Team Name : ***Dhvani*** sandesha

	Name	Branch and Semester	Contact Number	Email- ID
Team Leader	K S RAKSHIT	E &C 6th sem	9481851331	rakshitks99@gmail.com
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Member 2				
Transaction ID (anju.marina.lobo@oksbi)	005413388374			

Note:

1. One can participate either as a part of a team or an individual basis. Switching teams is not allowed.
2. The uploaded ideas will be screened to go to the second round.
3. Judging : competition entries shall be judged, or winners selected based on the following criteria
   - Is the problem worth solving
   - How innovative or novel is the idea
   - Scientific accuracy
   - Social impact
   - Scalability
4. Decisions of IIC JSSSTU in respect of all matters to do with the competition will be final and no correspondence will be entertained.
5. In second round, the selected teams will have to present their idea in front of the jury panel.
6. Payment of INR 50 should be made to the UPI ID **anju.marina.lobo@oksbi** and submit the transaction ID above.
7. Idea should be submitted in **.pdf** format.

TOPIC NAME:

SIGN LANGUAGE INTERPRETATION USING IMAGE PROCESSING AND DEEP LEARNING

Abstract: (not more than 150 words)

- Deaf or dumb people cannot communicate with the normal people since they don't understand the sign language. Deaf or dumb people have **gestures for every alphabet or word** through which they communicate .But the general public they don't know and they can't understand the sign language .
- Hence that results in communication between deaf or dumb people and the normal people. Deaf or dumb people hesitate to talk to normal people . That makes them socially isolated from the rest of the society.
- So we have developed a **prototype** which **captures and interprets** the hand gestures of deaf or dumb people in **real time** using image processing and deep learning and print the appropriate word or alphabet for their hand gesture they show to the camera
- The prototype also has a feature to **speak the gestures** shown by the deaf or dumb people and also **print it on the screen** make it easier for communication between normal people and the deaf or dumb people.
- This also be useful if **deaf wants to communicate with the blind.** Since we have both **audio-visual** feature for our prototype.
- To achieve this we make use of **deep learning and image processing** techniques.

Introduction (not more than 200 words)

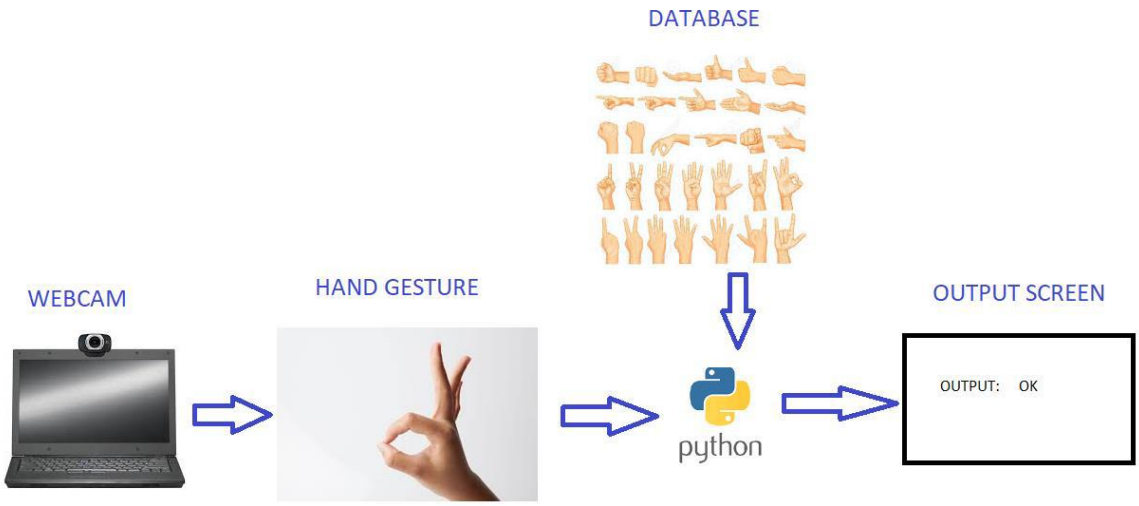
- Sign language is one of the effective **communication tools** for the people who are not able to speak or hear anything.
- Deaf or dumb people cannot communicate with normal people ,who don't know sign language, because of which normal people will not be able to understand their feelings. This the problem faced.
- So, the prototype helps them to understand the sign of the deaf and dumb people using **basic image processing techniques and deep learning**. In this prototype the **camera captures real time hand gesture** of the deaf or dumb people and compares it with the **database** created and **predicts** the appropriate character to generate a meaningful sentence.
- Along with **printing the character** or word it has recognized it will **speak out the character** and the word shown by the hand gestures.
- Once the sentence is generated it will read out the whole sentence . So that it will help the common people to understand what he wants to communicate.
- Since the prototype **supports both audio and visual interpretation** of hand gestures makes it unique prototype.
- It will also help the deaf to communicate with the blind since the deaf can't talk and the blind can't see . But our prototype will print and read out the sentence and making it easy for deaf to communicate with the blind .

