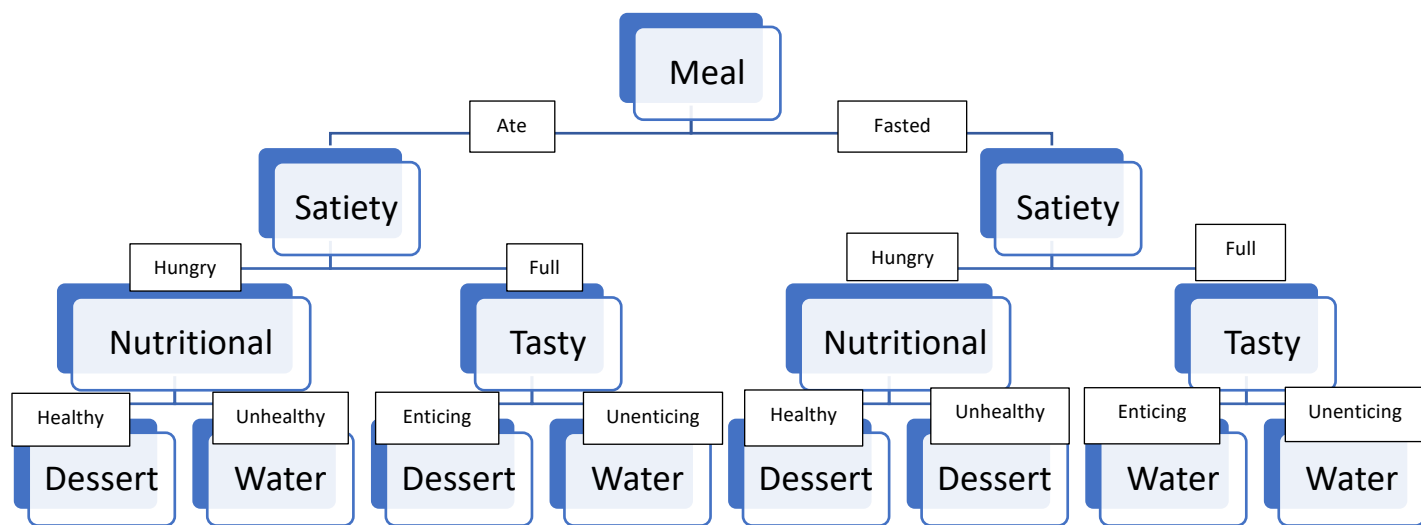


My Decision Tree:



