Medical Visualization: Individual Reports

Samuel Austin

At the beginning of the project I was focused on looking at the possibilities of creating a plugin for mevislab for us to create our visualization in. Quite quickly this turned out to be harder than we expected so we decided to look at other possibilities. I started creating my own python script using VTK for python to create a standalone visualization. This was easier than creating a plugin for mevislab but creating a user interface would be a lot more work as we could not use the mevislab framework.

In the end we decided to continue with a standalone python script and not worry about the user interface as we felt the visualization would be more important than a nice user interface. I set up some basic functionality for importing the data and visualizing it and implemented the point-to-point distance calculation between meshes. We used this data for creating a visualization of the difference between two meshes. I also created polylines based on the point-to-point data as an additional visualization and applied the same coloring as the mesh.

Because creating a user interface would take a lot of time I made it so you could control the visualization by button presses on the keyboard. This allowed us to quickly add functionality and be able to trigger it.

For the report I initially focused on describing the point-to-point calculation, how we used it for creating our visualizations and also discussed a bunch of the referenced papers in the related work section. For the rest I worked on various parts throughout the rest of the report.

Adrià Giner

Initially we all explore different options to implement the chosen project. I decided to look among medical visualization software and I learned how to use ParaView, but as it was based in VTK we finally agree to use python. After that we all did a bibliographic research of the principal lines of investigation in mesh comparison and visualization to get ideas of how to proceed.

I was mainly in charge of looking for techniques that could provide us quantitative results to present in the final report. Also, I was helping in different parts of the main script to define the way we were going to implement it. After that, as I suggested how to extract many of the final results, I analyze the data and defined various visualization modes that best suited for each of the data presented. Finally, my final contribution was to comment in the final report the results, and combine the extracted images to provide the best way to understand all the data provided.

<u>María García</u>

From the beginning I focused my attention on the extraction of individual organs for each patient file. To do so I got familiarized with the structure of a VTK file and its characteristics. Once we decided that going for python hard-coding was more intuitive than the MeVisLab software, I started creating my own script. Since I do not have a robust computer science background, I spend several time in getting familiarized with the python encoding.

The hardest task was indeed finding the appropriated VTK classes and methods to filter the dataset in order to extract the desired organ. One drawback that I had to cope with was reading C++ scripts, since the majority of examples with the VTK library are written in that language. Thus I finally was able to set the appropriated function to extract one organ and consequently the grouping function extracting the list of a set of organs for all the patients. I also adapted Sam's functions about the closest point-to-point distance and added the calculation of the point-to-point distance. In the end I added the suitable interaction events for the visualization being able to create the script OrgansExploration.py.

Regarding the report, I mainly was focused on written the abstract and the introduction. I also extracted from the scripts most of the analyzed data in the Result section of the report.