



# Sign Language Translator using machine learning approach

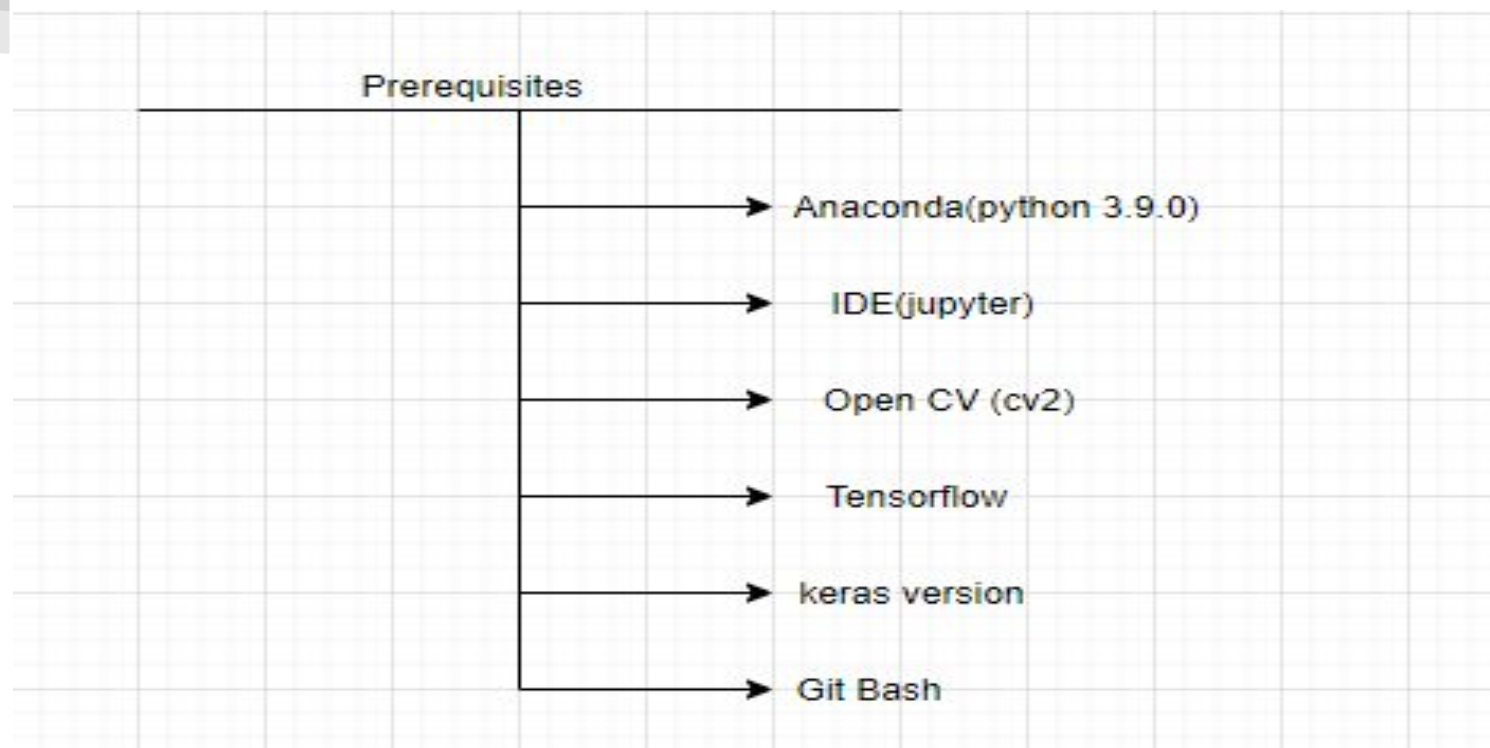
Sushank dambhare(C-18)

Amey surkar(A-28)

Yash mohare (B-70)

