Reviewer’s report

Title: A New Human Heart Vessel Identification, Segmentation and 3D Reconstruction Mechanism

Version: 2  Date: 20 June 2014

Reviewer: Farsad Zamani Boroujeni

Reviewer’s report:

Subject Appropriateness of the Manuscript
The topic of this manuscript falls within the scope of the journal.

Recommendation
Consider After Major Changes

Comments
In this paper, the authors presented mechanisms for enhancement, extraction and reconstruction of coronary arteries in photographs taken during the coronary bypass surgery. The authors used an image enhancement algorithm which is mainly based on de-correlation stretch technique followed by a semi-automatic segmentation strategy. They also proposed an algorithm for 3D reconstruction of the extracted surface vessels. The authors also compared their method with the other approaches.

Major Comments
1. It is important to indicate the benefit of the whole system for novice surgeons.
2. The authors should provide more details for describing the proposed algorithms, especially in section III parts (b) and (c).
3. A section should be included to describe the dataset, e.g. number of images, spatial resolution, number of gray levels, etc and the details of image acquisition process.
4. The authors should define the performance quantities, e.g. accuracy, robustness, etc and the equations or methods used to measure them.
5. The authors should include a section to compare the output of different segmentation algorithms shown in Figures 12 and 13.

Minor Revisions
1. The manuscript requires proof reading for typos and grammatical errors. For example, in line 11 of page 4, a verb is required after “Felkel et al”. In line 29 of page 4, an infinitive should be used after “purpose of”. The authors should check the manuscript thoroughly.
2. Explain the relationship between the robustness and the content of section V part a.
3. The authors should clearly describe the output of each step of the proposed framework shown in Fig.3 and how the output of one step was used as the input of the next step.

Discretionary Revisions
1- It is recommended to transfer the theoretical background and formulas from section V (discussion) to section I (background).

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

Yes.
I was a graduate student and worked as a research assistant from 2009 to 2012 in Faculty of Computer Science and Information Technology, University Putra Malaysia.

I do not have any other kind of competing interests in relation to this paper.