Motivation (not more than 100 words)

- We have seen deaf or dumb people coming to the stationary shop to purchase books pens etc.
- They try to explain the shopkeeper what they want using their hand gestures. But the shopkeeper fails to understand what they want.
- They have to physically touch the pen and show them that they want this pen.
- So we thought why not we solve this problem and their life easier
- So that the shopkeeper can understand the hand gesture of deaf or dumb people with the help of our prototype which reads and speaks based on the hand gestures shown.

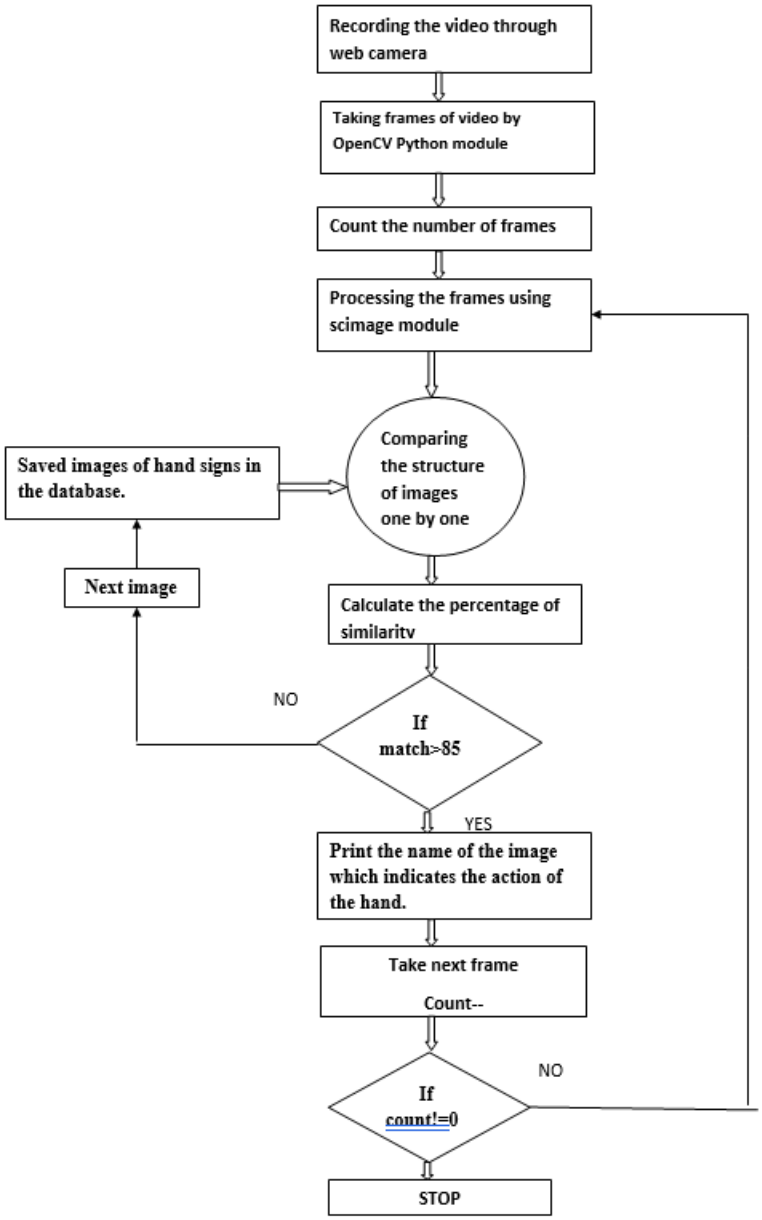
Methodology (block diagram, related figures etc)

Capturing the hand gesture of deaf and dumb people by camera and processing the video by converting it into frames and then processing the frames using the image processing methods and comparing the processed images with the saved database images and printing the appropriate message saved with highest compared images.



