Anomaly Detection with NASA shuttle data

ASHISH PIYA

Objective

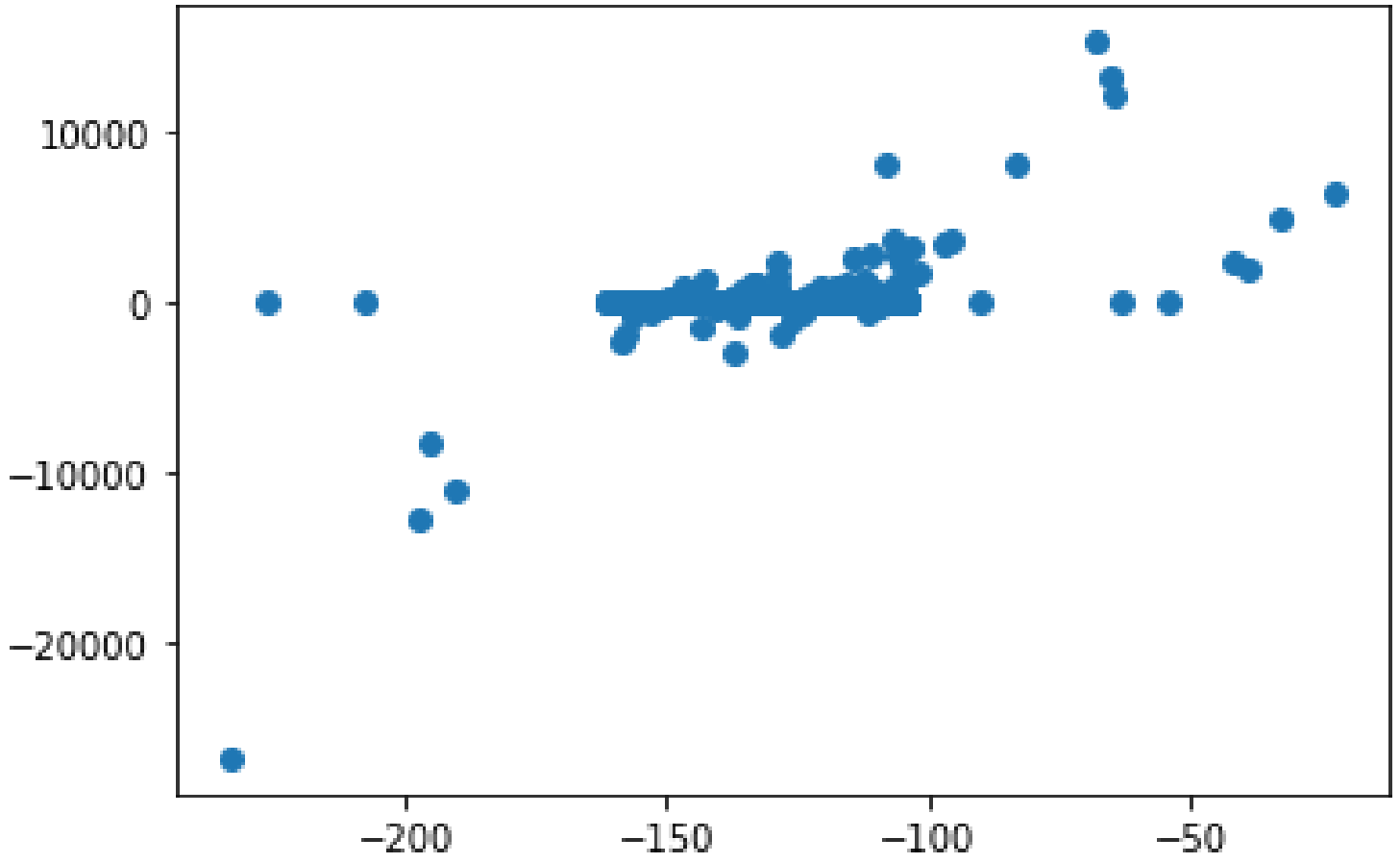
- Detect anomalous data among the Shuttle Dataset provided by NASA

