S. B. JAIN INSTITUTE OF TECHNOLOGY, MANAGEMENT & RESEARCH, NAGPUR.

Practical No. 1

Aim: Prelab-1. Introduction to Python 2. Installation of IDE PYCHARM, JUPITER3. Installation of library OpenCV, NumPy, pandas, Scikit-learn, matplotlib.

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OBJECTIVE/EXPECTED LEARNING OUTCOME:

The objectives and expected learning outcome of this practical are:

- ☐ To be able to understand & run python programs in different editors.

- ☐ To be able to execute python programs in various IDEs.

- ☐ To get knowledge about python and python libraries on online platforms.

- ☐ To be able to install and import various python libraries required for computer vision.

THEORY:

Python: is a general-purpose interpreted, interactive, object-oriented, and high-level programming language. It was created by "Guido van Rossum" during 1985- 1990. Python source code is also available under the GNU General Public License (GPL). Python is designed to be highly readable. It uses English keywords frequently whereas other languages use punctuation, and it has fewer syntactic constructions than other languages.

Installing python:

- Open a Web browser and go to https://www.python.org/downloads/.
- Follow the link for the Windows installer *python-XYZ.msi* file where XYZ is the version you need to install.

- To use this installer *python-XYZ.msi*, the Windows system must support Microsoft Installer 2.0. Save the installer file to your local machine and then run it to find out if your machine supports MSI.
- Run the downloaded file. This brings up the Python install wizard, which is really easy to use. Just accept the default settings, wait until the install is finished, and you are done.

IDEs, Editors & online platform for Python:

An IDE, or Integrated Development Environment, enables programmers to consolidate the different aspects of writing computer program. IDEs increase programmer productivity by combining common activities of writing software into a single application: editing source code, building executable, and debugging.

Following IDEs/Editors/Online platform can be used for python programming:

IDLE, PyCharm, Spyder, Jupyter, VS Code, PyDev, Eclipse, Netbeans, Cloud9, PyScriptor, Sublime Text3, Notepad++, Atom, Thonny, Wing, Eric, IntelliJ IDEA, Google Co-lab.

Python libraries commonly used for machine learning tasks:

NumPy: NumPy is a fundamental library for scientific computing in Python. It provides support for multidimensional arrays, mathematical functions, random number generators, and more.

Pandas: Pandas is a powerful library for data manipulation and analysis in Python. It provides support for data structures such as Series and Data Frame, and includes tools for data cleaning, merging, reshaping, and more.

Scikit-learn: Scikit-learn is a machine learning library that provides a wide range of tools for classification, regression, clustering, and more. It includes algorithms for feature selection, model selection, and evaluation, as well as utilities for data preprocessing and transformation.

Matplotlib: Matplotlib is a popular library for data visualization in Python. It provides support for various types of plots, including line plots, scatter plots, histograms, and more.

OpenCV: OpenCV (Open-Source Computer Vision Library) is an open-source computer vision and machine learning software library. It provides a comprehensive set of tools and functions for tasks related to computer vision, image processing, and machine learning. It includes image and video I/O, image processing functions, feature detection, object recognition, facial recognition, camera calibration, machine learning algorithms, and more.

OpenCV plays a crucial role in fields such as robotics, surveillance, autonomous vehicles, medical imaging, and augmented reality, among others.

FLOWCHART:

FLOWCHART:

Steps to install python libraries in Pycharm:

