2. BIBLIOGRAPHIC STUDY

Installing Dependencies

We have already talked about libraries of Python, which are useful for us to work with our system's webcam. Here, in this part, we will discuss only those Python libraries or modules whose functions are required to design a Python program for using our system's webcam as a motion detector. In this project, we will use the functions of the following libraries to design the required program:

1. OpenCV
2. Pandas

Both OpenCV and Pandas are purely Python-based libraries, and these libraries are also open-source like Python. We should make sure that both of these libraries are present in our system before we proceed with this tutorial. We should also ensure that the latest version of Python or Python having version 3 is installed in our system.

- **Installing OpenCV Library:**

The OpenCV is a Python library or module which comes with multiple functions that we can use to work with pictures and videos. This OpenCV module was designed to work with the pictures and videos in Python by using functions of this library in Python programs. Therefore, the functions of this library become very important for us to write the required program of this tutorial. The OpenCV is not an in-built Python module, which means this module doesn't get installed along with the installation of Python. Therefore, we should first make sure that this module is already installed in our system or not, and if this module is not present in our system, we have first to install this module to work on this project. We can install the OpenCV module in our system through various methods but installing this module through the pip installer method is the simplest and easiest installation method for this module. Therefore, we will use the pip installer method to install this module, and to install this module using pip; we have to use the command prompt shell of our system. First, we have to open the command prompt shell of our system, and after that, **we have to write the following pip installation command to install the OpenCV module through pip installer:**

```
pip install OpenCV
```

The OpenCV module will install in our system in a while as it requires many dependencies which get installed along with this module. After successfully installing this module in our system, we can move to the installation process of the Pandas library.

- **Installation of Pandas Module:**

Pandas is an open-source module of Python designed to work on scientific and mathematical-related tasks. Pandas is one of the most popular and strongest libraries of Python, having lots of in-built functions that can be used for many research & developments related works. The pandas' library can work on our system to perform multiple tasks related to system software, computing operations, development projects, and many others. Therefore, we use the functions of this module along with the OpenCV module's functions to create the required program in this tutorial. The Pandas library functions will help in computing & analyzing the frame capturing through the system's webcam, thus, making it work as a motion detector. We will learn more about this while understanding the working of the required program in the latter part of this tutorial. Therefore, using Pandas library and its functions in this tutorial is very important and required for the proper functioning of the project. The Pandas library is also not an in-built module of Python, which means this module doesn't get installed along with the installation of Python. Therefore, we should first make sure that this module is already installed in our system or not, and if this module is not present in our system, we have first to install this module to work on this project. We can install the Pandas module in our system through various methods but installing this module through the pip installer method is the simplest and easiest installation method for this module too. Therefore, we will use the pip installer method to install this module, and to install this module using pip; we have to use the command prompt shell of our system. First, **we have to open the command prompt shell of our system, and after that, we have to write the following pip installation command to install the Pandas module through pip installer:**

```
pip install pandas
```

After writing this command, we have to press the enter key, and then the Installation process for this module will start. The Pandas module will install in our system in a while as it requires many dependencies which get installed along with this module. After successfully installing this module in our system, we can move to the next sections of this tutorial.

!!! As both of these libraries are already present in our system, it will show 'requirement is already satisfied' as shown in the installation window. If the module is not present already, it will install the module in our system, and after installing the module successfully, show the message 'Module installed successfully' on the command prompt shell's installation window.

Other Requirements:

Apart from the pandas & OpenCV library, we need to use many in-built modules of Python in the required program so that we can use the webcam of our system as a motion detector sensor. These in-built modules provide support to the motion that will be detected in the

frames through the webcam. We will learn more about this while learning about the program's work.

Following are the in-built modules of Python whose functions we will use in the required program of this tutorial:

- Python Datetime Module: This in-built module deals with the functions related to datetime tasks and, more specifically, related to date-related tasks.

- Python Time Module: This is another in-built module of Python that deals with the functions required to perform time-related tasks and time functions.