Post mortem
VGL mesh deformation.

What went well:

Understanding the paper:

Though this might seem a bit contradictory to what I will write later, I do feel like understanding the majority of the paper went quite well. Reading through the paper everything seems quite well laid out and everything is quite well explained and I knew what needed to be done from the very start.

Laplace on manifold:

The paper describes these functions mathematically and they were therefore incredibly easy to implement, it was pretty much a first try success.

What went less well:

Volumetric graph:

Implementing the volumetric graph did go fine, not great, but I was able to do it in the given timeframe. I had some trouble implementing a method of 100% determining whether a node is inside the given mesh. This did turn out to mostly be due to another problem, which I will talk of later. Due to this I also had a lot of trouble creating a good inner shell. I was able to do either a great graph or a great inner shell, so in the end I only went with the graph, ignoring the inner shell.

What went poorly:

Planning (Time):

My greatest mistake this project was how naive I was concerning how much time everything would take to implement. I planned for the volume graph to be done in about one and a half week, but I was not done after three weeks, and had to settle for the simplified version I ended up using.

And thinking the deformation would be easy after reading the paper, I was not even close to understanding how it actually worked (more on this in the “Quadratic minimization part”). And so I had to completely abandon the idea of implementing the WIRE deformation used in the paper, and settle for single vertex deformation if I wanted to be have anything to show.

Choice of underlying data structure:

When I finally put all working parts together I realized that my halfedge mesh, which I had picked as structure for my mesh, did not seem to parse and pair all the faces and edges correctly. This was due to many of the meshes had holes in them, which my data structure was not planned to handle, due to its original use in the subdiv laboration.

But when thinking of how to fix this I also realized that the way I saved normals were also incorrect, and due to some incredibly poor design decisions it would take a long time to fix it. In the end this made me completely rewrite the mesh structure into a simpler mesh with simple adjacency information, which was all that was actually needed.

Quadratic minimization (energy functions):

I used a lot of my time during the last third of the project trying to figure out exactly how I was supposed to solve the given quadratic minimization problem that is described in the paper. I did somewhat understand what I needed to do, but this is the one part of the paper which I have problems with. To solve this I would need some kind of limits, but the paper does not describe any. This makes me assume that it is supposed to be obvious, but I just never got it.

And so I made a dumber way to approximate a decent position to deform vertices to.

Lessons learned

I'll do my very best the next time to write a more detailed todo and understand the paper in way more detail. I will also do a more complete tech spec for any future project, so anything I use fulfills the needs of the project.

The time consumed by everything were so much greater than expected that I'll probably never expect to do more than a FizzBuzz a week.