

Assignment II – Part I

Biomedical Imaging & Analysis (ECE J1-791) - Fall 2014

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Instructions

Please show your solutions to each problem in full, writing them neatly. For computer programs, please remember to turn in your code through the course's blackboard session, as well as any plots / figures that are requested. This assignment is due on **Tuesday, 18 Sept 2014** via Blackboard, including an a Report with explanations associated with each question in the assignment, as well as any associated code and result files. If you have collaborated with another student on solving this homework assignment please state so (e.g. "I helped John with question 1" etc.).

LEARNING GOALS:

- Working with Matlab and visualizing surface data.
 - Input & Output of essential file-types
 - Visualization of data using Visualization Tool Kit (VTK).
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1. (40 points) Extrapolate this logic used in question 1 of the Pre-Class Assignment (i.e. Assignment 1 Part II) computing the normal directions of each of the triangles in the following STL surface geometry and subsequently write out a file containing the points (i.e. vertices), triangles and normal vectors of the geometry (one normal vector per vertex) as a Legacy VTK (visualization toolkit) file:

- Source STL File: *CoronaryArteryBranch.stl*
- Visualize your results using "Glyphs" shaped like "arrows" in Paraview (Kitware Inc., NY: www.paraview.org) – the open source visualization engine based on VTK. Please download and install Paraview for your personal computing devices for this assignment.

❖ **¹Code is provided on Blackboard to help you get started:**

- Matlab function to write VTK PolyData (surface) files: *write_vtk_Surface*
- Matlab function to read STL (binary) surface geometries: *stlread*

❖ ¹This symbol means that "code" provided on Blackboard which requires to be used in this assignment. **And remember**, this assignment will require submission / uploading of your final code in addition to an inserted snapshot of the final rendering outputted and visualized in Paraview for your reports.

- ✓ `[v, f, n, c, stltitle] = stlread(filename, verbose);`
 - ✓ `v` is the list of vertices of the geometry and `f` is the list of faces of the geometry.
 - ✓ Here, `n` is the list of normal vectors to the Faces of the geometry. You may use this to validate your results! But note, you are expected to write out your normal vectors at each 'vertex' and not each face.
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