**Guide- Miss. Neha purohit**

# Prerequisites



# Create an Environment (yash env)

```
Command Prompt - conda install tensorflow - conda install keras - conda install nb_c
Microsoft Windows [Version 10.0.19044.1202]
(c) Microsoft Corporation. All rights reserved.

C:\Users\welcome>conda create -n yashenv
WARNING: The conda.compat module is deprecated and will be re
Collecting package metadata: done
Solving environment: done

==> WARNING: A newer version of conda exists. <==
  current version: 4.6.11
  latest version: 4.10.3

Please update conda by running

    $ conda update -n base -c defaults conda

## Package Plan ##

  environment location: C:\Users\welcome\.conda\envs\yashenv
```

# Install Tensorflow & keras

```
pycparser-2.20 | 94 KB | #####
Preparing transaction: done
Verifying transaction: done
Executing transaction: done

(yashenv) C:\Users\welcome>conda install keras
WARNING: The conda.compat module is deprecated and will be removed i
Collecting package metadata: done
Solving environment: done

==> WARNING: A newer version of conda exists. <==
  current version: 4.6.11
  latest version: 4.10.3

Please update conda by running

    $ conda update -n base -c defaults conda

## Package Plan ##

environment location: C:\Users\welcome\.conda\envs\yashenv

added / updated specs:
- keras
```

notebook-6.4.3	7.9 MB	#####	100%
testpath-0.5.0	86 KB	#####	100%
astor-0.8.1	46 KB	#####	100%
traitlets-5.0.5	81 KB	#####	100%
pysistent-0.17.3	92 KB	#####	100%
ipython-7.26.0	1.2 MB	#####	100%
protobuf-3.14.0	262 KB	#####	100%
win_inet_pton-1.1.0	33 KB	#####	100%
python-3.8.11	19.3 MB	#####	100%
matplotlib-inline-0.	12 KB	#####	100%
chardet-3.0.4	195 KB	#####	100%
jupyter_core-4.7.1	96 KB	#####	100%
tornado-6.1	674 KB	#####	100%
blinker-1.4	23 KB	#####	100%
pywinpty-0.5.7	55 KB	#####	100%
nb_conda_kernels-2.3	28 KB	#####	100%
wcwidth-0.2.5	34 KB	#####	100%

Preparing transaction: done

Verifying transaction: done

Executing transaction: / b'Enabling nb\_conda\_kernels...\nCONDA\_PREFIX: C:\\Users\\welcome\\.conda\\envs\\yashenv\\nStatus: enabled\\n'

| b'Config option `kernel\_spec\_manager\_class` not recognized by `EnableNBExtensionApp`.\\nEnabling notebook extension nb\_conda/main...\\n - Validating: ok\\nEnabling tree extension nb\_conda/tree...\\n - Validating: ok\\nConfig option `kernel\_spec\_manager\_class` not recognized by `EnableServerExtensionApp`.\\nEnabling: nb\_conda\\n