Flow Diagram

- Video processing
- Image processing
- Image comparison between processed image and images stored in database .
- In this prototype the hand gestures of the deaf or dumb people is captured in **real time** using image and video processing and then it is compared with the **database**.
- Once the match is found it is printed on the screen and spoken .
- Once a sentence and word is formed using the characters .The character and the **word is spoken**



Block diagram

- We have created our own database of around 1 lakh images for total of 26 character and trained it using deep learning algorithms by using convolution and dense layer .

- After training the deep learning model a model file is generated which is loaded into the detection of the hand gestures

- **The following youtube link shows the working of our prototype:**

- https://youtu.be/2CDaGPrzTHU

- Masking the image so that only the hand is detected and the background is made black and only the hand is made white so that comparison is most effective.

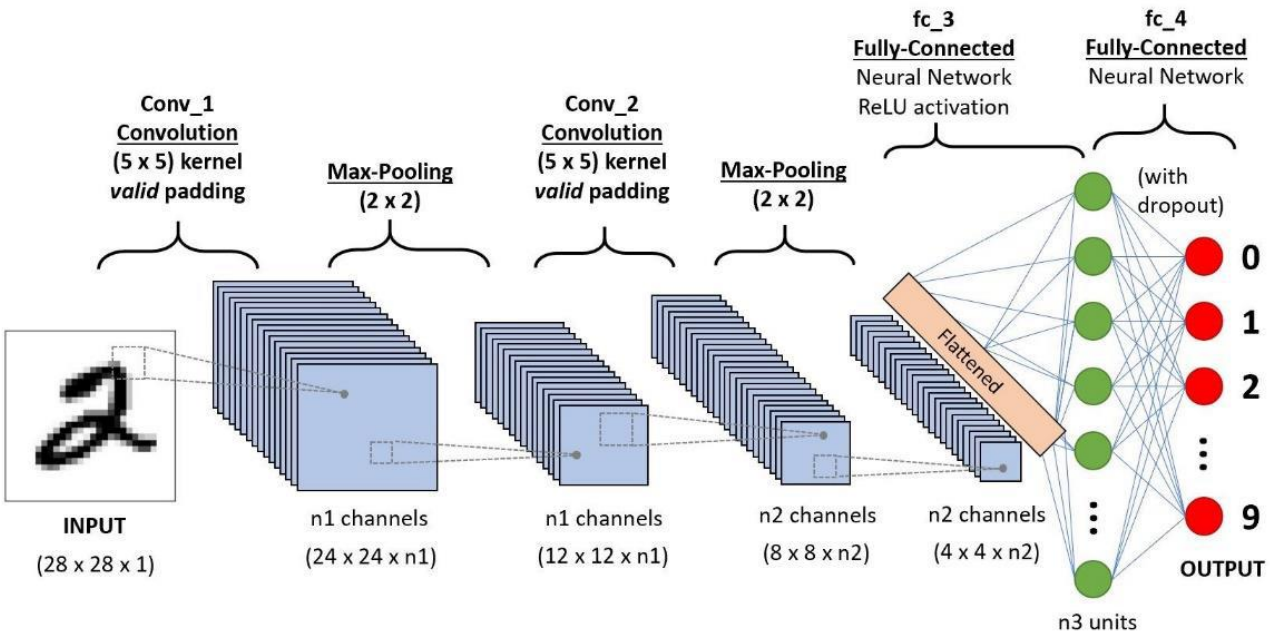
- Since comparing each image with 1 lakh image (database) is difficult we create a model and load it in the python file which loads it and uses that model file for detection.

- Image pre-processing for deblurring and smoothening is used to achieve the goal

- Once the hand gesture is detected we have included a library which speaks out the word.