- 9 Undisclosed category
- Around 49000 rows of data

	x_0	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	y
0	50	21	77	0	28	0	27	48	22	1
1	53	0	82	0	52	-5	29	30	2	0
2	37	0	76	0	28	18	40	48	8	0
3	37	0	79	0	34	-26	43	46	2	0
4	85	0	88	-4	6	1	3	83	80	1

Unsupervised Clustering

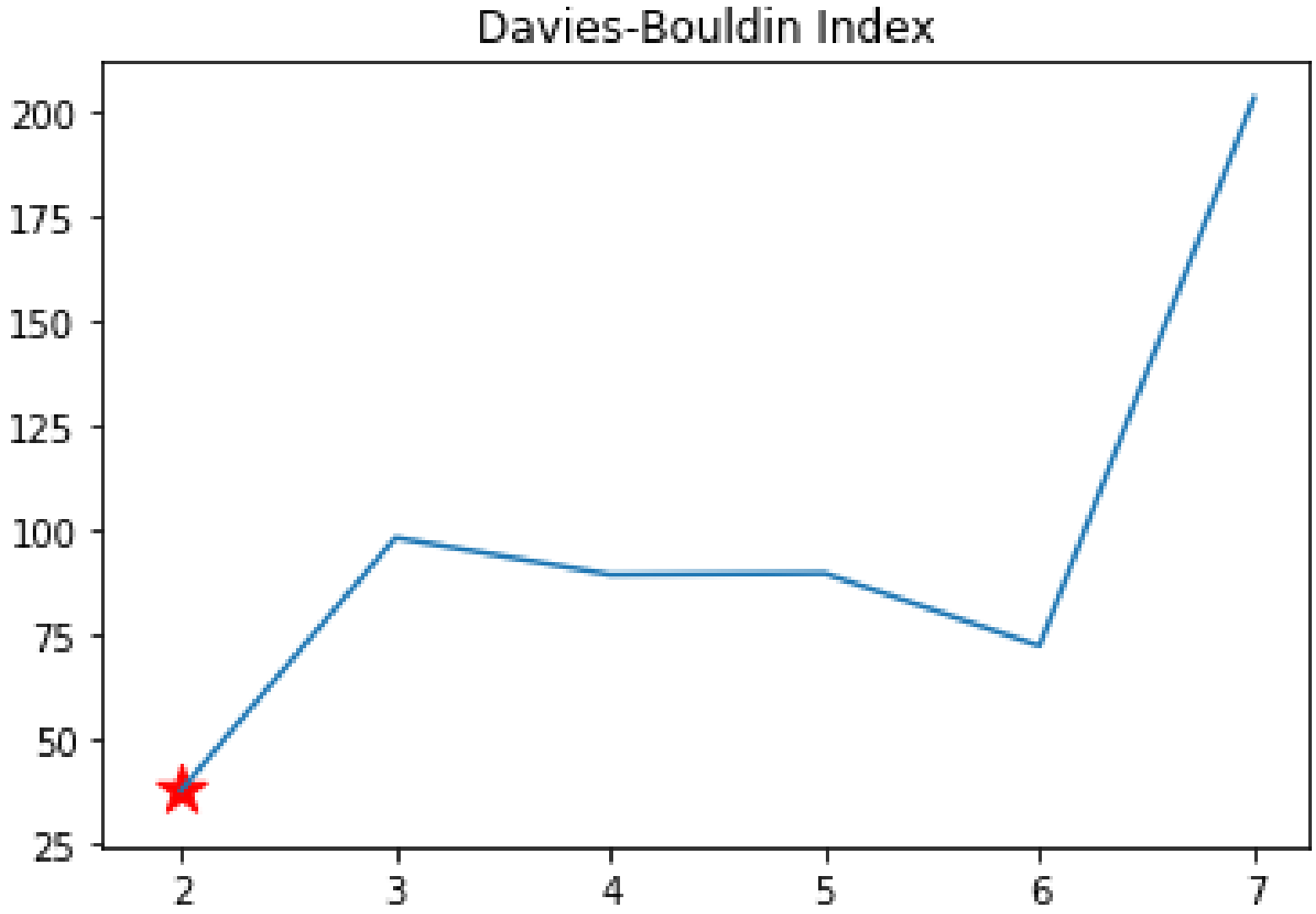
- K-means clustering
- Gaussian Mixture Model clustering
- DBSCAN

