**Task 1: Offl­ine Signature Verification**

* 1. **Code file name:** Gray\_scale

**Description:** It performs the pre-processing of the given images such as converting to grayscale and contrast stretching.

**Input Images Name:** Meghna.jpg

**Output Images Name:** mod\_Sig1.jpg

1.2 **Code file name:** Gradient\_sobel

**Description:** It computes a gradient feature vector describing a given image, applying Methods 1 for feature extraction. For method 1, 4 code chain direction is used.

**Steps:**

1. Calculate the Gradient Feature vector using sobel filter.
2. Calculate the angles of the Gradient Feature vector.
3. Decomposition of Gradient Vector using Method 1 (4 chain Code Direction).
4. Down sampling -- converting the image into 9\*9 for Method 1.
5. Calculate the cosine similarity.

**Input Images Name:** mod\_Sig.jpg, images.jpg.

**Run the program and obtain the cosine similarity in the two images.**

1.3 **Code file name:** Gradient\_sobel\_method2

**Description:** It computes a gradient feature vector describing a given image, applying Methods 2 for feature extraction. For method 2, 32 code chain direction is used.

**Steps:**

1. Calculate the Gradient Feature vector using sobel filter.
2. Calculate the angles of the Gradient Feature vector.
3. Decomposition of Gradient Vector using Method 2 (32 chain Code Direction).
4. Down sampling -- converting the image into 9\*9 for Method 2.
5. Calculate the cosine similarity.

**Input Images Name:** mod\_Sig.jpg, images.jpg.

**Run the program and obtain the cosine similarity in the two images.**