Team information

- Team Id: 45

- Names :
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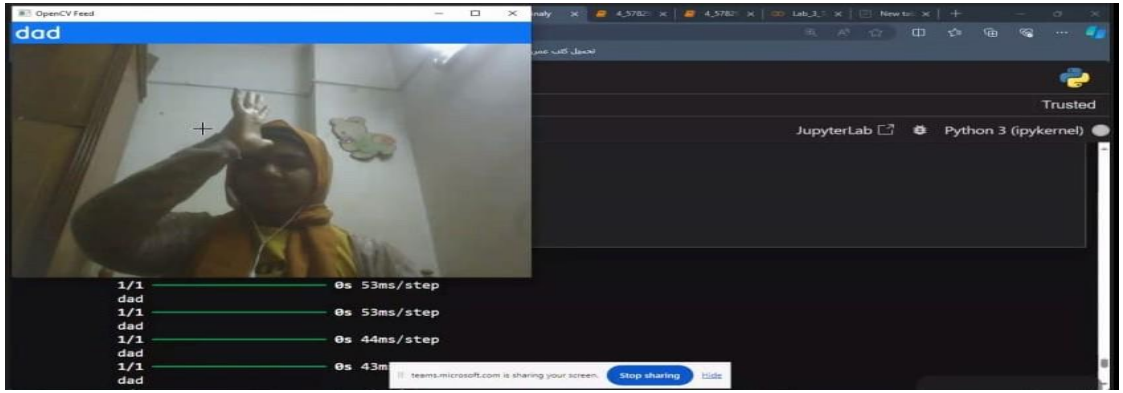
Task description

- **Sign language to text :**
  - ✓ This project aims to develop a system that automatically translates sign language gestures into text using deep learning techniques. This technology has the potential to bridge the communication gap between the deaf and hearing communities.

