R_f = no. of edge pixels / total no of pixels.

5.5.2T-Statistics:

T-Statistics = (mean1-mean2) / √ ((var1/no. of pixels) + (var2/no. of pixels))

5.5.3Confidence Interval (CI):

Confidence Interval = (Mean-t_stat * (s / √N), Mean + t_stat * (s / √N))

6. Reduced Reference Metrics

It is a quantitative performance measure where the comparison is made between the edges in captured image and the ground truth image.

6.1 Pratt's Figure of Merit(FOM)

This measure uses the distance between all pairs of points corresponding to quantify, with precision, the difference between the contours. The figure of merit of Pratt, which assesses the similarity between two contours, is defined in below formula and Ranges between (0, 1) and is defined as follows:

$$IMP = \frac{1}{\max(NI, NB)} \sum_{i=1}^{NB} \frac{1}{1 + \alpha * d_i^2}$$

where NI and NB = Edge points in the image and ground truth image. di = Distance between edge pixel and the nearest edge pixel of the ground truth, Empirical calibration constant α= 1/9

6.2 Global Index

A new global index, which is defined by Euclidean distance is d_{e2}^4 in R_4 to the point, P = (1; 1; 0; 0), where its coordinates are optimum values achieved by indices Pco, IMP, P_{nd} ε P_{fa} respectively. The point *P* represents the optimum point to be reached by an ideal edge detector. The distance to this point can be calculated by the equation below:

$$D_{e2}^4 = \sqrt{(Pco - 1)^2 + (IMP - 1)^2 + P_{nd}^2 + P_{fa}^2}$$

The percentage of pixels that were correctly detected (P_{co}):

$$P_{co} = \frac{TP}{\max(NI, NB)}$$

Where TP = True Positive, False Positive

The percentage of pixels that were not detected (P_{nd}):

$$P_{nd} = \frac{FN}{\max(NI, NB)} P_{fa} = \frac{FP}{\max(NI, NB)}$$