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Introduction to Connectomics  
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### Graph Analysis Write-up

For Criteria 0, three suggestions for improvement:

1. The notebook took a while to run. If possible, optimize the notebook to run more efficiently. If the system is rebooting, then the notebook will take even longer to run.
2. It would be useful for more explanation on what the graphs display, and what happens in the ndmg pipeline. There are nice figures, however, there is no description explaining the processes of registration, tensor calculation, fiber tractography, or graph generation.
3. More explanation of what exactly is in the datasets

For Criteria 0, three things that worked well:

1. The docker and notebook were easy to run
2. Each figure is very well displayed.
3. The graph information is very clearly displayed.

Degree Centrality - Since Degree Centrality computes the average connections that each node has, it basically computes how well connected the brain is. Through this class, we have learned that the brains of females are better connected than the brains of males. Therefore, Degree Centrality calculates a specific difference between male and female brains, making it a very useful feature for classification.

Adjacency Spectrum - The Adjacency Spectrum returns the eigenvalues of the adjacency matrix. Graphs with different connectivities must show differences in the adjacency matrix. As such, this feature helps better analyze the differences between brains with different connectivities, so this would be a useful feature for classification between male and female brains.

Number of Edges - For number of edges, we are again focusing on the connectivity differences between males and females. This is once again feature that analyzes connectivity.

Number of Nodes - This feature is intent on measuring volume. It has been noted that male brains tend to have larger volumes than female brains. As such, this would be used to predict that male brains have more nodes.

Density - Research has shown that there are some density differences between males and females. So, when comparing densities, male graphs will tend to have higher densities.

Naive Bayes Classifier - We choose the Naive Bayes Classifier, since it provided the most consistent accuracies.

We learn to use features based on real world data. We also learn to distinguish what feature is appropriate for the purpose of extracting significant information. By trying out different classifiers, we have a glimpse of what attribute is important for each classifier as well. By using real world data, we have a general idea of how connectomics works in a higher level.