DENTAL CONTOUR MATCHING BY OPTIMAL THINNING FOR HUMAN IDENTIFICATION

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Abstract- Forensic dentistry involves the identification of people based on their dental recorded mainly available as radiograph images. An automated dental identification system consists of two main groups: Feature Extraction and Feature Matching. Here we are present new tool for human identification based on dental information and some image processing algorithm. first we applied pre-process on the image. In this resize and reshape and change the image in gray scale then apply the edge detection algorithm on the dental image data base and get silent features likes contour, artificial prosthesis, number of cupids, etc. is extracted from the radiographs. Then applied different thinning values on these extracted dental images and get feature matching of different dental images and using in this information show that human identification is done easy base on dental images.

Keywords- input image(query image), reference images(general images), canny, thinning

I. INTRODUCTION

Edge detection is a basic operation in image processing, it refers to the process identifying and locating sharp discontinuities in an image, the discontinuities are abrupt changes in pixel intensity which characterize boundaries of objects in a scene. It is a very important first step in many algorithms used for segmentation, tracking and object recognition [1]. There are an extremely large number of edge detection operators available, each designed to be sensitive to edges, typically it reduces the memory size and the computation cost[2] the edge detection algorithms are implemented using software. In this paper we use canny algorithm to use edge detection. And also get much more information for the human identification by using dental radio graph. When any road accident or any other thing which happen in real time. So any how any teeth of the which happen in real time. So here we using teeth contour comparision with query image(input image) & general images (reference images). Comparision is made by different thinning factors.

In this paper we are taking e1 image as input (query image) and this image match with other reference(general images).here e1x, e1xx images are with noise and with more noisy image respectively.

II. CANNY EDGE DETECTION

We can derive the optimal edge operation to find step edges in the presence of white noise, where “optimal” means

- Low error rate of detection
  Well match human perception results
- Good localization of edges
  The distance between actual edges in an image and the edges found by a computational algorithm should be minimized
- Single response
  The algorithm should not return multiple edges pixels when only a single one exists.

Canny algorithm was made by J Canny in 1986.

In the algorithm is shown in the figure in this the first step is image smoothing this is use for noise removing from the image. There is low pass filter is there. Then next is gradient filter is there. The equation for

one dimension filter is $G(x) = e^{-x^2/2\sigma^2}$

two dimension filter is $G(x) = e^{-(x^2 + y^2/2\sigma^2)}$

in this the Gaussian curve is shown in the figure. In this the curve line is circle.

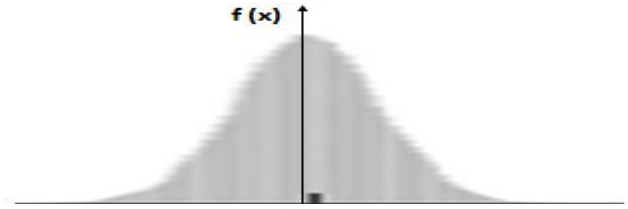

Fig.1 Gaussian curve

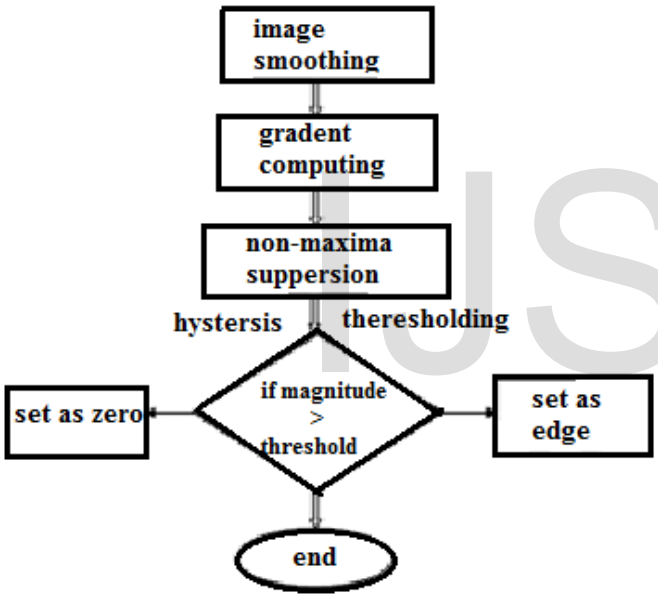

Fig.2 flow chart of canny edge detection

III. IMPLIMENTATION

In this paper we are implement the image by change its thresholding point. We use thresholding point is 0.1, 0.2, 0.3, 0.4 and show what is change accure in this in input image and reference images and get priority for this matching here we put small idea for this. We shown below:

First we applied thresholding point = 0.4

Input image

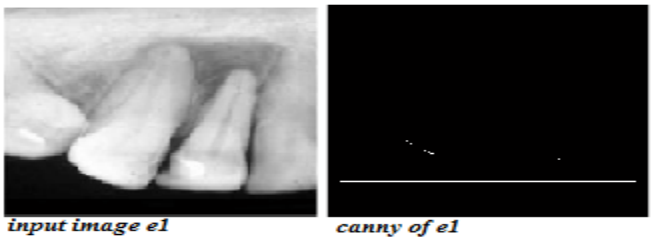

Fig.3: query image e1, canny operated e1[8]

Reference images(general images)

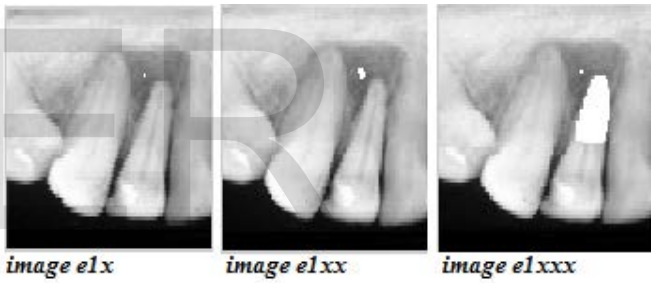

Fig 4: e1x with noise,e1xx with more noise,e1xxx full noise [8]

Fig 5: i1,i2,i3[8]

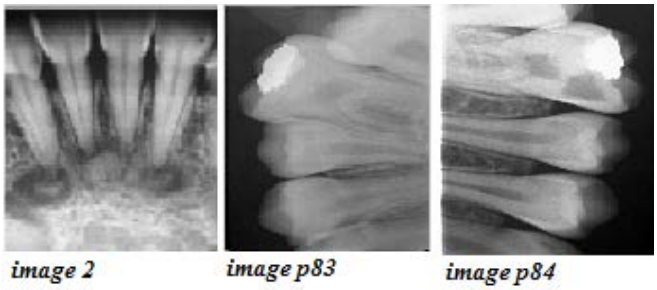

Fig 6: 2,p83,p84.[8]

In this reference images the image e1x, e1xx, e1xxx is the defected input image. So it is image as same person. Other images i1, i2, i3, 2, p83, p84 all the images are reference images.

Then we apply canny algorithm on the reference images. It is shown in figure.

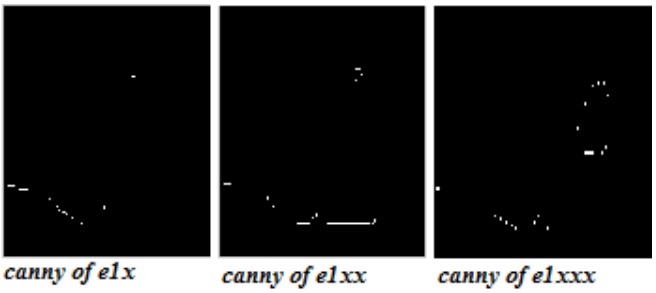

Fig 7: e1x,e1xx,e1xxx

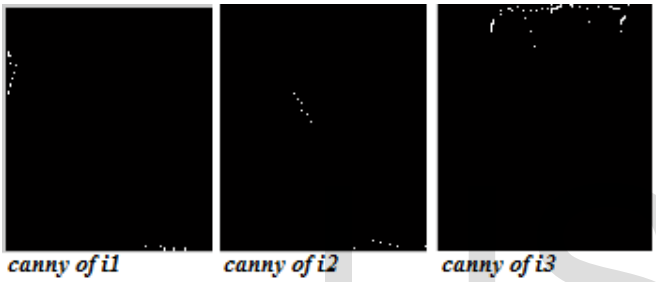

Fig 8: i1,i2,i3

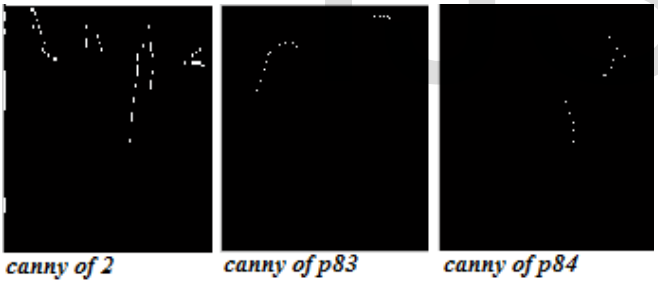

Fig.9 : 2,p83,p84

Then we compare input canny image and reference canny image.

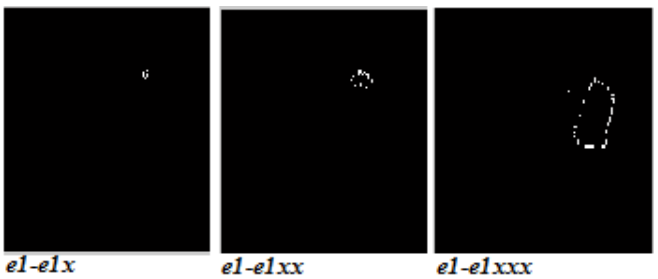

Fig 10: e1-e1x,e1-e1xx,e1-e1xxx

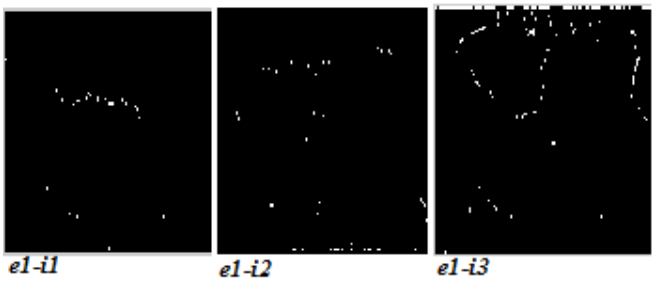

Fig 11: e1-i1,e1-i2,e1-i3

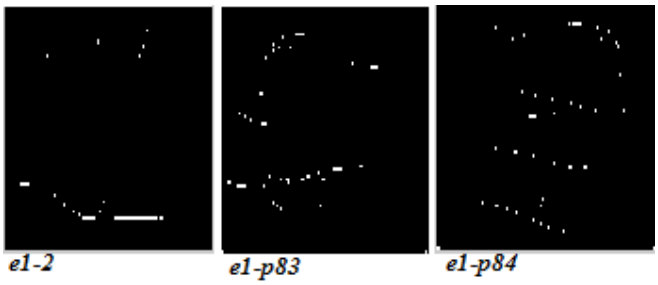

Fig. 12: e1-2,e1-p83,e1-p84

Table 1: Tthresholding point 0.4

	Maximum pixel	matching	mismatching
e1-e1x	348135	348111	24
e1-e1xx	348086	348013	73
e1-e1xxx	347749	347339	422
e1-i1	346401	344643	1758
e1-i2	346048	343937	2111
e1-i3	345318	342477	2841
e1-2	344979	341799	3180
e1-p83	345614	343069	2545
e1-p84	344787	341415	3372

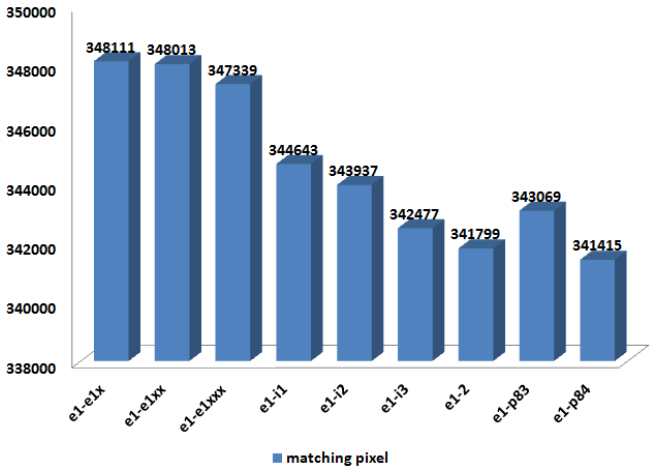

Fig. 13 Chart for theresholding point 0.4

Thresholding point is 0.3.

The input image

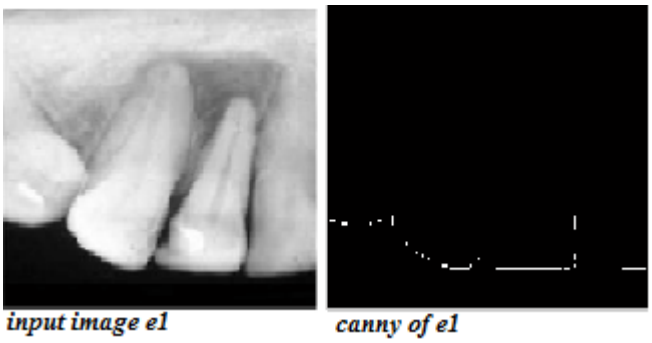

Fig.14 query image e1, canny operated e1

Canny of reference images when the thresholding point 0.3.

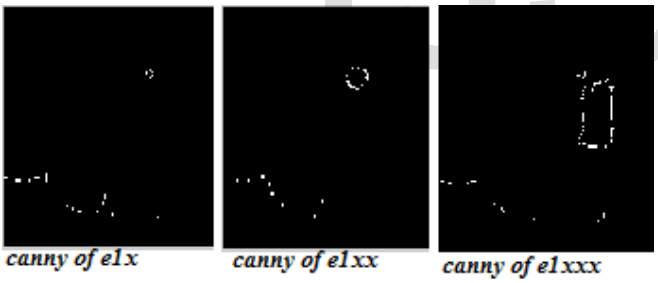

Fig 15 :e1x,e1xx,e1xxx

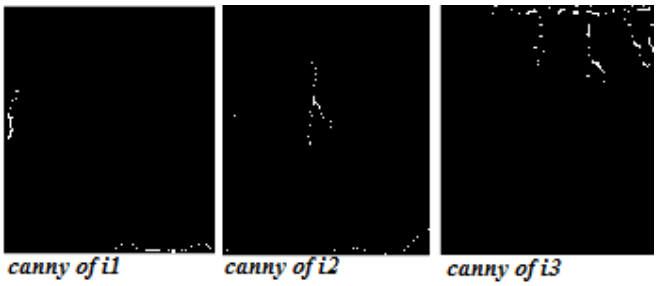

Fig 16 : i1,i2,i3

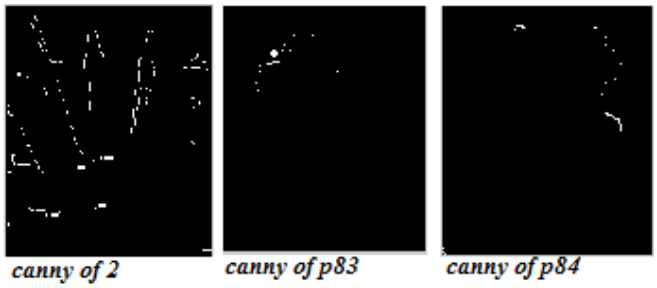

Fig 17 : 2,p83,p84

Compare reference image with input image when thresholding point 0.3.

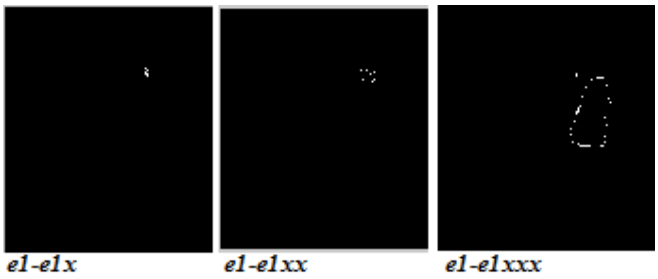

Fig 18: e1-e1x,e1-e1xx,e1-e1xxx

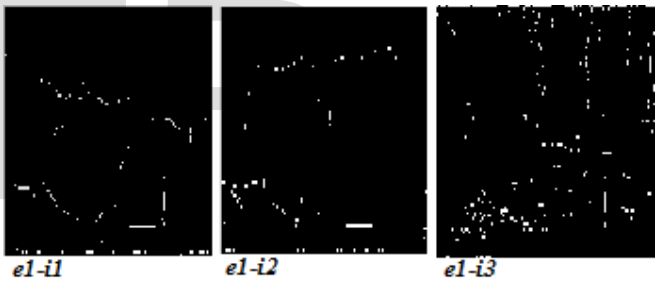

Fig 19: e1-i1,e1-i2,e1-i3

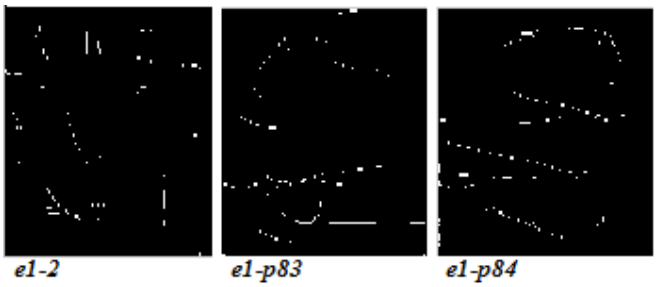

Fig 20: e1-2,e1-p83,e1-p84

Table 2 : Thresholding point 0.3

	Maximum pixel	matching	mismatching
e1-e1x	348135	348111	24
e1-e1xx	348086	348013	73
e1-e1xxx	347749	347339	410
e1-i1	344968	341777	3191
e1-i2	344644	341129	3515
e1-i3	341138	334117	7021
e1-2	342760	337361	5399
e1-p83	344358	340557	3801
e1-p84	343097	338035	5062

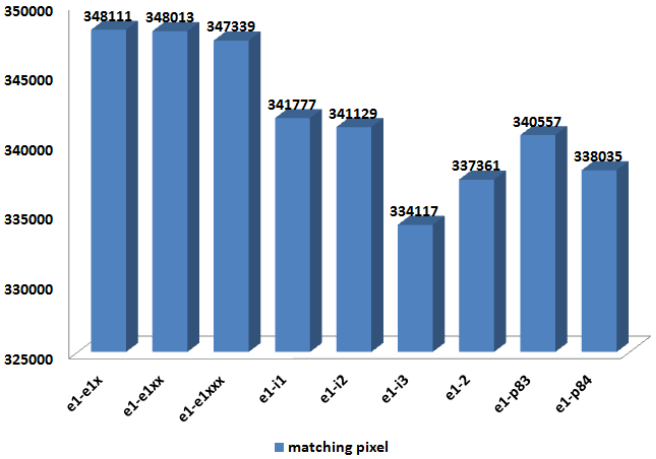

Fig 21: Chart for thresholding point 0.3

Thresholding point 0.2

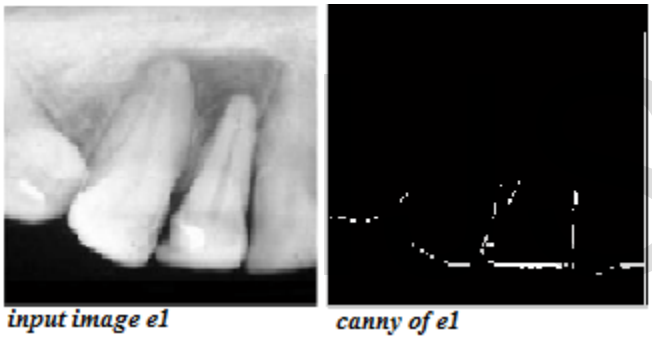

Fig.22: query image e1, canny operated e1

Reference image is shown in figure below. When the thresholding point is 0.2.

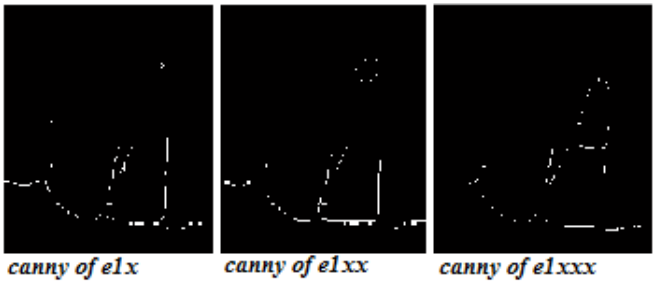

Fig 23 :e1x,e1xx,e1xxx

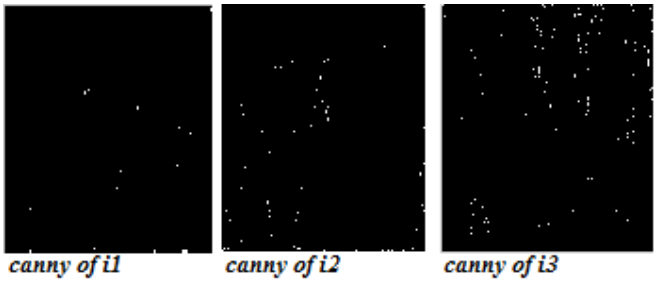

Fig 24 : i1,i2,i3

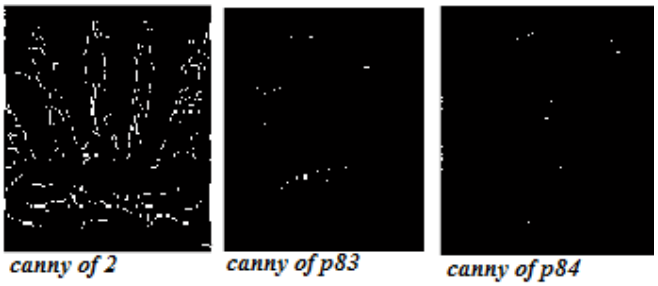

Fig 25 : 2 ,p83 ,p84

Then we compare the input image with reference image when the thresholding point is 0.2.

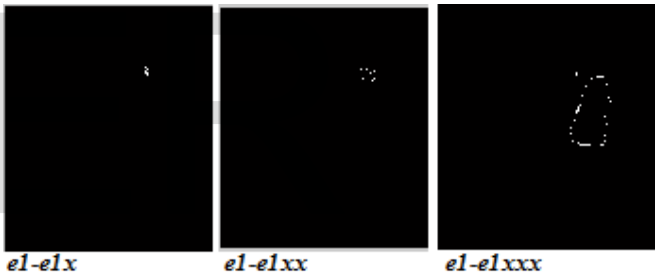

Fig 26: e1-e1x,e1-e1xx,e1-e1xxx

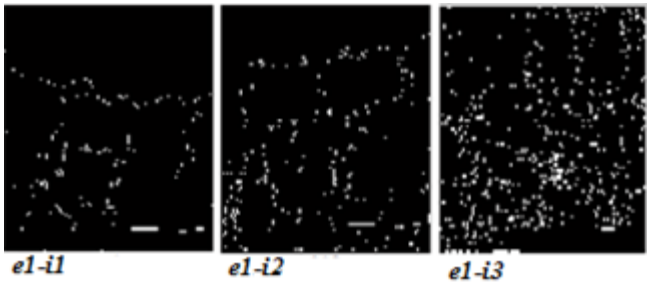

Fig 27: e1-i1,e1-i2,e1-i3

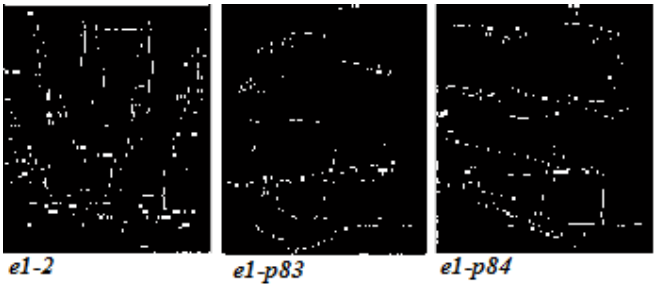

Fig 28: e1-2,e1-p83,e1-p84

Table 3: Thresholding point 0.2

	Maximum pixel	matching	mismatching
e1-e1x	348135	348111	24
e1-e1xx	348086	348013	73
e1-e1xxx	347749	347339	410
e1-i1	340621	333083	7538
e1-i2	337882	327605	10277
e1-i3	325478	302797	22681
e1-2	334085	320011	14074
e1-p83	340506	332853	7653
e1-p84	338605	329051	9554

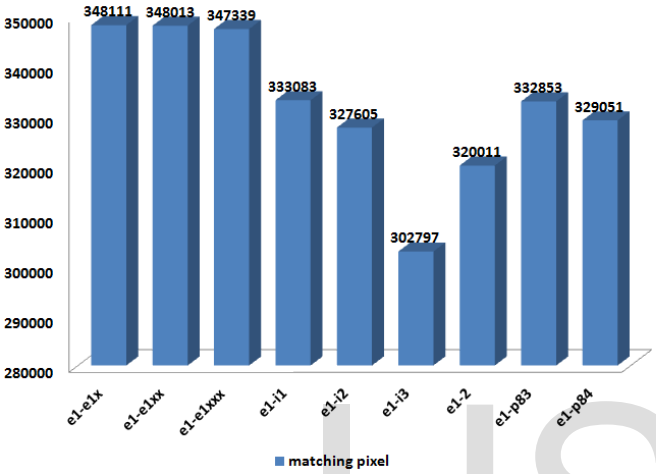

Fig.29 : Chart for thresholding point 0.2

Thresholding point is 0.1

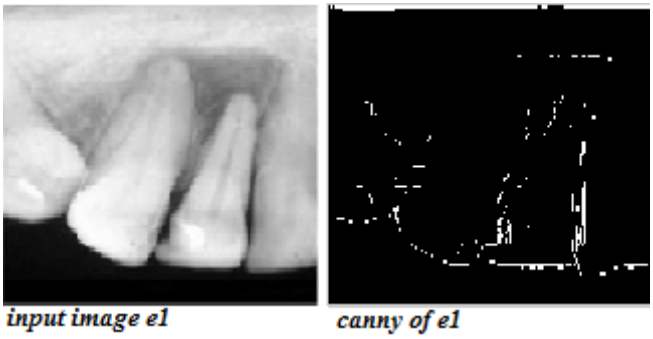

Fig.30 : query image e1, canny operated e1

Canny of reference images shown in the figure. When the thresholding point is 0.1.

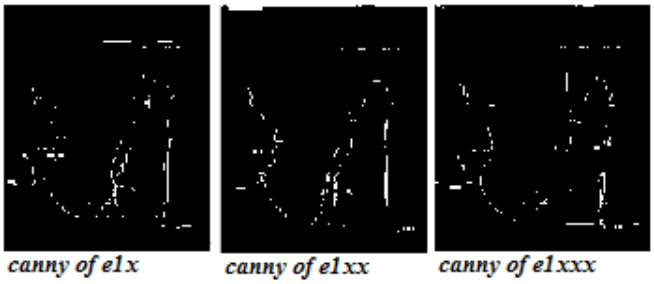

Fig 31 :e1x,e1xx,e1xxx

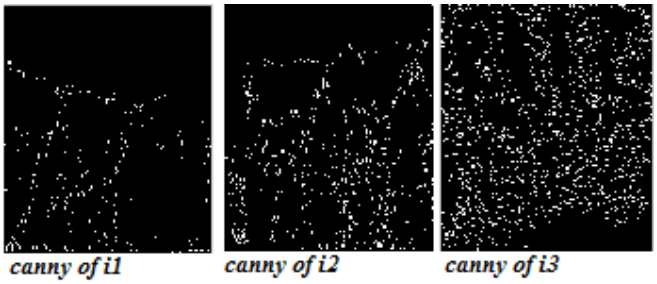

Fig 32 : i1,i2,i3

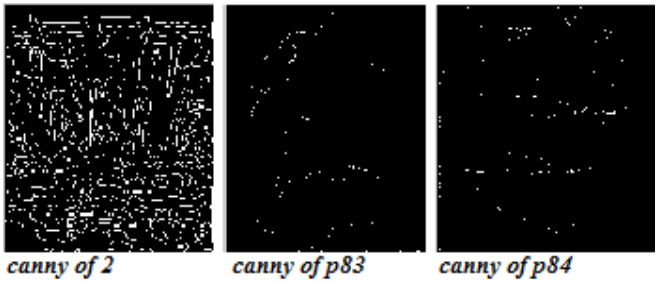

Fig 33 : 2 ,p83 ,p84

Compare input image with reference image when thresholding point is 0.1.

