**What the robot will learn:**

Our robot will learn how to classify turns into whether it had overshot, undershot, or was the correct turn.

**The learning algorithm that will be used:**

K nearest neighbors

* Classification for labeling
* Learning on 8 attributes: initial and final sensor values for left and right IR sensors and DMS sensor, gyroscope, left or right turn
* Euclidean distance function
* Test on different values for K to see which one provides the greatest accuracy

**Tests that will be run:**

Gather and record data for training dataset:

* 50 right and left turns at different locations in the maze, with different surrounding walls, and starting from different initial headings
* Hand label them as one of the bins (largely overturned, barely overturned, correctly turned, barely under turned, largely under turned) based on the angle measured.
* Largely overturned is > 20°, barely overturned is between 20° and 5°, correctly turned is between 5° and -5°, barely under turned is between -5° and -20°, largely under turned is < -20°.

**Data that will be gathered:**

Test robot's ability to classify turns

* Use a random 30% of the data as our test set, train on other 70% of data points, compute error function for test data
* Run this using different values for k, different sets of attributes (with or without gyroscope), right and left data together or separate, recording the classification accuracy of each