Three-dimension coronary artery tree curvature confirmation.

ABSTRACT

Problem statement: Three-Dimension (3D) reconstruction is one of the vital and robust tools that provide aid in many fields, especially medicine. This article is about 3D shape similarity and it presents a comparison approach between principal curvature methods of 3D output. Our approach follows the concept of using the gray scale value as the z dimension and the other approach is a standard one. A comparison of the curvature of the 3D outputs will be made between the standard approach and our proposed one to prove its correctness. We propose to use the standard deviation technique to compare the output features of the 3D coronary artery trees. We applied a standard approach of 3D shape similarity and compared the features with ours. The standard approach was published in 1998 as a study comparing certain 3D curvature measurement algorithms. Approach: Our approach consists of three major steps: (1) Apply the paraboloid fitting technique from the standard approach; (2) Apply the 3D reconstruction algorithm proposed in this research on the same data in step (1) and (3) Apply the Standard Deviation technique on both outputs from (1) and (2) and compare the outputs. Results: Experimental evaluation has been done on clinical raw data sets where the experimental results revealed that both outputs are totally matched. Conclusion: The match in the output refers to the correctness of the proposed 3D output and subsequently its coronary artery tree curvature as well.