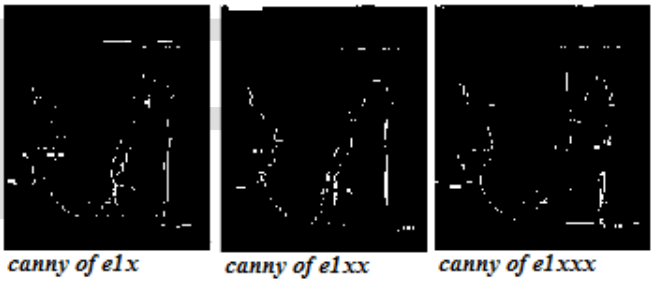

Fig 34: e1-e1x,e1-e1xx,e1-e1xxx

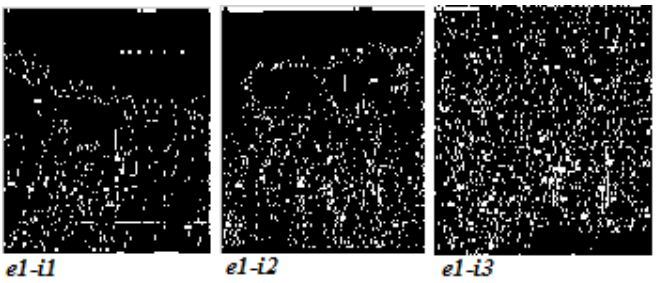

Fig 35: e1-i1,e1-i2,e1-i3

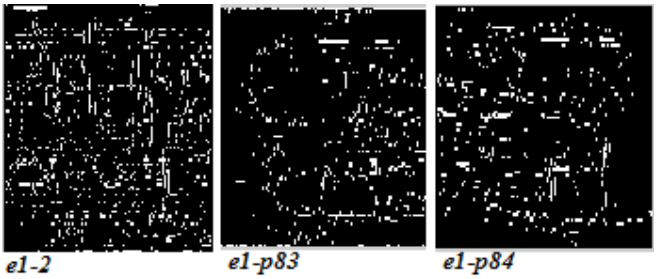

Fig 36: e1-2,e1-p83,e1-p84

Table 4 : Thresholding point 0.1

	Maximum pixel	matching	mismatching
e1-e1x	348135	348111	24
e1-e1xx	348086	348013	73
e1-e1xxx	347749	347339	410
e1-i1	327824	307489	20335
e1-i2	317728	287297	30431
e1-i3	298603	249047	49556
e1-2	312130	276101	36029
e1-p83	328561	308963	19598
e1-p84	326920	305681	21239

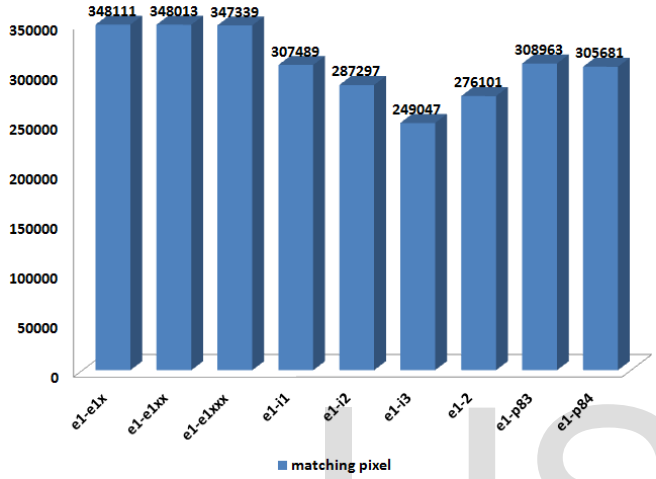

Fig.37 : Chart for thresholding point 0.1

IV. CONCLUSION

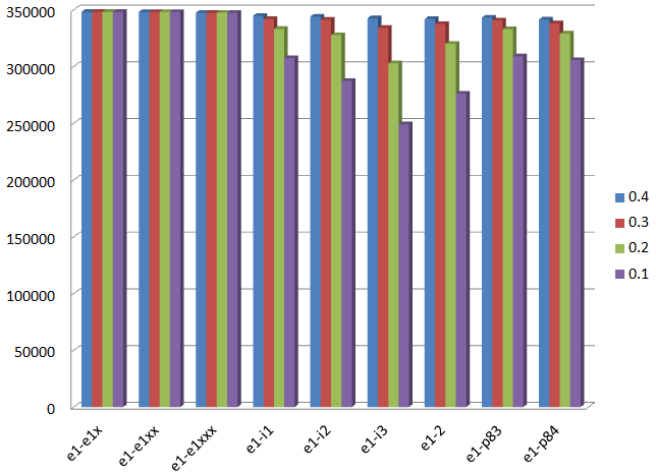

Fig. 38 : comparision of all thinning factors

In this chart we can show that the image e1 is compare with all the other images like e1x, e1xx, e1xxx these images are destroyed from e1. So these images are almost same matching and mismatching rate. Other have different matching and mismatching rate.

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