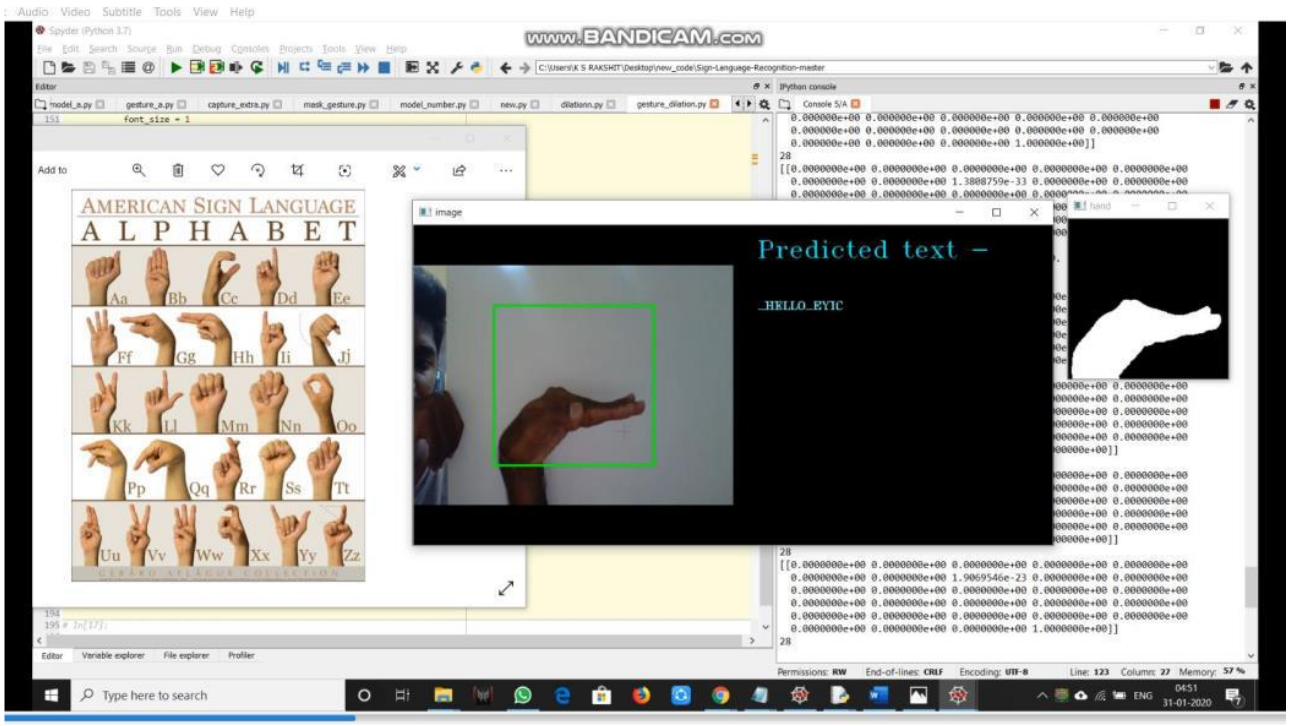
- For comparing the dataset images it uses pixel values and the similarities in the structure of the image as shown in the block diagram.

- We use convolution neural network (CNN) to compare the database with the real time image



CNN APPLIED FOR TRAINING

OUTPUT SNAPSHOT OF THE PROTOTYPE



OUTPUT PROTOTYPE VIDEO LINK: https://youtu.be/2CDaGPrzTHU

Social Impact

- This has a huge social impact on the lives of deaf or dumb people .
- It is like the voice for the dumb and the ears for the deaf as we have voice feature for the dumb and visual for the dumb people.
- This will not only reduce the communication between normal people and the deaf or dumb people but will also help in making them more capable jobs .
- They can easily hired by the companies since they become as capable as normal people.
- They can easily take part in the presentation and debate .
- Communication between deaf and blind people is also possible.
- This will be breakthrough innovation which will completely transform the life of deaf and dumb people .
- They can be independent
- They won’t need a mediator to communicate with the normal people.

Market Survey

- According to the 2011 census roughly about 1.3 million people are deaf and dumb people in India.
- That is a huge market.
- Since the existing products for deaf and dumb like the one made using flex sensors are highly inefficient .It gives lot of errors .
- But since our prototype is highly efficient and accurate since it using image processing and deep learning .It is cheap and best.
- Our prototype will involve a raspberry pi with a camera module and the display.
- Raspberry pi is portable as it of the size of the mobile .It can be carried in the pocket.
- Since we have used American English sign language recognition. It has a huge market in the other countries .
- Market is huge and even the demand since it is effective and solves a real life problem of deaf and dumb people. More importantly it is **real time processing.**
- That makes it much more effective and convenient