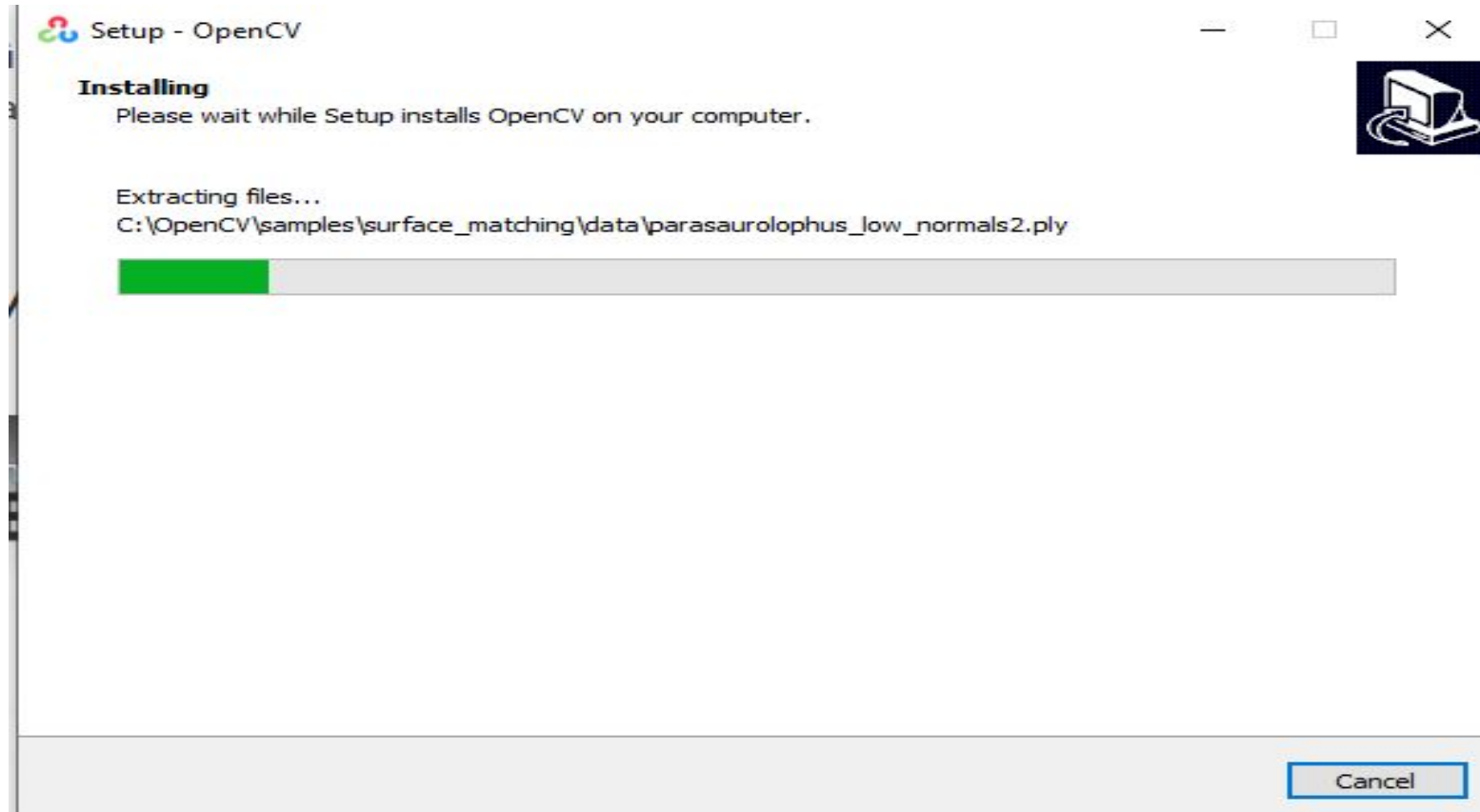
Writing config: C:\\Users\\welcome\\.conda\\envs\\yashenv\\etc\\jupyter\\n - Validating...\\n nb\_conda 2.2.1 ok\\n'

done

(yashenv) C:\\Users\\welcome>



# OPenCV installation- on Desktop



Microsoft Windows [Version 10.0.19044.1202]  
(c) Microsoft Corporation. All rights reserved.

C:\Users\welcome>conda create --name virtualenv python=3  
WARNING: The conda.compat module is deprecated and will be removed in a future release.  
Collecting package metadata: done  
Solving environment: done

==> WARNING: A newer version of conda exists. <==  
current version: 4.6.11  
latest version: 4.10.3

Please update conda by running

```
$ conda update -n base -c defaults conda
```

### ## Package Plan ##

environment location: C:\Users\welcome\.conda\envs\virtualenv

added / updated specs:  
- python=3

The following packages will be downloaded:

package	build	
python-3.9.7	h6244533_1	19.9 MB
setuptools-58.0.4	py39haa95532_0	1005 KB
Total:		20.9 MB

