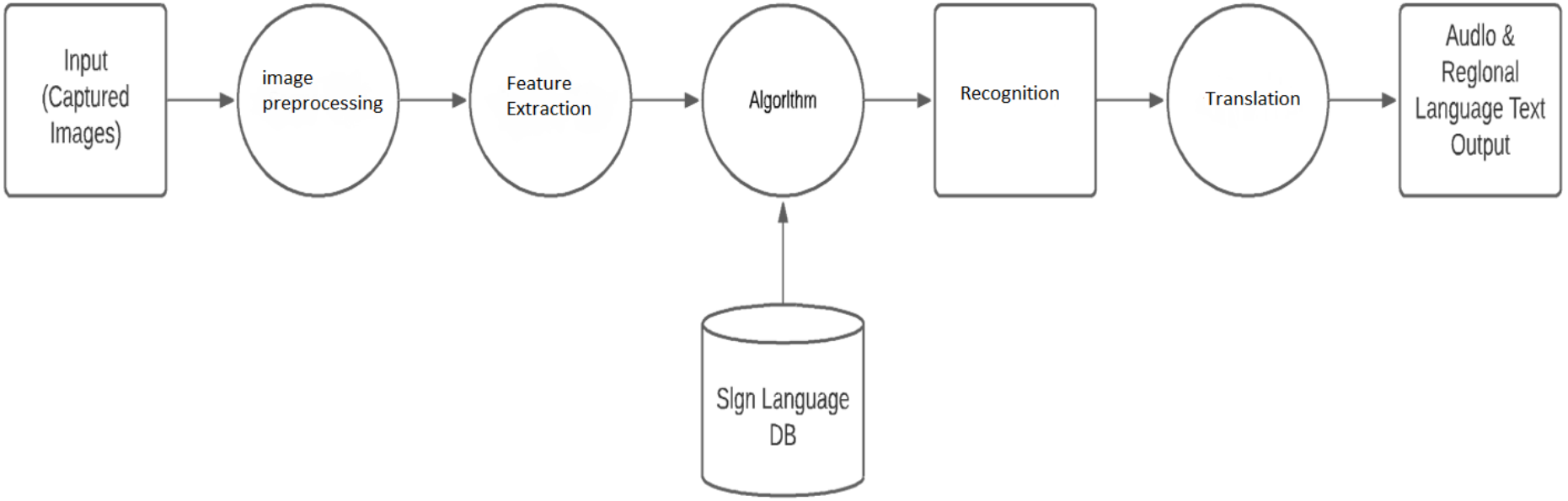
Level 0

Level 1

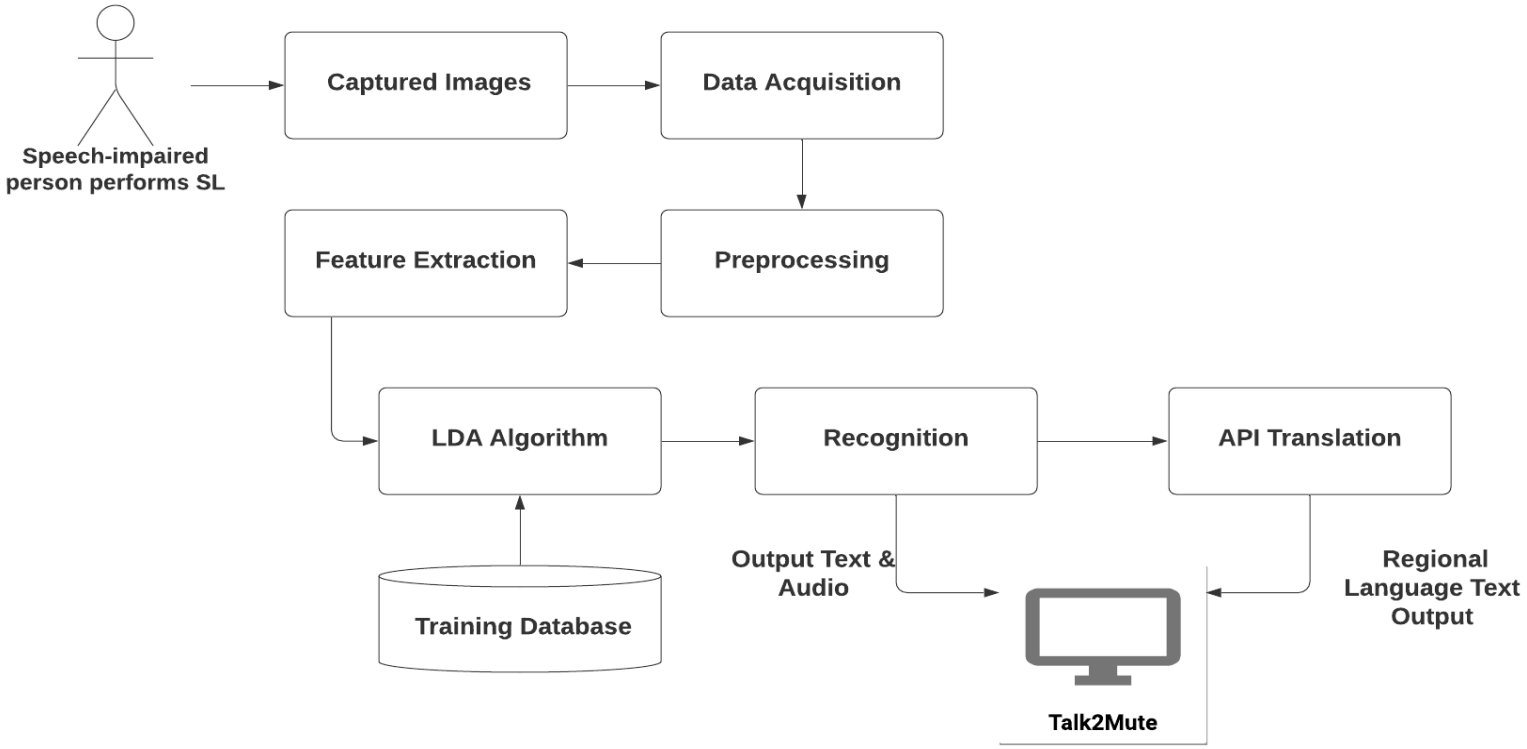


DATA FLOW DIAGRAM

Level 2



ARCHITECTURE



APPLICATIONS

- An easier way of communication among speech-impaired and the rest.
- Useful for learning the fundamentals of sign language gestures
- People who do not know English language can also use, since it provides regional language output in form of text and audio.

COURSE OUTCOMES

COs	Description
C410.1	The students will be able to analyse a current topic of professional interest and present it before an audience.
C410.2	Students will be able to identify an engineering problem, analyse it and propose a work plan to solve it.
C410.3	Students will have gained thorough knowledge in design, implementations and execution of Computer science related projects.
C410.4	Students will have attained the practical knowledge of what they learned in theory subjects.
C410.5	Students will become familiar with usage of modern tools.
C410.6	Students will have the ability to plan and work in a team.

CO-PO MAPPING

	POs											
COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
C410.1	3	2	3	3	3	3	2	3	3	3	3	2
C410.2	3	3	3	3	2	3	2	3	2	3	3	3
C410.3	3	3	2	3	3	3	3	3	2	3	3	3
C410.4	3	2	2	3	3	3	3	2	3	3	3	3
C410.5	2	3	3	3	2	3	3	2	2	3	2	2
C410.6	3	2	3	2	2	3	2	3	3	3	3	2
Average	2.83	2.5	2.67	2.83	2.5	3	2.5	2.67	2.5	3	2.83	2.67

CONCLUSION

