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Abstract

Coronary heart diseases (CHD) are one of the most prevalent causes of death all over the world. Noninvasive imaging technique such as Computed Tomography (CT) has greatly assisted the diagnosis of coronary heart diseases. Coronary vessels are 3D structures in nature. From CT images we get 3D structures. For a treatment plan or physicians' surgical operations it is very important to segment out the coronary arteries of heart using CT images. After extraction of heart arteries it is also medically essential to visualize these arteries. In this paper novel image segmentation approach is proposed to segment the left coronary arteries of the heart and then a VTK pipeline is developed and implemented for 3D visualization of the segmented arteries. In this work after extraction of 3D heart shape the regional statistical information is incorporated in the structure through the Bayesian law. Finally the Marching Cube method is applied to extract the desired coronary arteries image. Then proposed VTK pipeline visualizes the segmented branches. The proposed segmentation framework segments out the main branches of the left coronary arteries, which is quite satisfactory.

Reference

- American Heart Association, 2006. Heart Diseases and Stroke Statistics Update.
- Goyal, A. & Yusuf, S., September, 2006. The burden of cardiovascular disease in the Indian subcontinent. Population Health Research Institute, McMaster University & Hamilton Health Sciences Hamilton, Ontario, Canada.
- Goldszal.A.F. & Dzung, L Pham., 2000. Volumetric Segmentation , Academic press.
- Sahoo, P.K. & S. Soltani, and Wong, A.K.C., 1998, A survey of thresholding techniques., Computer Vision, Graphics and Image processing. vol-41, issue-2, pp.233-260.
- Fiorentini, S. Larrabide,I. Venere, M J., A Simple 3D segmentation technique over Medical data, Facultad de Ciencias Exactas. Universidad Nacional del Centro (7000) Tandil.
- Cemil, Kirbas. & Francis K.H Quek. November-2002. A review of vessel Extraction Techniques and Algorithms ,ACM computing surveys. vol-36, pp. 81-121.
- Yan Yang, Allen R.Tannenbaum , Don P.Giddens, 2004. Knowledge – Based 3D Segmentation and reconstruction of Coronary Arteries Using CT Images. international Conference of the IEEE EMBS, USA, pp.1664-66.
- Yan Yang, Allen R.Tannenbaum, Don P.Giddens., 2006. Multiscale vessel filtering the generation of patient specific CFD models for coronary arteries. Bioengineering conference,USA, pp.1-2.
- K. william, 2007. Digital Image Processing. Wiley, Fourth edition.
- M. Ross Sheldon, 2000. Introduction to Probability Models. Academic press, seventh edition.
- W.E. Lorensen and H.E. Cline, 1987. Marching Cubes : A High Resolution 3D Surface Reconstruction Algorithm. Computer Graphics, vo-l21, 4, pp163—169.
- Xenophon papademetries, 2006. An introduction to programming for medical image processing with visualization toolk. draft,kitware.
- A A Ahmed, M S Abd Latiff, K Abu Bakar, Z A Rajon, 2007. Automatic Visualization pipeline formation for medical data sets on grid computing environment. World Academy of Science, Science And Technology, pp.342-347.
- Will Schroeder , Ken Martn, Bill Lorensen, 2002. The Visualization Toolkit- An object oriented approach to 3D graphics,kitware”, prentice Hall,Third edition.

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