



Talk2Mute

Department of CSE
Jyothi Engineering College
Thrissur

April 16, 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 through text and audio output



LITERATURE SURVEY

Papers used

1. Sign Language Translator Using Machine Learning
2. Sign Language Converter
3. Conversion Of Sign Language To Text And Speech Using Machine Learning Technologies
4. Conversion Of Sign Language Into Text



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



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

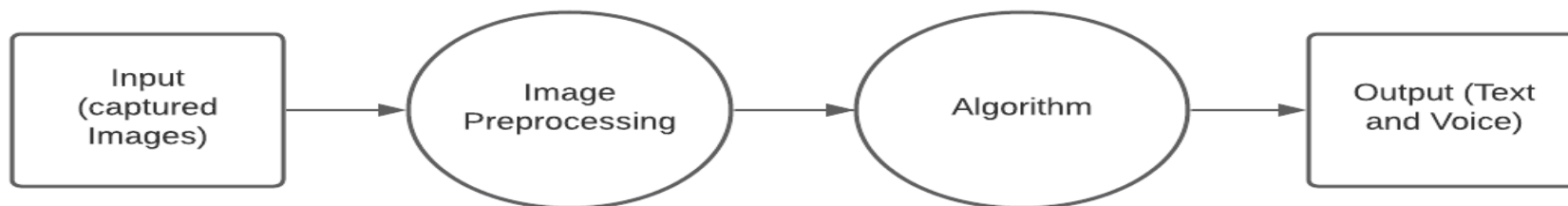


DATA FLOW DIAGRAM

Level 0



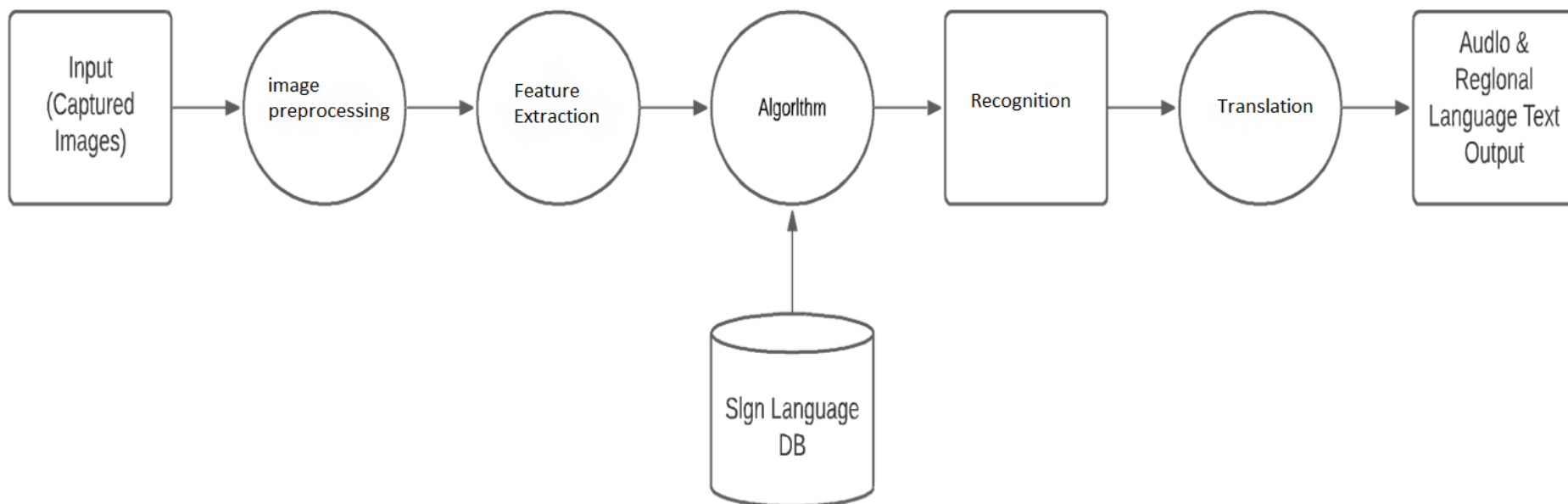
Level 1





DATA FLOW DIAGRAM

Level 2





ARCHITECTURE

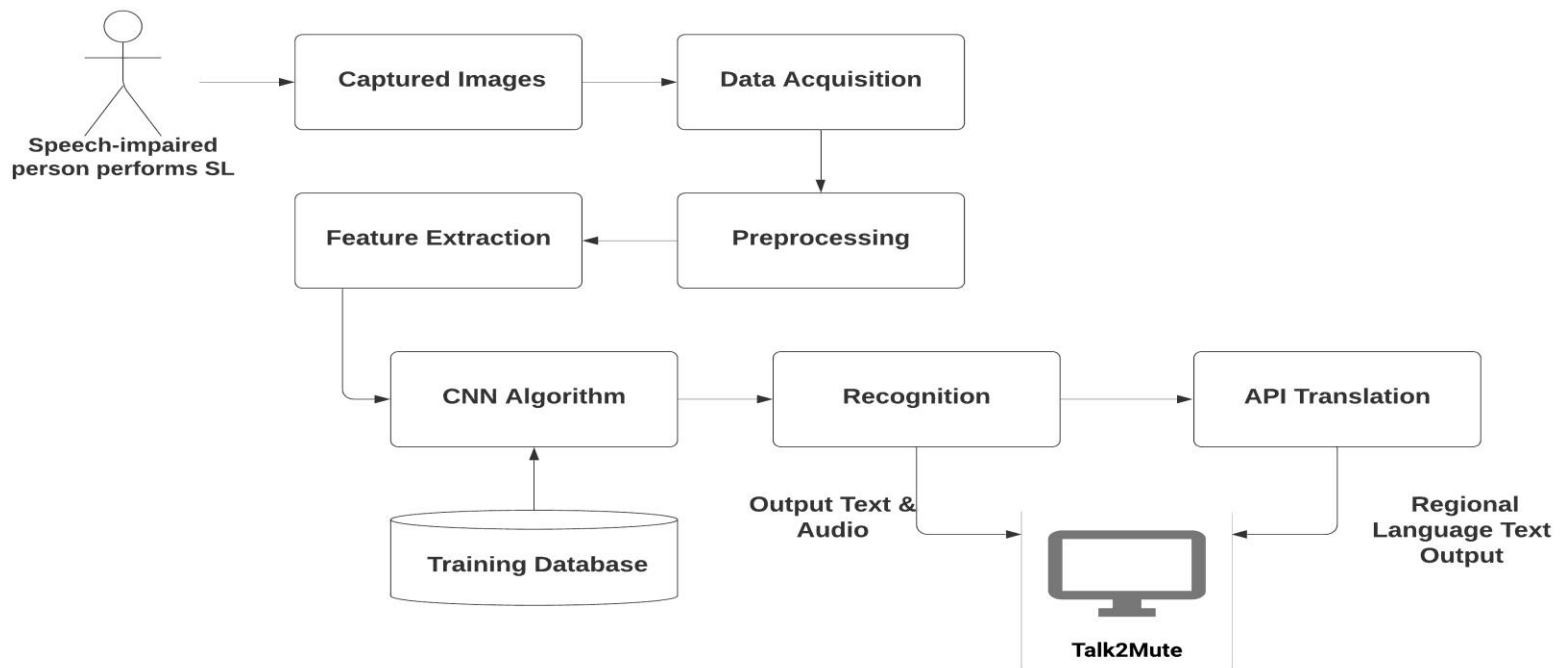




Image Capturing

R\\Desktop - Geany

Document Project Build Tools Help

Save All Revert Close Back Forward Compile Build Execute Color Chooser

y x

```
import cv2 # importing cv2 library

cam = cv2.VideoCapture(0)
count = 0

while True:
    ret, img = cam.read()

    cv2.imshow("Test", img)

    if not ret:
        break

    k=cv2.waitKey(1)

    if k%256==27:
        #For Esc key
        print("Close")
        break
    elif k%256==32:
        #For Space key

        print("Image "+str(count)+"saved")
        file='C:/Users/SREEHARI/Desktop/image/img'+str(count)+'.jpg'
        cv2.imwrite(file, img)
        count +=1

cam.release
cv2.destroyAllWindows
```




Output

```

cam.py - C:\Users\SREEHARI\Desktop - Geany
File Edit Search View Document Project Build Tools Help
New Open Save Save All Revert Close Back Forward Compile Build Execute Color Chooser Find Jump to Quit
Symbols Documents
cam.py
1 import cv2 # importing cv2 library
2
3 cam = cv2.VideoCapture(0)
4
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Command Prompt - cam.py
Microsoft Windows [Version 10.0.16299.214]
(c) 2017 Microsoft Corporation. All rights reserved.
C:\Users\SREEHARI>cd Desktop
C:\Users\SREEHARI\Desktop>cam.py
Image 0saved
Image 1saved
Image 2saved
Image 3saved
Process failed. (The system cannot find the file specified)

