VIT-AP UNIVERSITY

Machine Learning Lab
Slot: - L47+L48
Team Name – TechnoSapiens
Environmental Setup

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1. Project Abstract (What This Project Does)

This project detects human actions such as walking, running, jumping, and waving from a video. It uses machine learning and computer vision techniques to process videos and recognize these actions automatically. The project works by:

1. Reading video frames one by one.

2. Extracting key body points (pose landmarks) using MediaPipe (a tool for pose estimation).

3. Using a pre-trained model to classify the movement as either walking, running, jumping, or waving.

4. Displaying the detected action on the video screen.

This guide will help you set up everything from installing Python to running the project on your computer.

2. Installing Python and PyCharm (The Tools We Need)

To run this project, we need:

1. **Python** – A programming language used to write the code.

2. **PyCharm** – A software where we will write and run our Python code easily.

Step 1: Download and Install Python

1. Open your browser and go to the official Python website:
   👉 https://www.python.org/downloads/

2. For windows click the big yellow button that says "Download Python 3.x.x" (the latest version).

3. If you are not using Windows, select your operating system from the available options and download the latest version. The website provides specific downloads for macOS and Linux to ensure compatibility with your system. Once you have selected your operating system, proceed with the download.

4. After downloading, open the file and install Python.

5. **IMPORTANT**: While installing, check the box that says "Add Python to PATH", then click "Install Now".

6. Wait for the installation to complete and click "Close".

☑ **Python is now installed on your computer!**

Step 2: Download and Install PyCharm

1. Open your browser and go to the official PyCharm website:
   👉 https://www.jetbrains.com/pycharm/download/

2. Select Your Operating System

- Choose Windows, macOS, or Linux based on your system.
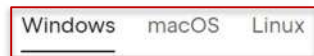
3. Choose the Correct Installer for Windows

- If you're using Windows 64-bit, select the .exe (Windows) file (most modern systems are 64-bit).
- If you have an older 32-bit Windows, check if there's a 32-bit installer available.
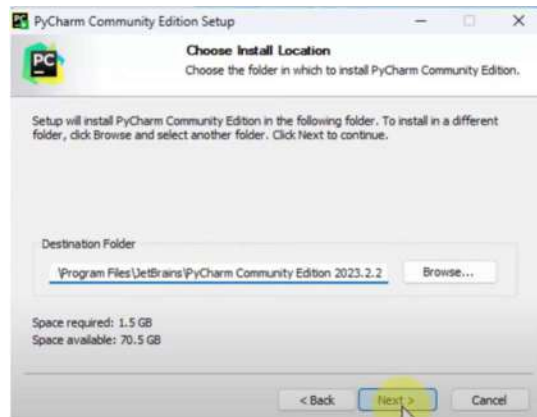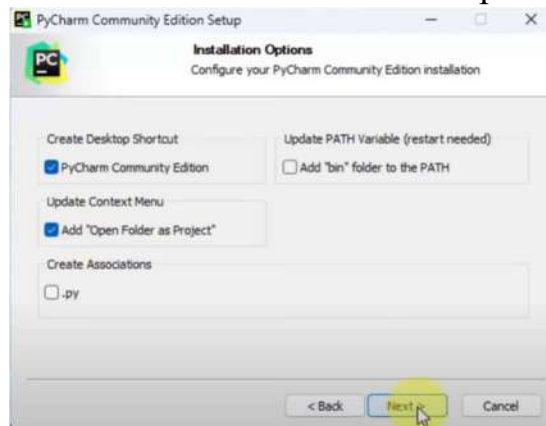

4. Download and Install
- Click Download, then open the downloaded .exe file.
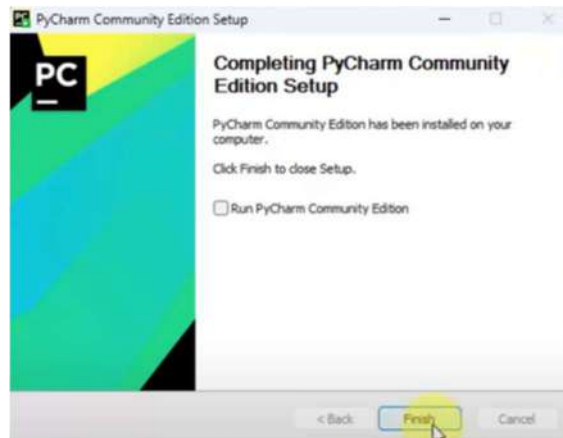

- Select path for the pycharm and click next.

