Jon Organ

CS677

Homework 7, kNN Variations

**Question 1.1:**

Saving Q1.1 k Accuracy by Value graph...

A graph with a line

Description automatically generated

The optimal K value for year 1 is 3

**Question 1.2:**

Using the k\* (3) from year 1, the accuracy for year 2 is: 0.36%

**Question 1.3:**

k\* confusion matrix for year 2:

col\_0 Red

Color

Green 16

Red 9

**Question 1.4:**

The optimal k\* value is 3, which is different from the 11 obtained by the previous assignment

**Question 1.5:**

Year 2 true positive rate: 0%

Year 2 true negative rate: 100%

**Question 1.6:**

Buy-and-hold result from previous assignment: $125.70

Calculated kNN (p = 1) result: $68.02

Buy-and-hold results in a larger balance at the end of the year

**Question 1.7:**

Using Euclidean kNN resulted in $209.81 at the end of the year, so the Manhattan metric was a decline in performance

**Question 2.1:**

Saving Q2.1 k Accuracy by Value graph...

A graph with a line

Description automatically generated

The optimal K value for year 1 is 3

**Question 2.2:**

Using the k\* (3) from year 1, the accuracy for year 2 is: 0.36%

**Question 2.3:**

k\* confusion matrix for year 2:

col\_0 Red

Color

Green 16

Red 9

**Question 2.4:**

The optimal k\* value is 3, which is different from the 11 obtained by the previous assignment

**Question 2.5:**

Year 2 true positive rate: 0%

Year 2 true negative rate: 100%

**Question 2.6:**

Buy-and-hold result from previous assignment: $125.70

Calculated kNN (p = 1.5) result: $68.02

Buy-and-hold results in a larger balance at the end of the year

**Question 2.7:**

Using Euclidean kNN resulted in $209.81 at the end of the year, so the Minkowski metric was a decline in performance

**Question 3.1:**

The green centroid has a larger average radius (0.01074) than the red centroid (0.01053)

The green centroid has a smaller median radius (0.00885) than the red centroid (0.00961)

**Question 3.2:**

Using centroids, the true positive rate for year 2 was: 79.31%

Using centroids, the true negative rate for year 2 was: 90.48%

**Question 3.3:**

Buy-and-hold result from previous assignment: $125.70

Centroid strategy result: $323.84

The centroid strategy results in a higher balance than buy-and-hold

**Question 3.4:**

Using Euclidean kNN resulted in $209.81 at the end of the year, so the centroid strategy was an improvement in performance