Deaf and Dumb people rely on sign language interpreters for communications. We have proposed a system which translates Sign Language to English and regional languages in the form of text and speech. By using LDA algorithm for sign recognition operation the dimensionality will be reduced. Due to dimensionality reduction the noise will be reduced and with high accuracy. Hence this system makes the communication between speech-impaired people and other simple and comfortable.

PENDING WORK

- The dataset for the model is to be populated
- The model is to be coded and implemented
- The model is to be tested for accuracy

REFERENCE

- Arsan, Taner & Ulgen, Oguz. (2015). Sign Language Converter. International Journal of Computer Science & Engineering Survey. 6. 39-51. 10.5121/ijcses.2015.6403.
- Mahesh Kumar. "Conversion of sign language into text." International Journal of Applied Engineering Research 13.9 (2018): 7154-7161.
- Tolentino, Lean Karlo S., et al. "Static Sign Language Recognition Using Deep Learning." International Journal of Machine Learning and Computing 9.6 (2019).
- Madhyastha, Srinidhi. "Conversion of Sign Language to Text and Speech." International Journal for Advance Research and Development 2.3 (2017).
- K.Hemanth gupta, M.Viswajith reddy, M.kalyan Kumar Chowdary, M.Narengurusai, Dr.K Helen prabha. “Sign Language Translator Using Machine Learning.” International Journal of Applied Engineering Research 13.4 (2018)

THANK YOU