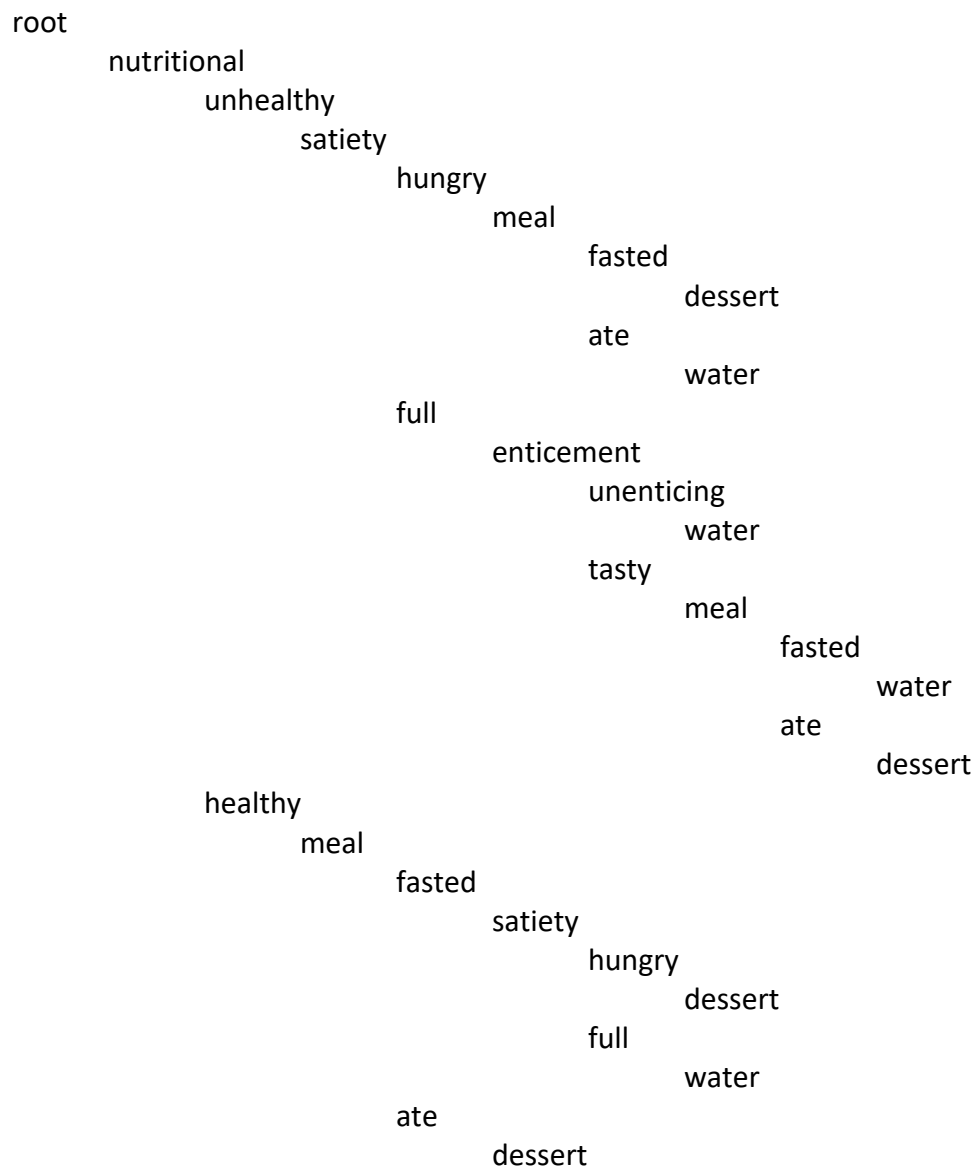
Summary:

My final project consists of creating a decision tree by hand, coding up the data corresponding to that tree, writing the ID3 algorithm, printing the ID3 algorithm tree, and showing the efficacy of my algorithm. As you can see in Figure 1, my decision tree has four distinct attributes (meal, satiety, nutrition, and enticement) with two possible attribute values for each attribute and two possible classifications (water, dessert). There are many ways I could have made the data (i.e., dictionary, list of lists, etc.), however, I chose a more unorthodox route. I created a numpy array composed of unique combinations of variables representing the attribute values. I assign those variables 0s and 1s corresponding to the attribute values by following the tree. I then sampled from these 16 unique combinations using `np.random.choice()` to expand to a sufficient number of rows (i.e., 10000). Finally, I split the expanded data object to have a training set and testing set (two data objects). After creating the data, I wrote the main with four important lists corresponding to the attributes, changeable attributes, attribute values, and the classifications. Subsequently, I wrote the routine to run the algorithm. Next, I worked on the ID3 algorithm and Node Class. Finally, I worked out a way to classify the data to show the efficacy of my algorithm.

Note: Although there was extreme interest to test my ID3 algorithm using real world data, I did not have the time to make it complete and wanted to avoid leaving anything half finished. Thus, there is no application of the ID3 on a real-world dataset.

Results: Printed results from python console.

Thank you for your interest in the Food Choice Decision Tree



The decision tree is complete.

Now we look at the accuracy of the ID3 algorithm!

We have 100.0% accuracy!

What if we purposefully flip one classification in the test data so that it does not follow the tree?

We get 99.9% accuracy, as expected!