```




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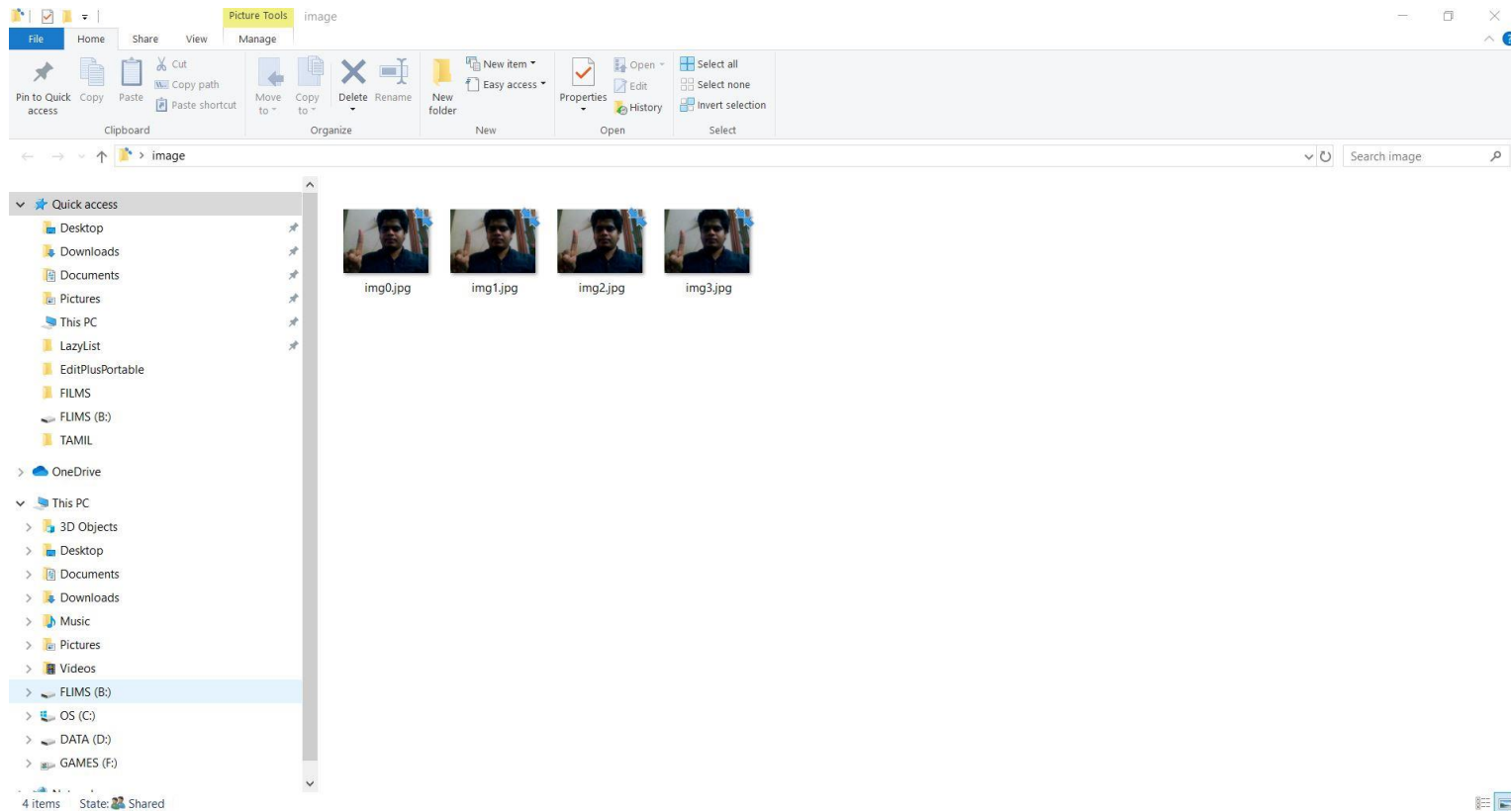
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A CENTRE OF EXCELLENCE IN SCIENCE & TECHNOLOGY BY THE CATHOLIC ARCHDIOCESE OF TRICHUR

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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.





