

## Social Distancing Alerting System

### Program Description:

In this course, we will start with a theoretical understanding of simple Python, OpenCV, Computer Vision, neural nets and gradually move to Deep Neural Nets and Convolutional Neural Networks.

Artificial Intelligence (AI) is that wave sweeping the technology world today. If you want to join this revolution but do not have the skills yet, this series of courses are right for you.

In addition to the development of machine learning that leads to new capabilities, we have subsets within the domain of machine learning, each of which offers a potential area of specialization for those interested in a career in AI.

- Neural Networks  
Neural networks are integral for teaching computers to think and learn by classifying information, similar to how we as humans learn. With neural networks, the software can learn to recognize images, for example. Machines can also make predictions and decisions with a high level of accuracy based on data inputs.
- Natural Language Processing (NLP)  
Natural language processing gives machines the ability to understand human language. As this develops, machines will learn to respond in a way a human audience can understand. In the future, this will dramatically change how we interface with all computers.
- Deep Learning  
Deep learning is at the cutting-edge of intelligent automation. It focuses on machine learning tools and deploying them to solve problems by making decisions. With deep learning, data is processed through neural networks, getting closer to how we think as humans. Deep learning can be applied to images, text, and speech to draw conclusions that mimic human decision making.

We'll be exploring how to use Python and the OpenCV (Open Computer Vision) library to analyse images and video data.

The most popular platforms in the world are generating never before seen amounts of image and video data. Now more than ever it's necessary for developers to gain the necessary skills to work with image and video data using computer vision.

Computer vision allows us to analyse and leverage image and video data, with applications in a variety of industries, Social Distancing, including self-driving cars, social network apps, medical diagnostics, and many more.

As the fastest growing language in popularity, Python is well suited to leverage the power of existing computer vision libraries to learn from all this image and video data.

We'll start the course by learning about numerical processing with the NumPy library and how to open and manipulate images with NumPy. Then will move on to using the OpenCV library to open and work with image basics. Then we'll start to understand how to process images and videos.

Then we'll move on to understanding video basics with OpenCV, including working with streaming video from a webcam. Afterwards we'll learn about direct video topics, such as optical flow and object detection. Including face detection and object tracking. Then we'll move on to an entire section of the course devoted to the latest deep learning topics, including image recognition and custom image classifications. We'll even cover the latest deep learning networks, including the YOLO (you only look once) deep learning network, Fast R-CNN, Retina-NET, Mask R-CNN, Single Shot Detector. This course covers all this and more, including the following topics:

- NumPy
- Images with NumPy
- Image and Video Basics with NumPy
- Streaming video with OpenCV
- Object Detection
- Template Matching
- Corner, Edge, and Grid Detection
- Contour Detection
- Feature Matching
- Object Tracking
- Optical Flow
- Deep Learning with Keras
- Keras and Convolutional Networks
- Customized Deep Learning Networks
- State of the Art YOLO Networks and much more!

**Who this course is for:**

These program is designed for Students/Faculty/Working Professionals. The only prerequisite for taking these courses is a basic understanding of Python or C++.

**Technology Requirements:****Hardware**

- PC: Windows 7 or higher with the latest updates installed.
- Mac: OS X 10.11 or higher with latest updates installed.
- Linux: Any recent distribution that has the supported browsers installed.
- Ubuntu: 17.10+ or 14.04 LTS+.
- Must have Install Permissions on Computer.
- WebCam if you want to learn the video streaming content

**Installations:**

**Visual Studio:** <https://visualstudio.microsoft.com/downloads/>

**Python:** <https://www.python.org/downloads/>

**Anaconda:** <https://www.anaconda.com/downloads>

**Notepad++:** <https://notepad-plus-plus.org/downloads/>

**Python Packages:**

**Numpy:** <https://numpy.org/install/>

**Pandas:** [https://pandas.pydata.org/pandas-docs/stable/getting\\_started/install.html](https://pandas.pydata.org/pandas-docs/stable/getting_started/install.html)

**Opencv-python (CV2):** <https://pypi.org/project/opencv-python/> OR  
[https://docs.opencv.org/master/da/df6/tutorial\\_py\\_table\\_of\\_contents\\_setup.html](https://docs.opencv.org/master/da/df6/tutorial_py_table_of_contents_setup.html)

**Imutils:** <https://pypi.org/project/imutils/>

**Argparse:** <https://pypi.org/project/argparse/>

**Dlib:** <https://pypi.org/project/dlib/> OR <https://www.learnopencv.com/install-dlib-on-windows/>

**Tensorflow:** <https://www.tensorflow.org/install> OR  
<https://www.tensorflow.org/install/pip>

**Tensorflow GPU:** <https://www.tensorflow.org/install/gpu>

**Keras:** <https://pypi.org/project/Keras/>

**Recommended:**

- Graphic Card Settings:(Cuda / CuDNN) :  
<https://www.pyimagesearch.com/2020/02/03/how-to-use-opencv-dnn-module-with-nvidia-gpus-cuda-and-cudnn/>
- Cuda Toolkit: <https://docs.nvidia.com/cuda/index.html>
- Cmake: <https://cmake.org/download/>
- Sublime Text: <https://www.sublimetext.com/3>
- Adobe Flash Player
- An up-to-date version of Chrome/Firefox/ Safari/ Opera/Microsoft Edge.

**Prior Knowledge (Basic):**

It will be a better opportunity to handle the training session with ease if you have a dictionary understanding of the following concepts:

Python Basics

openCV

Euclidean distance

Understanding of path variables

Basic understanding of Image properties, Video Properties (pixels and frames)

Command Line Arguments

Creating a Virtual Environment in python

Neural Networks

\*We recommend you to have at least basic knowledge on the above topics

**Course deliverables:**

- Instructor videos
- Live session
- Learn by doing exercises
- Object detection models to implement Social Distancing.
- Guided By Industry Professionals
- Certificate of Completion

# Thank you!

See you soon. 😊