**KNN**

A graph with blue and orange lines

Description automatically generatedThe figure illustrates the accuracy of the KNN classifier across different values of k. As the value of k increases, the training accuracy gradually decreases, while the validation accuracy improves and becomes more stable, indicating a reduction in overfitting. During **k=21**, training and validation performance converge, suggesting a balanced model. The testing data achieved an accuracy of approximately **0.668**.

**K\_Means**

A red and blue line

Description automatically generatedA red and blue line graph

Description automatically generatedThe left plot shows the clustering results **without removing outliers**, while the right plot shows the results **after removing outliers**. In the left plot, a few points deviate from the main linear trend, which may distort the clustering boundary and affect cluster assignments. After removing outliers (right plot), the data distribution becomes cleaner and more compact along the main trend line. This makes the clusters more distinct and representative of the underlying structure, reducing the influence of extreme values.