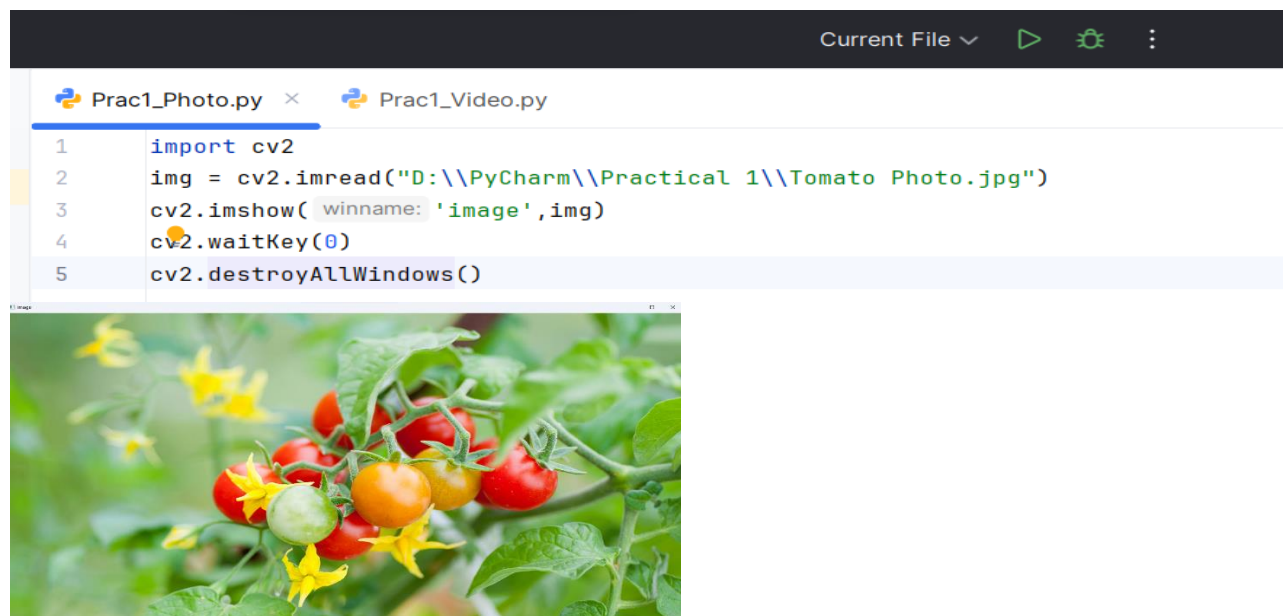**Steps to install python libraries on Google Co-lab:**

Steps to install python libraries on Jupiter:
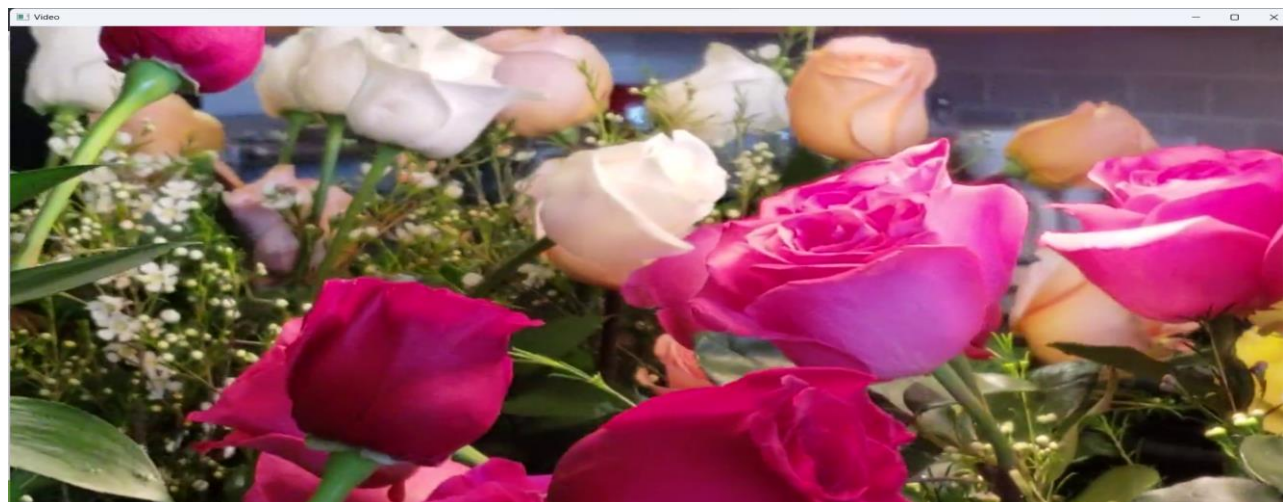
PROGRAM CODE:

Simple write code for image read and print:

Simple code to read and video using OpenCV:

INPUT & OUTPUT:

Display Image:

Display Video:

CONCLUSION: We have learnt and understand the various IDEs, editors and online platforms use in Python also learnt installation of various Python libraries such as OpenCV, NumPy, Pandas, Matplotlib, Scikit- learn and SciPy used in computer vision.

DISCUSSION QUESTIONS:

1) What is Python?

2) What are the Python libraries commonly used in Computer Vision?

3) What is the use of OpenCV, Pandas, NumPy, matplotlib and scikit-learn libraries of Python?

4) What is the OpenCV library mostly used for?

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