Training

```
train.py - C:/Users/vincy/Desktop/train.py (3.8.2)
File Edit Format Run Options Window Help

import tensorflow as tf
from tensorflow import keras
from keras.models import Sequential
from keras.layers import Activation, Dense, Flatten, BatchNormalization, Conv2D, MaxPool2D, I
from keras.optimizers import Adam, SGD
from keras.metrics import categorical_crossentropy
from keras.preprocessing.image import ImageDataGenerator
import itertools
import random
import warnings
import numpy as np
import cv2
from keras.callbacks import ReduceLROnPlateau
from keras.callbacks import ModelCheckpoint, EarlyStopping
warnings.simplefilter(action='ignore', category=FutureWarning)

train_path = r'D:\gesture\train'
test_path = r'D:\gesture\test'

train_batches = ImageDataGenerator(preprocessing_function=tf.keras.applications.vgg16.preproc
test_batches = ImageDataGenerator(preprocessing_function=tf.keras.applications.vgg16.preproc

imgs, labels = next(train_batches)

#Plotting the images...
def plotImages(images_arr):
    fig, axes = plt.subplots(1, 10, figsize=(30,20))
    axes = axes.flatten()
    for img, ax in zip( images_arr, axes):
        img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
        ax.imshow(img)
        ax.axis('off')
    plt.tight_layout()
    plt.show()

plotImages(imgs)
print(imgs.shape)
print(labels)
```



File Edit Format Run Options Window Help

```
model.add(MaxPool2D(pool_size=(2, 2), strides=2))

model.add(Conv2D(filters=64, kernel_size=(3, 3), activation='relu', padding = 'same'))
model.add(MaxPool2D(pool_size=(2, 2), strides=2))

model.add(Conv2D(filters=128, kernel_size=(3, 3), activation='relu', padding = 'valid'))
model.add(MaxPool2D(pool_size=(2, 2), strides=2))

model.add(Flatten())

model.add(Dense(64,activation ="relu"))
model.add(Dense(128,activation ="relu"))
#model.add(Dropout(0.2))
model.add(Dense(128,activation ="relu"))
#model.add(Dropout(0.3))
model.add(Dense(10,activation ="softmax"))

# In[23]:

model.compile(optimizer=Adam(learning_rate=0.001), loss='categorical_crossentropy', metrics=[
reduce_lr = ReduceLROnPlateau(monitor='val_loss', factor=0.2, patience=1, min_lr=0.0001)
early_stop = EarlyStopping(monitor='val_loss', min_delta=0, patience=2, verbose=0, mode='auto')

model.compile(optimizer=SGD(learning_rate=0.001), loss='categorical_crossentropy', metrics=[
reduce_lr = ReduceLROnPlateau(monitor='val_loss', factor=0.2, patience=1, min_lr=0.0005)
early_stop = EarlyStopping(monitor='val_loss', min_delta=0, patience=2, verbose=0, mode='auto')

history2 = model.fit(train_batches, epochs=10, callbacks=[reduce_lr, early_stop], validation
imgs, labels = next(train_batches) # For getting next batch of imgs...

imgs, labels = next(test_batches) # For getting next batch of imgs...
scores = model.evaluate(imgs, labels, verbose=0)
print(f'{model.metrics_names[0]} of {scores[0]}; {model.metrics_names[1]} of {scores[1]*100};
```



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File Explorer interface showing the 'gesture' folder contents.

Navigation: File Explorer > gesture > train

Name	Date modified	Type	Size
A	17-04-2021 12:58 PM	File folder	
B	17-04-2021 12:59 PM	File folder	
C	17-04-2021 12:59 PM	File folder	
D	17-04-2021 12:59 PM	File folder	
E	17-04-2021 12:59 PM	File folder	
F	17-04-2021 01:00 PM	File folder	
G	17-04-2021 01:00 PM	File folder	
H	17-04-2021 01:00 PM	File folder	
I	17-04-2021 01:00 PM	File folder	
J	17-04-2021 01:00 PM	File folder	
K	17-04-2021 01:00 PM	File folder	
L	17-04-2021 01:01 PM	File folder	
M	17-04-2021 01:01 PM	File folder	
N	17-04-2021 01:01 PM	File folder	
O	17-04-2021 01:01 PM	File folder	
P	17-04-2021 01:02 PM	File folder	
Q	17-04-2021 01:02 PM	File folder	
R	17-04-2021 01:01 PM	File folder	
S	17-04-2021 01:01 PM	File folder	
T	17-04-2021 01:01 PM	File folder	
U	17-04-2021 01:01 PM	File folder	
V	17-04-2021 01:01 PM	File folder	
W	17-04-2021 01:01 PM	File folder	
v	17-04-2021 01:01 PM	File folder	

26 items



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 CNN algorithm we are trying to do this. This system makes the communication between speech-impaired people and other simple and comfortable.



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THANK YOU