The following NEW packages will be INSTALLED:

ca-certificates	pkgs/main/win-64::ca-certificates-2021.7.5-haa95532_1
certifi	pkgs/main/win-64::certifi-2021.5.30-py39haa95532_0
openssl	pkgs/main/win-64::openssl-1.1.1l-h2bbff1b_0
pip	pkgs/main/win-64::pip-21.2.4-py38haa95532_0
python	pkgs/main/win-64::python-3.9.7-h6244533_1
setuptools	pkgs/main/win-64::setuptools-58.0.4-py39haa95532_0

# Packages installation

The following packages will be downloaded:

package	build	
python-3.9.7	h6244533_1	19.9 MB
setuptools-58.0.4	py39haa95532_0	1005 KB
Total:		20.9 MB

The following NEW packages will be INSTALLED:

ca-certificates	pkgs/main/win-64::ca-certificates-2021.7.5-haa95532_1
certifi	pkgs/main/win-64::certifi-2021.5.30-py39haa95532_0
openssl	pkgs/main/win-64::openssl-1.1.1l-h2bbff1b_0
pip	pkgs/main/win-64::pip-21.2.4-py38haa95532_0
python	pkgs/main/win-64::python-3.9.7-h6244533_1
setuptools	pkgs/main/win-64::setuptools-58.0.4-py39haa95532_0
sqlite	pkgs/main/win-64::sqlite-3.36.0-h2bbff1b_0
tzdata	pkgs/main/noarch::tzdata-2021a-h5d7bf9c_0
vc	pkgs/main/win-64::vc-14.2-h21ff451_1
vs2015_runtime	pkgs/main/win-64::vs2015_runtime-14.27.29016-h5e58377_2
wheel	pkgs/main/noarch::wheel-0.37.0-pyhd3eb1b0_1
wincertstore	pkgs/main/win-64::wincertstore-0.2-py39h2bbff1b_0

Proceed ([y]/n)? y



# Install openCV in environment

```
Proceed ([y]/n)? y
```

```
Downloading and Extracting Packages
```

```
setuptools-58.0.4    | 1005 KB | #####  
python-3.9.7         | 19.9 MB | #####  
#####
```

```
Preparing transaction: done
```

```
Verifying transaction: done
```

```
Executing transaction: done
```

```
#
```

```
# To activate this environment, use:
```

```
# > activate virtualenv
```

```
#
```

```
# To deactivate an active environment, use:
```

```
# > deactivate
```

```
#
```

```
# * for power-users using bash, you must source
```

```
#
```

```
C:\Users\welcome>activate virtualenv
```

```
(virtualenv) C:\Users\welcome>pip install opencv-contrib-python
```

```
Collecting opencv-contrib-python
```

```
  Downloading opencv_contrib_python-4.5.3.56-cp39-cp39-win_amd64.whl (41.8 MB)
```

```
    | 13.8 MB 1.1 MB/s eta 0:00:26
```

```
C:\Users\welcome>activate virtualenv
```

```
(virtualenv) C:\Users\welcome>pip install opencv-contrib-python
```

```
Collecting opencv-contrib-python
```

```
  Downloading opencv_contrib_python-4.5.3.56-cp39-cp39-win_amd64.whl (41.8 MB)
```

```
|████████████████████████████████████████| 41.8 MB 205 kB/s
```

```
Collecting numpy>=1.19.3
```

```
  Downloading numpy-1.21.2-cp39-cp39-win_amd64.whl (14.0 MB)
```

```
|████████████████████████████████████████| 14.0 MB 3.3 MB/s
```

```
Installing collected packages: numpy, opencv-contrib-python
```

```
Successfully installed numpy-1.21.2 opencv-contrib-python-4.5.3.56
```

```
(virtualenv) C:\Users\welcome>python
```

```
Python 3.9.7 (default, Sep 16 2021, 16:59:28) [MSC v.1916 64 bit (AMD64)] :: Anaconda, Inc. on win32
```

```
Type "help", "copyright", "credits" or "license" for more information.
```

```
>>>
```

