



Department of Software Engineering

CS 474: Computer Vision

Class: BESE-7

Lab 6: Hough Transform

Date: 2nd March 2020

Time: 10:00 am-1:00 pm

Instructor: Dr. Muhammad Moazam Fraz

Lab Engineer: Ms Anum Asif

Course Learning Outcomes (CLOs)		PLO ** Mapping	BT Level *
Upon completion of the course, students should demonstrate the ability to:			
CLO 1	Understand existing tools and techniques to solve computer vision problems	PLO 1	C2
CLO 2	Implement basic Computer Vision algorithms	PLO 2	C3
CLO 3	Design and implement solutions for complex problems	PLO 3	C6
<p>* BT= Bloom's Taxonomy, C=Cognitive domain, P=Psychomotor domain, A= Affective domain</p> <ul style="list-style-type: none">○ Knowledge(C-1), Comprehension(C-2), Application(C-3), Analysis(C-4), Synthesis(C-5), Evaluation(C-6)○ Perception(P-1), Set(P-2), Guided Response(P-3), Mechanism(P-4), Complete Overt Response(P-5), Adaption(P-6), Organization(P-7)○ Receiving(A-1), Responding(A-2), Valuing(A-3), Organization(A-4), Internalizing(A-5) <p>** PLOs are published on department website</p>			



Lab 6 Line / Circle Detection using Hough Transform

Learning Outcome

CLO 2: Develop solutions for image/video understanding and recognition.

Introduction

The Hough transform is a feature extraction technique used in image analysis, computer vision, and digital image processing. The purpose of the technique is to find imperfect instances of objects within a certain class of shapes by a voting procedure. This voting procedure is carried out in a parameter space, from which object candidates are obtained as local maxima in a so-called accumulator space that is explicitly constructed by the algorithm for computing the Hough transform.

The classical Hough transform was concerned with the identification of lines in the image, but later the Hough transform has been extended to identifying positions of arbitrary shapes, most commonly circles or ellipses.

Objectives

In this lab you will learn to detect objects of line and circular shaped by using Hough transform

Background

- Please see the example:
 - https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_imgproc/py_houghlines/py_houghlines.html
 - <https://alyssaq.github.io/2014/understanding-hough-transform/>
- Read the documentation of the functions / methods related to finding circle and lines using Hough Transform, and visualizing them on the images.

Lab tasks

Find lines and circles in the attached images and visualize them on the images.

Bonus: Visualization of circle and line on the same image

Deliverable

Students are required to upload the lab task in a **zip file** on LMS containing the following:

- The Jupyter Notebook file containing the script or function performing all the lab tasks. The code should be well commented.
- **A Word document file that has the snapshot of resulting images. Write a couple of sentences explaining each snapshot.**