- Tick the boxes as shown in the picture below and click next.
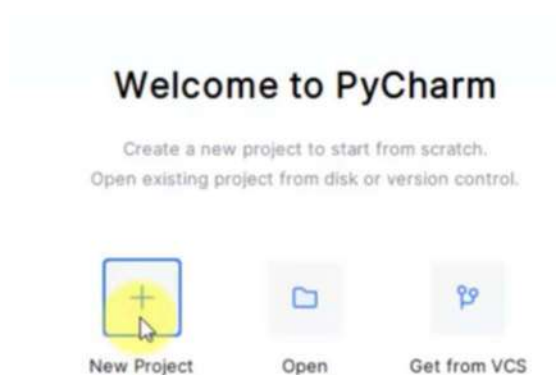

- Click on install.

- Click on finish.

☑ **Now you have Python and PyCharm installed!**
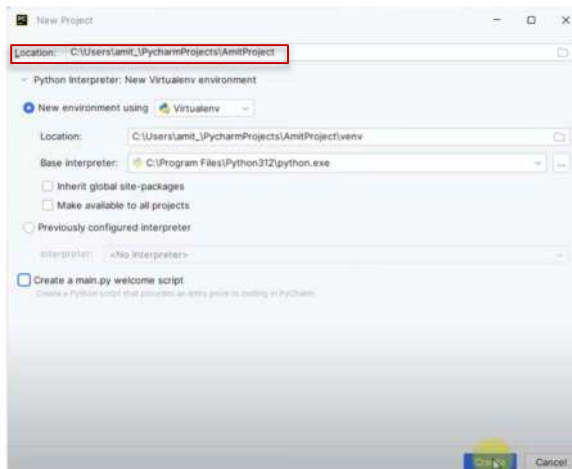
3. Setting Up PyCharm and Python

Now, we need to set up Python inside PyCharm to run our project.

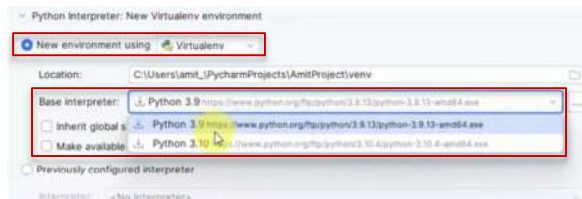## Step 1: Open PyCharm and Create a New Project
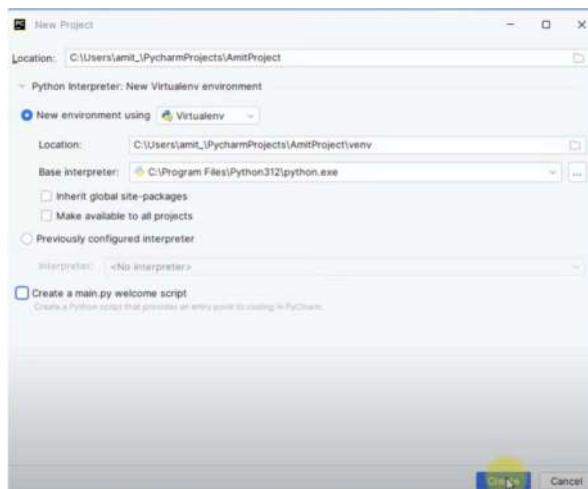
1. Open PyCharm.

2. Click on "New Project".

3. In the "Location" field, choose where you want to save your project.

4. Under "Python Interpreter," click "New Virtual Environment" and select Python 3.x.x.

5. Click "Create".

☑ **Your PyCharm project is ready!**

4. Downloading and organizing the Weizmann Dataset

The **Weizmann Dataset** contains images and text files representing different human actions like walking, running, jumping, and waving.

Step 1: Download the Weizmann Dataset

1. Create a Kaggle Account

1. Visit Kaggle:

   - Go to https://www.kaggle.com.

2. Sign Up:

   - Click on "Register" in the top-right corner.

   - You can register using your Google account or email address.