# Importing open cv2- environment

```
C:\Users\welcome>activate virtualenv

(virtualenv) C:\Users\welcome>pip install opencv-contrib-python
Collecting opencv-contrib-python
  Downloading opencv_contrib_python-4.5.3.56-cp39-cp39-win_amd64.whl (41.8 MB)
    | 41.8 MB 205 kB/s
Collecting numpy>=1.19.3
  Downloading numpy-1.21.2-cp39-cp39-win_amd64.whl (14.0 MB)
    | 14.0 MB 3.3 MB/s
Installing collected packages: numpy, opencv-contrib-python
Successfully installed numpy-1.21.2 opencv-contrib-python-4.5.3.56

(virtualenv) C:\Users\welcome>python
Python 3.9.7 (default, Sep 16 2021, 16:59:28) [MSC v.1916 64 bit (AMD64)]
Type "help", "copyright", "credits" or "license" for more information.
>>> import cv2
>>> print(cv2.__version__)
4.5.3
>>>
```



# Calling Jupyter Notebook

```
(yashenv) C:\Users\welcome>jupyter notebook
WARNING: The conda.compat module is deprecated and will be removed in a future release.
[I 00:19:14.894 NotebookApp] [nb_conda_kernels] enabled, 2 kernels found
[I 00:19:16.085 NotebookApp] [nb_conda] enabled
[I 00:19:16.085 NotebookApp] Serving notebooks from local directory: C:\Users\welcome
[I 00:19:16.085 NotebookApp] Jupyter Notebook 6.4.3 is running at:
[I 00:19:16.085 NotebookApp] http://localhost:8888/?token=0168c39a180ea1f52c74963b4ba5a969bb33f56f
[I 00:19:16.085 NotebookApp] or http://127.0.0.1:8888/?token=0168c39a180ea1f52c74963b4ba5a969bb33
[I 00:19:16.085 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to
[C 00:19:16.349 NotebookApp]
```

To access the notebook, open this file in a browser:

file:///C:/Users/welcome/AppData/Roaming/jupyter/runtime/nbserver-6936-open.html

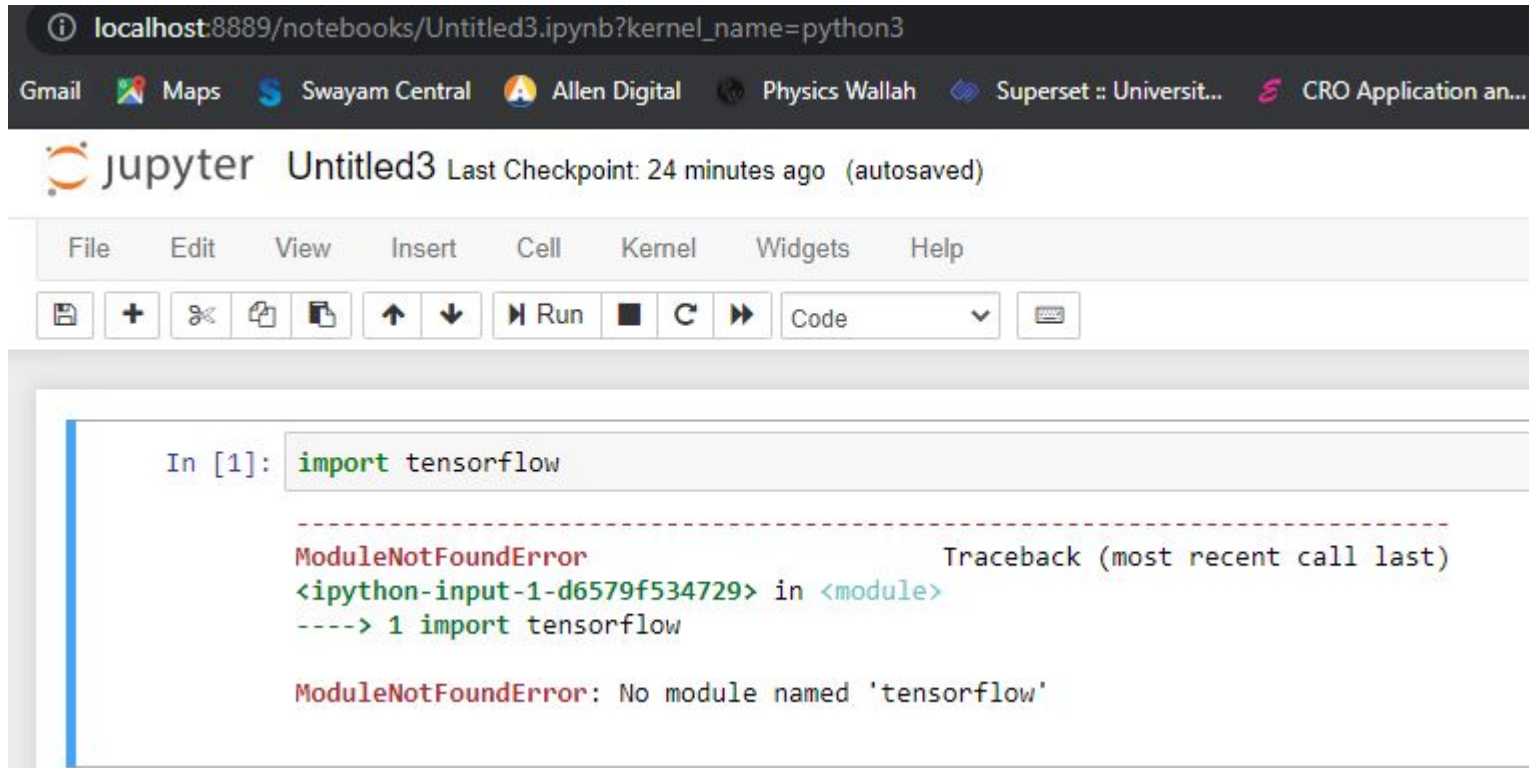
Or copy and paste one of these URLs:

http://localhost:8888/?token=0168c39a180ea1f52c74963b4ba5a969bb33f56f56e362b4

or http://127.0.0.1:8888/?token=0168c39a180ea1f52c74963b4ba5a969bb33f56f56e362b4

```
C:\Users\welcome\.conda\envs\yashenv\lib\json\encoder.py:257: UserWarning: date_default is deprecate
lt.
```

# Before installing Tensorflow



The screenshot shows a Jupyter Notebook interface in a web browser. The address bar shows the URL: localhost:8889/notebooks/Untitled3.ipynb?kernel\_name=python3. The browser's address bar has several bookmarks: Gmail, Maps, Swayam Central, Allen Digital, Physics Wallah, Superset :: Universit..., and CRO Application an... The Jupyter Notebook interface has a title bar that says "jupyter Untitled3 Last Checkpoint: 24 minutes ago (autosaved)". Below the title bar is a menu bar with options: File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. Below the menu bar is a toolbar with icons for saving, adding, deleting, and running code. The main area of the notebook shows a code cell with the following content:

```
In [1]: import tensorflow
```

Below the code cell, the output shows a traceback for a `ModuleNotFoundError`:

```
-----  
ModuleNotFoundError                                Traceback (most recent call last)  
<ipython-input-1-d6579f534729> in <module>  
----> 1 import tensorflow  
  
ModuleNotFoundError: No module named 'tensorflow'
```



# Environment, which we created (yash env).



Quit

Logout

Files

Running

Clusters

Conda

Select items to perform actions on them.

