**CMSC 691 Computer Vision Project Proposal**

**Hough Transform Implementation in Python**

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**Aim :**

The Hough transform is a technique particularly used for feature extraction during Image Analysis. The basic idea behind the Algorithm is to reduce the amount of data on the image. Though edge detection is used to do the same thing, then too it gives output of a lot of edge pixels, which still is a lot of data.

With Hough transform we can identify the Underlying characteristics of the image by defining it as a set of arbitrary shapes. The Algorithm was developed to identify lines, and can now detect arbitrary shapes too based on their characteristic equations.

With this project we aim to implement the same algorithm from scratch in Python Language. (Are we doing it just for line or all shapes?) We aim to cover Line Detection as of now.

We will implement the algorithm in the following steps:

* Edge detection, e.g. using the Canny edge detector.
* Mapping of edge points to the Hough space and store them in an accumulator.
* Evaluating values of the accumulator with the characteristic equation to find lines on the image.
* Conversion of infinite lines to finite lines based on best fit line.

**Output Expected from the Project:**

**UMBC has diverse building structures thhroughout the campus. With our Algorithm implementation, we aim to detect the lines around this beautiful architectural design of the campus.**

References:

<https://aishack.in/tutorials/hough-transform-basics/>

<http://web.ipac.caltech.edu/staff/fmasci/home/astro_refs/HoughTrans_lines_09.pdf>

<https://docs.opencv.org/2.4/doc/tutorials/imgproc/imgtrans/hough_lines/hough_lines.html>