REPORT

Description of Database:

Predicting the age of abalone from physical measurements. The age of abalone is determined by cutting the shell through the cone, staining it, and counting the number of rings through a microscope -- a boring and time-consuming task. Other measurements, which are easier to obtain, are used to predict the age. Further information, such as weather pattern and location (hence food availability) may be required to solve the problem. Description of all the attributes is given below.

Name	Data Type	Measurement	Description
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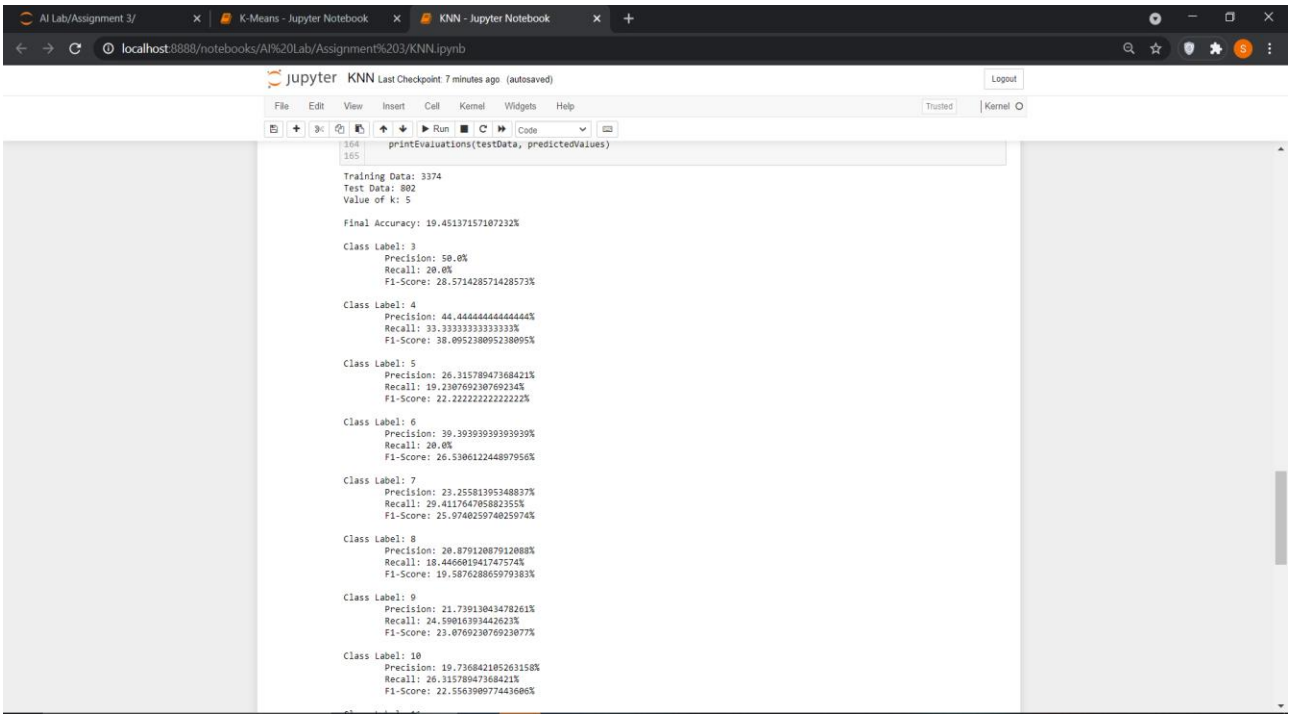
Sex	**nominal**	**M, F, and I (infant)**	**Gender**
Length	**continuous**	**mm**	**longest shell measurement**
Diameter	**continuous**	**mm**	**perpendicular to length**
Height	**continuous**	**mm**	**with meat in shell**
Whole weight	**continuous**	**grams**	**whole abalone**
Shucked weight	**continuous**	**grams**	**weight of meat**
Viscera weight	**continuous**	**grams**	**gut weight (after bleeding)**
Shell weight	**continuous**	**grams**	**after being dried**
Ring's	**integer**		**+1.5 gives the age in years**

KNN Algorithm:

1. Load the data and split it into training and test data.
2. Initialize the value of k.
3. For getting the predicted class, iterate from 1 to total number of training data points
4. Calculate the distance between test data and each row of training data. Here I used Euclidean distance as the distance metric.
5. Get min k rows from the calculated distance.
6. Get the most frequent class within these rows.
7. Return the predicted class.

Screenshot of KNN Output:



K-Means Algorithm:

1. Specify number of clusters K.
2. Initialize K data point randomly without replacement as centroids from the dataset.
3. Compute the sum of the squared distance between data points and all centroids.
4. Assign each data point to the closest cluster (centroid).
5. Compute the centroids for the clusters by taking the average of the all-data points that belong to each cluster.
6. Repeat steps 3, 4, 5 until there's no change in the clusters.
7. Then I calculated Davies Boulding Score.
8. Then plotted the clusters by reducing the dimension into 2 using PCA.

Screenshot of K-Means Output: