Reconstruction of Noisy 2D straightline by Reachability distance

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Abstract

Reconstruction of the straight line is a very tedious task, given a noisy set of points in a 2D plane. In the reconstruction of the straight line there are several previous studies, all the studies reconstructing only uniform samples. Here implementation of a new approach to straightline reconstruction from noisy pointset. Choosing neighborhood points and information regarding local density. Solving the surface issue from point sets make extensive use of the fact that the data are grouped into boundaries and the contours are situated in parallel planes. Similarly, specialist algorithms to rebuild surfaces From multiple viewpoint data range may leverage the data points adjacent connection within each. Implementing this reconstruction of straight lines by consistency and density informations.

1. Introduction

Rebuilding 2D models is one thing of the disciplines of computer vision which are fast Boosting momentum. The reverse engineering, computational and geometrical simulation of a close line reconstruction of 2-d point data is a fundamental problem Geom try, image and computer graphics, computer vision. For example, one of the effective in reverse engineering Methods for modeling point data for manufacturing with fast prototype techniques are to adapt the data points to a specific one Direction, in a number of layers and each layer has points Treated as at. Prior works only handling non noisy or uniform pointset. Here introducing consistency condition, Neighbourhood relationship and density informations.
2. Related works

In this section, review briefly the most important works. Unorganized point data straightline reconstruction and investigation whether they can handle noise and outliers and and Keep the characteristics sharp. Shape alpha[1] introduced an alpha shape, It introduces and analyzes the generalization of the convex hull of a certain number of points on the plane. This generalization results in a family of straight graphs, "alpha forms," which apparently capture the intuitive concepts of "ne form" and "crude form" in point set. A-shapes have been shown to be subgraphs of Delaunay triangulation from the nearest point or furthest point. An optimal O(n log N) algorithm is developed based on this result which constructs shapes. It not using noisy point sets.

Nina Amenta and Marshall Bern[6] Restoring a curve that does not always have a sample assurance. The Crust and Skeleton: Combinatorial curve is the first algorithm for reconstruction of a sample that produces a curve. There are two phases of the Crust algorithm.

A Simple Proven Curve Reconstruction Algorithm has been implemented by Tamal, K. Dey Piyush Kumar[7] for curve construction. This algorithm is based on the closest neighbor from the moment. If the input is 1/3 samples, all the closest adjacent borders connecting a point to the closest Euclidean must be reconstructed. However, the closest neighboring edges are not the edges of the reconstruction.

A new method is introduced by, S. Ohrhallinger et al.[31] Suggest a parameter-free approach to restore multiple connectivity with local feature width in unstructured, high-noise 2D point clouds. It enables the capture of the characteristics resulting from the noise.

3. Definitions

L is set of straight lines and C is a collection of smooth curves that can consist of one or more connected simple curves, i.e., loops and segments (both bound by two end-points), prohibiting T connections or crossings, but are not always bounded by the R² and twice differentiated, but boundaries. C. C is the result of a collection of smooth curves. They can not contain sharp angles, because the curves are smooth.

3.1. Cohesiveness

The distance between the two neighbors \( d = ||X_{i-1}, X_{i+1}|| \) is greater than their respective distance to s: \( d > ||X_{i-1}, X_i|| \) and \( ||X_{i+1}, X_i|| \).
3.2. Local density of point set

The local density is calculated by the typical distance from its surroundings to a point. A additional measure for achieving more stable results within clusters is the definition of the "reachable distance".

3.3. Local Feature Size

Local feature size (LFS) of the given point set is used for nding the extend of noise in the input pointset. LFS is the distance between any point to its medial axis. Given a planar straight-line graph, the local feature size at any
point $x$ is the radius of the smallest closed ball centered at $x$ which intersects any two disjoint features (vertices or edges) of the graph.

Reconstructing Straight line from the given noisy point set is done previously by neightbourhood relationship between the point sets. Here Strightline recovering algorithm is done by using neightbourhood relations, consistent between the points and LFS of the given points.

**Algorithm: Straight Line from Noisy Pointset**

1. Given point set  
2. Find the extent of noise by Local Feature size  
3. Check consistency between the points  
   - if the points satisfy consistency  
     1. connect the neightbourhood points  
4. connect all points by checking the consistency  
5. Result from step 4 is added to checking Local density information and reduce number of points connected.
5. Results and Discussion

The MATLAB framework is introduced. Noisy pointset reconstruction is very accurately identified. The method RANSAC is used to provide information about the local density of the point. The matlab scripts are correctly collecting consistency and neighborhood relationships. Input points are represented by black points, and the output by Straightline algorithm is represented in red color. The figure shows Algorithm perfectly reconstruct the straightline. Elimination of the noisy point is done.

5.1. Performance Analysis

The performance review showed that the function’s execution time was approximately 0.06ms in matlab. It indicates that the output is very good, with lower execution time.

6. Conclusion and Future works

Noisy straightline reconstruction is done correctly. Before the algorithm, several papers were studied. For noisy point set reconstruction, fewer algorithms are available. Local density reconstruction of straightline works well with other algorithms. This algorithm uses the relationships between neighborhoods to connect the points. Future works are reconstructing all the manifold using neighbourhood and consistency of the given pointsets.
7. References

Herbert Edelsbrunner, David G. Kirkpatrick, And Raimund Seidel, "On the shape of a set of points in the plane," in IEEE, 2000,

Luiz Henrique de Figueiredo Jonas de Miranda Gomes, Computational morphology of curves. The Visual Computer, February 1994, Volume 11, Issue 2, pp 105{112


Remco C. Veltkamp, 3D Computational Morphology, CWI, Dept. Interactive Systems


WANG J., YUZ., ZHANG W., WEIM., TAN C., DAIN., Z HANG X, Robust reconstruction of 2d curves from scattered noisy point data. Computer-Aided Design 50 (2014),


Nina amenta and Marshel ben surface reconstruction by veronoi itering ACM 1998