

A Survey of Medical Imaging Reconstructions and Rendering

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Abstract a b c

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1 INTRODUCTION

Intro a b c

2 OVERVIEW

Overview a b c

3 IMAGE PROCESSING

3.1 Thresholding

Mukundan [2] observes that in HRCT lung scans, tissue regions are "characterized by different and easily separable intensity levels". Simple thresholding can be used to pick out regions.

3.2 Contour Finding

Mukundan [2] starts with a binary image after thresholding. Eroding the image with a 3x3 element then subtracting this from the thresholded image gives one pixel wide edges. Sequential edge following is used to extract contours. Discarding small contours reduces the number of contours significantly.

Mackay [1] uses contours generated from Adaptive Contour Marching.

4 VOLUMETRIC RENDERING

5 SURFACE RECONSTRUCTIONS

5.1 Point Cloud Methods

5.2 Contour Correspondence

contour correspondence...

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5.3 Point Correspondence

Point correspondence is an optional step in surface reconstructions, where points on matched contours are matched to each other as a precursor to triangulation.

Mackay [1] proposes Dynamic Time Warping (DTW) as a method of point correspondence. DTW is intended to match features on the same structure across different times. In point correspondence, it matches points on contours which are from the same structure but in different slices, so slightly warped.

5.4 Mesh Triangulation

mesh triangulation...

5.5 The Branching Problem

Mackay [1] uses contour merging to help DTW point correspondence in the branching case. In a slice with one contour and a slice with two contours, the two contours are merged at their nearest point to give one larger contour. Point correspondence between the matched contours can then proceed as normal.

5.6 Mesh Rendering

mesh rendering...

6 TESTING

6.1 Generating Models

Mackay [1] uses Blender3D to create test models, by creating surface of revolutions about bezier curves.

Pluta et al. [3] propose a rule-based method of generating models, including deformations and noise.

6.2 Measuring Similarity

Mackay [1] uses Hausdorff distance (essentially a maximum deviation between point sets) to measure mesh similarity. Points are sampled from a ground truth model and the nearest distance is found to the reconstructed model.

7 CONCLUSION

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