Demo

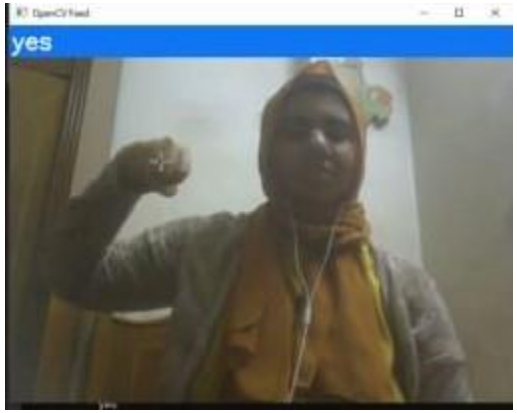
- Sign for hello

Sign for dad



- Sign for stop

Sign for yes



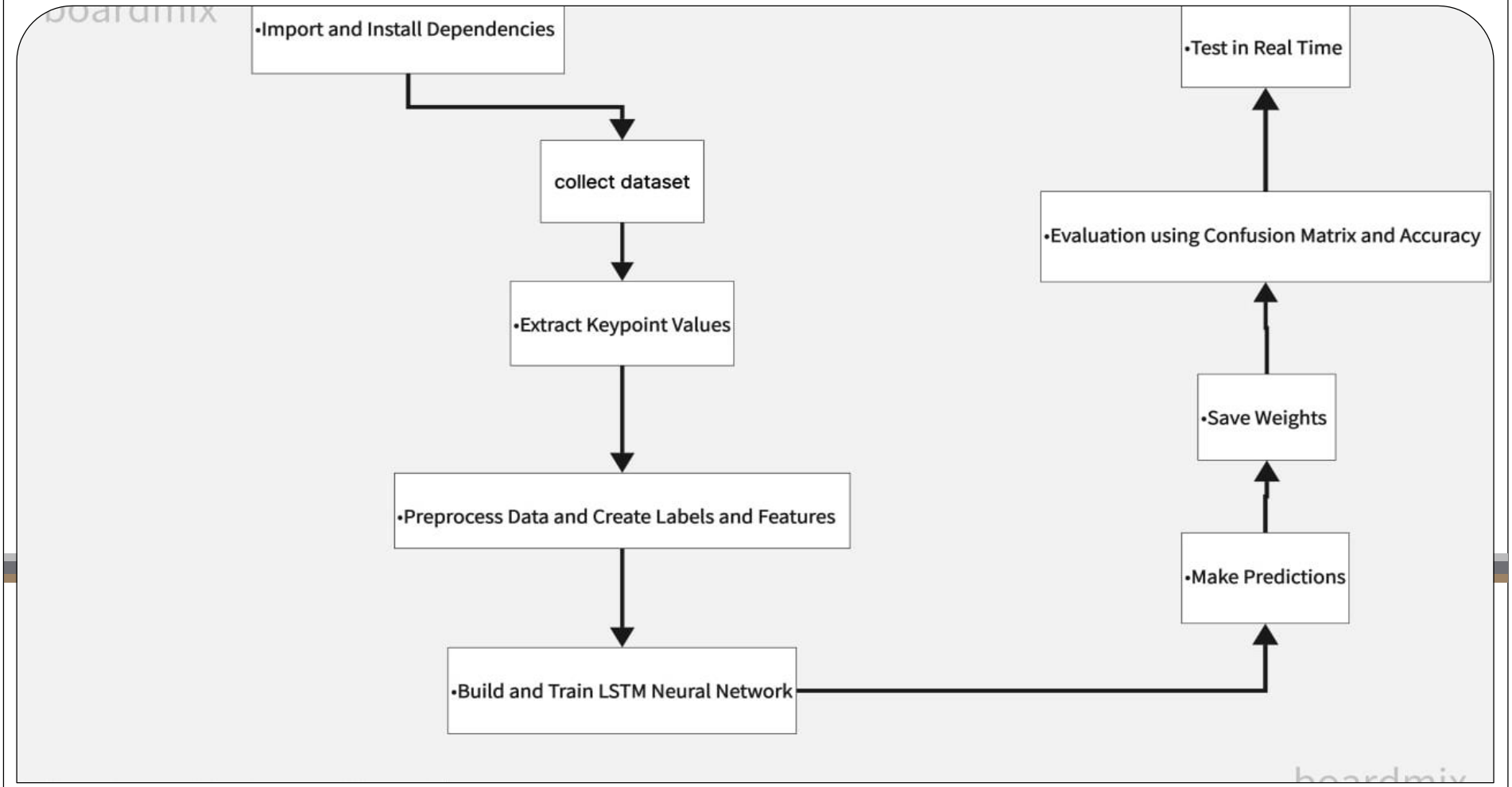
Contribution

- Create our dataset.
- Train model on our dataset.

Data

- Collect data by using web camera .
- We capture 30 video for one word .
- Take 30 frame from every video .
- There are three landmark which are :
  - Left hand
  - Right hand
  - face
- Dataset cover 25 word in ASL.
- Dataset include (hello , how are you , bad ,fine , nice , yes , learn, bath, dad , food , stop , I am, nothing , name , what is , your , to meet you , no , bed , mam , help ,drink ,thanks)

Project Architecture



An illustration explaining the steps to train mode

Methods

- We use mediapipe holistic to collect keypoints .
- Train a deep neural network with LSTM layers for sequence :
  1. Input layer :
     - Type : layers.Input .
     - Purpose: Defines the input shape of the model.
  2. Hidden layers :
     - Type : layers.LSTM , layers.Dense
     - Purpose of layers.LSTM : perform LSTM operations on sequances .
     - Purpose of layers.Dense :
       - Dense layer 1 :
         - Applies a fully connected layer with 64 units to the output of LSTM Layer 3.
       - Dense layer 2 :
         - Applies a fully connected layer with 32 units to the output of Dense Layer 1.
     - Activation function : ‘relu’.

Methods

3. Output layers:
   - Type : layers.Dense .
   - Purpose :
     - applies a fully connected layer with a number of units equal to a number of actions in the actions array.
   - Activation function : ‘softmax’ .

- Using OpenCv to make a real time detection .

Results

- Accuracy of model training : 0.7261

```
18/18 ━━━━━━━━━━━━━━━━━━━━ 2s 82ms/step - categorical_accuracy: 0.7064 - loss: 0.8358
Epoch 100/100
18/18 ━━━━━━━━━━━━━━━━━━━━ 2s 85ms/step - categorical_accuracy: 0.7261 - loss: 0.7526
5/5 ━━━━━━━━━━━━━━━━━━━━ 1s 163ms/step
18/18 ━━━━━━━━━━━━━━━━━━━━ 1s 29ms/step
0.625
```

Results

```
[32]: model.summary()
```

Model: "sequential_1"

Layer (type)	Output Shape	Param #
lstm_3 (LSTM)	(None, 30, 64)	408,320
lstm_4 (LSTM)	(None, 30, 128)	98,816
lstm_5 (LSTM)	(None, 64)	49,408
dense_3 (Dense)	(None, 64)	4,160
dense_4 (Dense)	(None, 32)	2,080
dense_5 (Dense)	(None, 25)	825

Total params: 1,690,829 (6.45 MB)

Trainable params: 563,609 (2.15 MB)

Non-trainable params: 0 (0.00 B)

Optimizer params: 1,127,220 (4.30 MB)

Thanks