

C S B 15 - 82

Contents

1	Introduction	2
2	Review of Literature	3
2.1	Different techniques of polygonal approximation	3
2.1.1	Sequential tracing approach	3
2.1.2	Split method	4
2.1.3	Merge method	4
2.1.4	Split-and-Merge method	4
2.1.5	Dominant point detection	5
2.2	Image Matching	5
2.2.1	Graph Based Image Matching	6
3	Technical Background	7
3.1	MATLAB Introduction	7
3.2	OpenGL Fundamentals	8
3.2.1	Modelling Transformation	8
3.2.2	Viewing Transformation	9
4	Polygonal approximation method for digital image	10
4.1	Important definitions and Methods	10
4.1.1	Sector Method for Polygonal approximation:	11
4.1.2	Tests performed during Sector method:	12
4.2	Optimal polygon formation:	15
4.2.1	Algorithm for optimal polygon:	16
4.2.2	Computational Complexity of the algorithm:	18
4.2.3	Advantages of the proposed algorithm:	18
4.3	Snapshots of the results obtained from Polygonal approximation algorithm	18

5	Voronoi Diagram of Approximated Polygon	20
5.1	Basics of Voronoi Diagram	20
5.1.1	Voronoi diagram of set of points	20
5.1.2	Voronoi diagram of line segments:	21
5.2	Medial axis transformation	22
5.3	Matching	23
5.3.1	Isomorphism Properties:	24
6	Conclusion and Future Scope	25
References		25

List of Figures

2.1 Split and merge method	5
2.2 Dominant point detection	5
4.1 The slope of the curve at point A is equal to the slope of the straight line BC. By finding the slope of the straight line BC, we have found the slope of the curve at point A.	11
4.2 Sector Method	12
4.3 Point of tangency in a circle	13
4.4 Upper and Lower tangent	13
4.5 Point inside the sector	14
4.6 orientation test for point inside a sector	14
4.7 Checking the direction of one vector on another	15
4.8 Image consisting of objects as well as holes	16
4.9 Input Image1	18
4.10 Output Image1	18
4.11 Input Image2	18
4.12 Output Image2	18
4.13 Input Image3	18
4.14 Output Image3	18
4.15 Input Image4	19
4.16 Low Threshold	19
4.17 Mid Threshold	19
4.18 High Threshold	19
5.1 Voronoi diagram of set of points	20
5.2 Bisector of points and Line segments	21
5.3 Voronoi diagram of line segments bounded within a box	21
5.4 Voronoi diagram of Polygon 1	22
5.5 Voronoi diagram of Polygon 2	22
5.6 Medial axis of letter E	23

5.7	Medial axis and Voronoi diagram comparison	23
5.8	Non Isomorphic Graphs	24
5.9	Isomorphic Graphs	24