3. Complete Registration:

   - Follow the on-screen instructions to set up your profile.
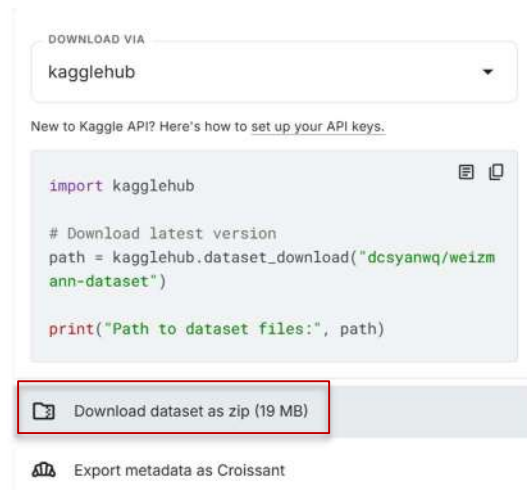
**2. Download the Weizmann Dataset**

1. Find the Dataset on Kaggle:

   - Visit the Weizmann Dataset page:
     https://www.kaggle.com/datasets/dcsyanwq/weizmann-dataset.
   - Click the download button at the top right corner and then select download as a zip file to download the weizmann dataset.

- After downloading open the archive folder then select weizmann folder and then select extract all.
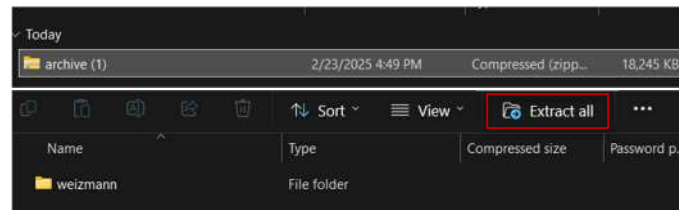
Step 2: Organizing the Dataset

1. Create a new folder on your computer and name it "weizmann".

2. Inside this folder, create four subfolders:

   - Walk
   - Run
   - Wave
   - Jump

3. Move the images and text files into the correct folders based on the numbering:

   - First 300 images and text files → Put them in the "walk" folder.
   - Images and text files from 600 to 900 → Put them in the "run" folder.
   - Images and text files from 900 to 1200 → Put them in the "wave" folder.

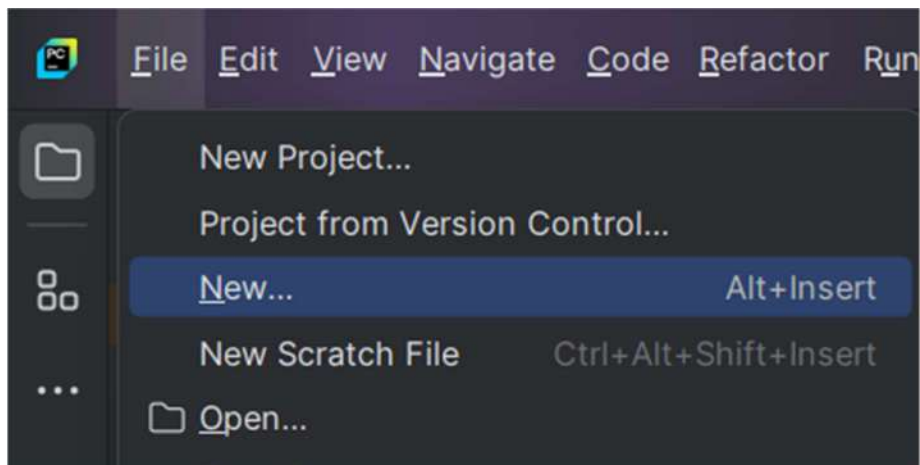- Images and text files from 1200 to 1500 → Put them in the "jump" folder.
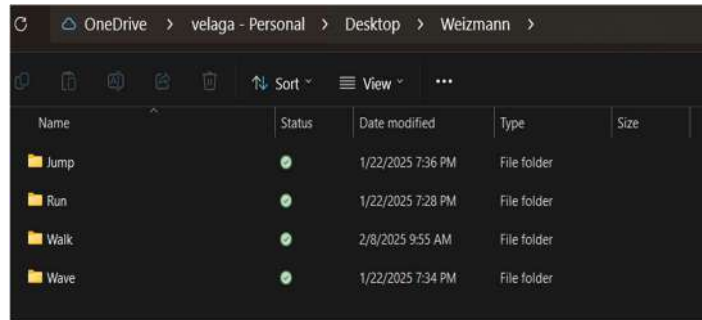
☑ **Now your dataset is ready!**
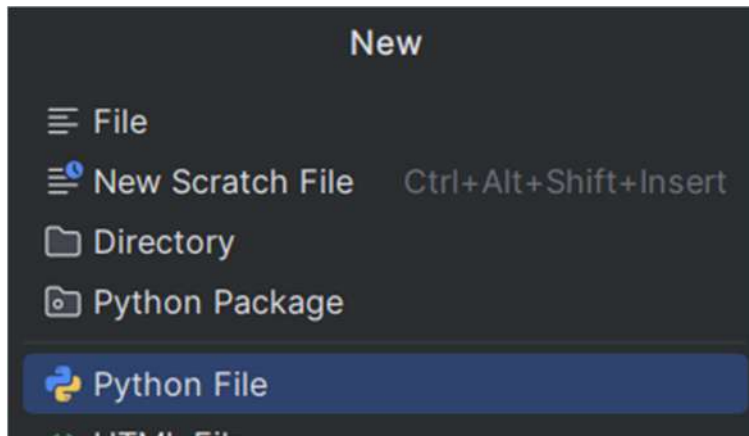
5. Creating a Python File in PyCharm