Upload

New



☐ 0 ▾ /

☐ 396

☐ 3D Objects

☐ AndroidStudioProjects

☐ Contacts

☐ Desktop

☐ Desktop

☐ Documents

Notebook:

Python 3 (ipykernel)

Python [conda env:.conda-yashenv] \*

Python [conda env:root]

Other:

Text File


Folder

Terminal

12 days ago

a month ago

# Jupyter(after installing tensorflow,keras ,opencv)

 jupyter Untitled8 (unsaved changes)

File Edit View Insert Cell Kernel Help

       Run    Code  

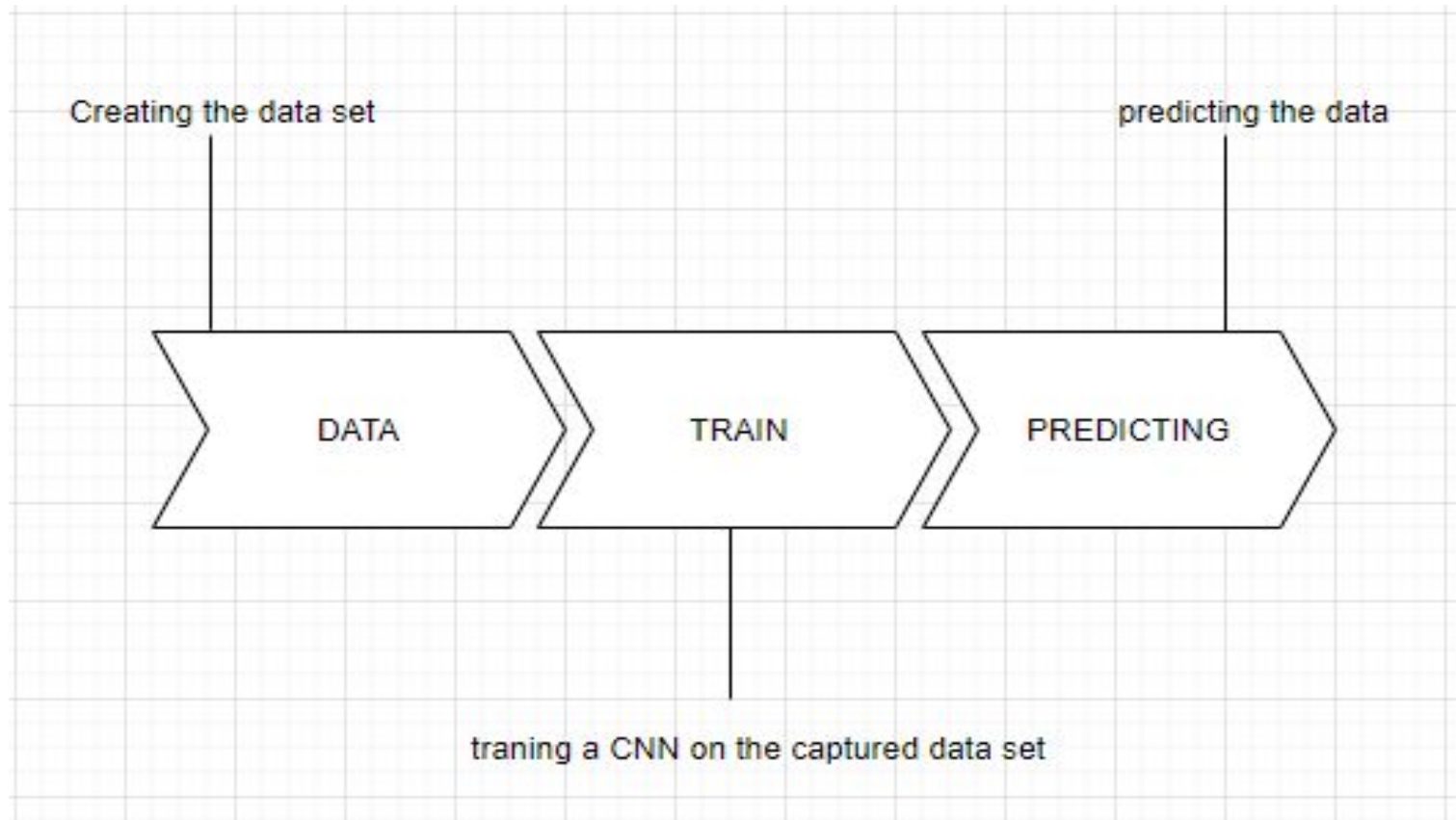
```
In [*]: import tensorflow
```

```
In [*]: import keras
```

```
In [*]: import opencv
```

```
In [ ]: |
```

