

## Image Processing training using Python & OpenCV Platform

This course mainly deals with Implementation of Image Processing algorithm using Python Script & OpenCV platform.

### Introduction

OpenCV is a library of cross platform programming functions aimed at real time Computer Vision. IT was designed for computational efficiency and with a strong focus on real-time applications, video and image processing. Python is a widely used general-purpose, high-level programming language. Its design philosophy emphasizes code readability, and its syntax allows programmers to express concepts in fewer lines of code than would be possible in languages such as C. The language provides constructs intended to enable clear programs on both a small and large scale. The growing demand of integrating OpenCV with python promises clear cut solutions to image processing problems. Since the tools are open source, researchers can exploit the freedom and possibilities of expansion. Wide spread applications in the field of robotics underlines the scope of OpenCV for image processing.

**Course content Details:** Brief course content is provided below.

<b>Python Training</b>	<ul style="list-style-type: none"> <li>•History &amp; Overview</li> <li>•Installation &amp; Getting Started</li> <li>•Basic Syntax and Operators</li> <li>•Decision Making</li> <li>•Strings, Lists, Tuples, Dictionary</li> <li>•Mutability</li> <li>•Loops</li> <li>•User defined Functions</li> <li>•File IO</li> </ul>
<b>Getting Started with Python-OpenCv</b>	<p><b>1. Introduction</b></p> <ul style="list-style-type: none"> <li>• About OpenCV</li> <li>• Installation</li> <li>• Opencv &amp; Python Integration</li> <li>• About Images</li> </ul> <p><b>2.Basic operations on Images</b></p> <ul style="list-style-type: none"> <li>• Read &amp; Writing an Image</li> <li>• Access pixel properties, values &amp; modifying</li> <li>• Splitting &amp; Merging of image channels</li> <li>• Arithmetic Operation</li> <li>• Bitwise Operation</li> </ul>

<p><b>Image Processing Module 1</b></p> <p><b>Image Processing Module 1</b></p>	<p><b>3. GUI Features</b></p> <ul style="list-style-type: none"> <li>• Display images in window</li> <li>• Getting started with video capturing</li> <li>• Drawing Functions like circle, line, rectangle, polyline</li> <li>• Plotting functions</li> </ul> <p><b>4. Changing Color Spaces</b></p> <p><b>5. Geometric Transforms</b></p> <ul style="list-style-type: none"> <li>• Scaling</li> <li>• Translation</li> <li>• Rotation of Image</li> </ul> <p><b>6. Histograms</b></p> <ul style="list-style-type: none"> <li>• About Histogram</li> <li>• Histogram Calculation</li> <li>• Histogram Equalization</li> </ul>
<p><b>Image Processing Module 2</b></p>	<p><b>7. Filters</b></p> <ul style="list-style-type: none"> <li>• About Convolution</li> <li>• Different types of filters like Averaging, Blurring, Gaussian and Median</li> </ul> <p><b>8. Thresholding</b></p> <ul style="list-style-type: none"> <li>• About Thresholding</li> <li>• Adaptive Thresholding</li> </ul> <p><b>9. Edge Detection</b></p> <ul style="list-style-type: none"> <li>• Different type of edge detection like Canny, Sobel and Laplacian edge detectors.</li> </ul>
<p><b>Image Processing Module 3</b></p>	<p><b>10. Morphological Operation</b></p> <ul style="list-style-type: none"> <li>• Erosion, Dilation, Opening and Closing</li> </ul> <p><b>11. Image Transformation</b></p> <ul style="list-style-type: none"> <li>• Discrete Fourier Transform and Inverse Fourier Transform</li> </ul> <p><b>12. Python-Opencv sample Demos</b></p>