Now that everything is set up, let's create the Python file where we will write the code.

Step 1: Create a New Python File

1. In PyCharm, go to the "Project" section (left side).

2. Right-click on your project folder and select "New" → "Python File".
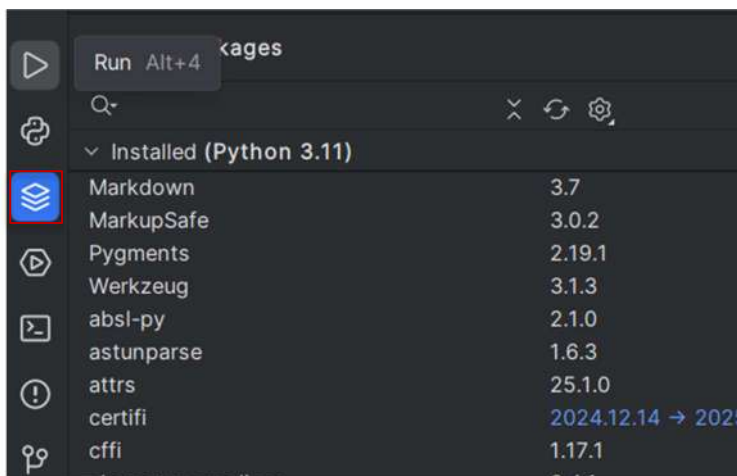
3. Name the file "filename.py".

☑ **Now you have a Python file to write your code!**

6. Installing the Required Python Packages

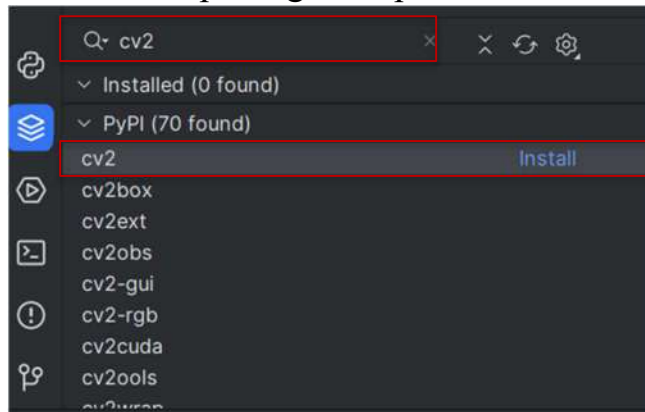Before running the project, we need to install some Python packages (extra tools that Python needs).

Step 1: Install Packages in PyCharm

1. Open PyCharm.

2. Open the Python Packages panel at the bottom left.

- Click on the search bar at the top.

- Type the package name (e.g., opencv-python).
- Click on the package and press Install.

3. Install all the below packages:

- cv2
- os
- numpy
- natsort
- sklearn
- tensorflow
- tensorflow.keras
- mediapipe

Step 2: Verify Installation

Once all the packages are installed, check if Python can find them:

1. Open your **Python file** (action_recognition.py).

2. Type this and run the code (click the green "Run" button):

```
import cv2
import os
import numpy as np
import natsort
import sklearn
import tensorflow
import tensorflow.keras
```

```
import mediapipe

print("All packages installed successfully!")
```

If you see "All packages installed successfully!" in the terminal, everything is working perfectly.

☑ **Now your project is fully set up and ready to run!**