# Methodology



# Creating the data set for sign language detection

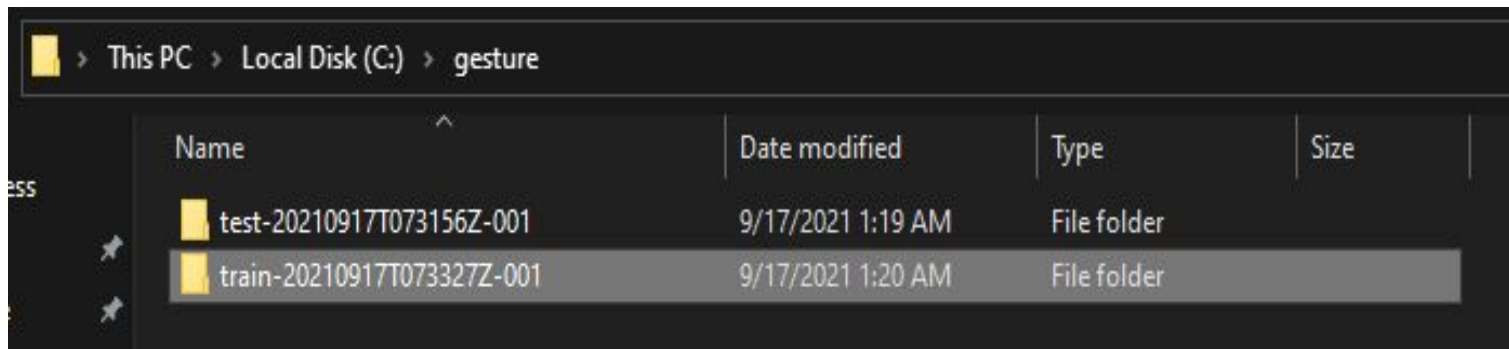


1. Creating data set on our own

2. Directory

The video or every frame that detects hand in ROI created will be saved in a directory.

3. Directory contains two folder which is train & test .





4. Each containing 10 folders containing images captured using `create_gesture_data.py` .

s PC > Local Disk (C:) > gesture > train-20210917T073327Z-001 > train		
Name	Date modified	Type
1	9/17/2021 1:20 AM	File folder
2	9/17/2021 1:20 AM	File folder
3	9/17/2021 1:20 AM	File folder
4	9/17/2021 1:20 AM	File folder
5	9/17/2021 1:20 AM	File folder
6	9/17/2021 1:20 AM	File folder
7	9/17/2021 1:20 AM	File folder
8	9/17/2021 1:20 AM	File folder
9	9/17/2021 1:20 AM	File folder
10	9/17/2021 1:20 AM	File folder

s PC > Local Disk (C:) > gesture > test-20210917T073156Z-001 > test		
Name	Date modified	Type
1	9/17/2021 1:19 AM	File folder
2	9/17/2021 1:19 AM	File folder
3	9/17/2021 1:19 AM	File folder
4	9/17/2021 1:19 AM	File folder
5	9/17/2021 1:19 AM	File folder
6	9/17/2021 1:19 AM	File folder
7	9/17/2021 1:19 AM	File folder
8	9/17/2021 1:19 AM	File folder
9	9/17/2021 1:19 AM	File folder
10	9/17/2021 1:19 AM	File folder





For creating the dataset we get the live cam feed using OpenCV .

Create an ROI that is nothing but the part of the frame where we have to detect the hand in for the gestures.

The red box is the ROI and this window is for getting the live cam feed from the webcam.





2. Calculate threshold value

3. Training CNN

4. Predict the gesture









