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Project Title: Automated Left Ventricular Segmentation

Time Log From 4/1/2024 - 4/7/2024

10 Hours

Date	Duration	Type	Description of completed work	Challenges and/or next steps
4/1	3 hours	Research	After some reading, I realized that the issue I was facing with my model constantly predicting 0s was the result of a massive imbalance of the classes. Some of the solutions I read proposed methods I could not understand. One easy-to-understand solution proposed filling in the area of interest. I informed my supervisor of my problem and he thought this may be an answer to my problem.	Research and implement a method to fill in the region of interest (The area where the left ventricle is denoted by 1s)
4/2	3 hours	Research, coding, organization	I found a popular image processing library that finds boundaries in an image and fills them in. I used it on the binary mask images I had. It worked perfectly and then I spent time organizing the results for each patient.	Before there were about 200 1s and 65,000 0s in a binary mask for an image. Now there are about 2000-2500 1s. Still a heavy imbalance but this is much better to work with
4/3	3 hours	Coding/debugging	The data is still imbalanced. I tried messing around with architecture and have not come up with a solution. The model still keeps predicting 0s for all the pixels on an image	
4/4	1 hour	Research	I decided to take some time to read up on if other people have had this issue when training and found some possible solutions. A very promising solution I found was putting extra weight to the 1s so that the model pays more attention to predicting it rather than the 0s.	I'm going to go through the process of adding more weight to the minority class and try to train the model.

This Weeks Summary

This week I didn't get to spend too much time on the project but I made some progress in figuring out my problems and taking steps to address them. I don't think there is anything wrong inherently with the way I have everything set up. It is just the fact that the model is seeing so many more 0s than 1s and is paying more attention to the 0s because if it predicts a majority of those, then no penalty would be incurred and the model's loss scores would still be high. However, now I'm sure that I have found a solution to the imbalance. I will implement in the coming week.