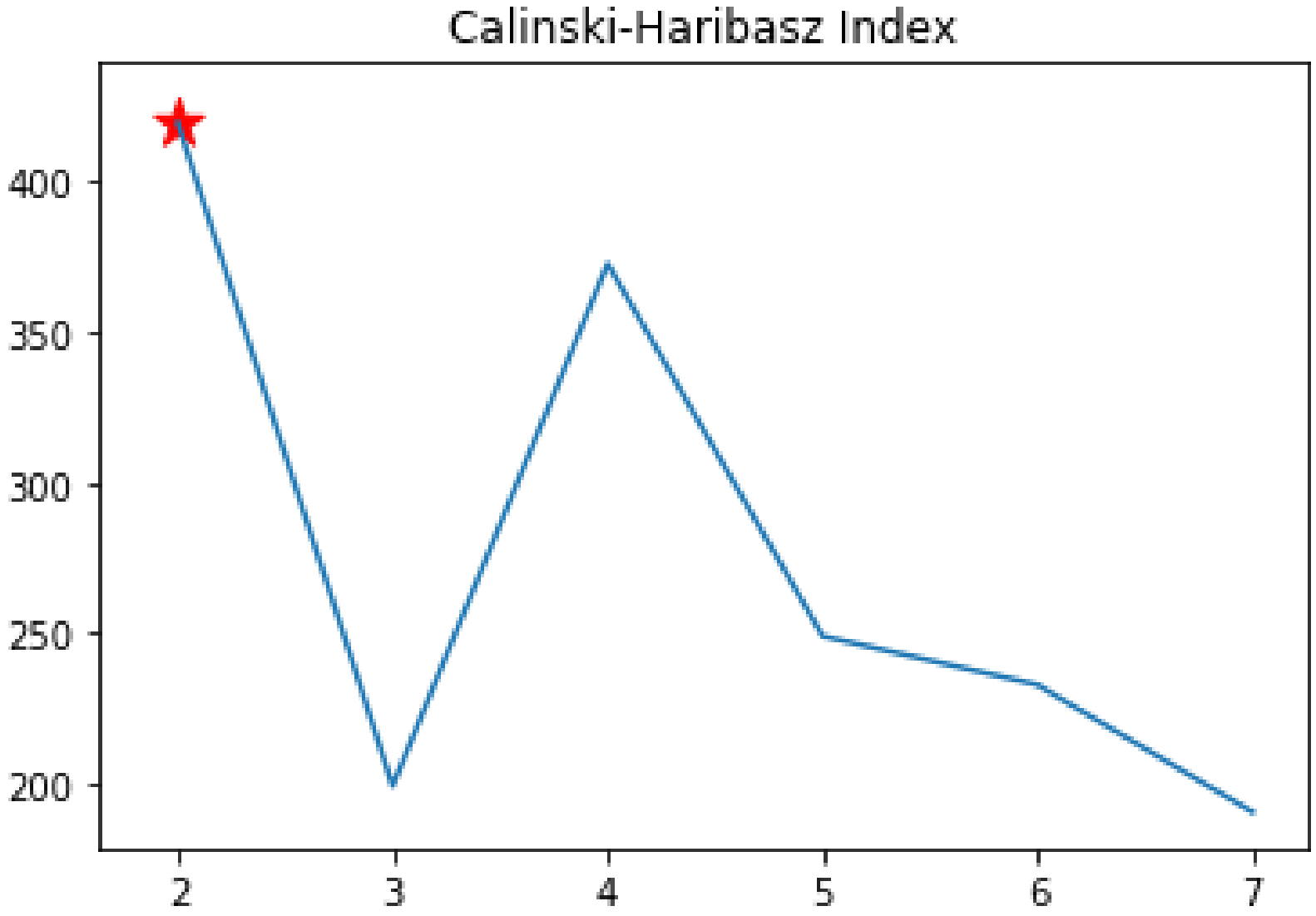


Dimensionality Reduction for Visualization

Davies-Bouldin Index

Suggested number of Cluster 2

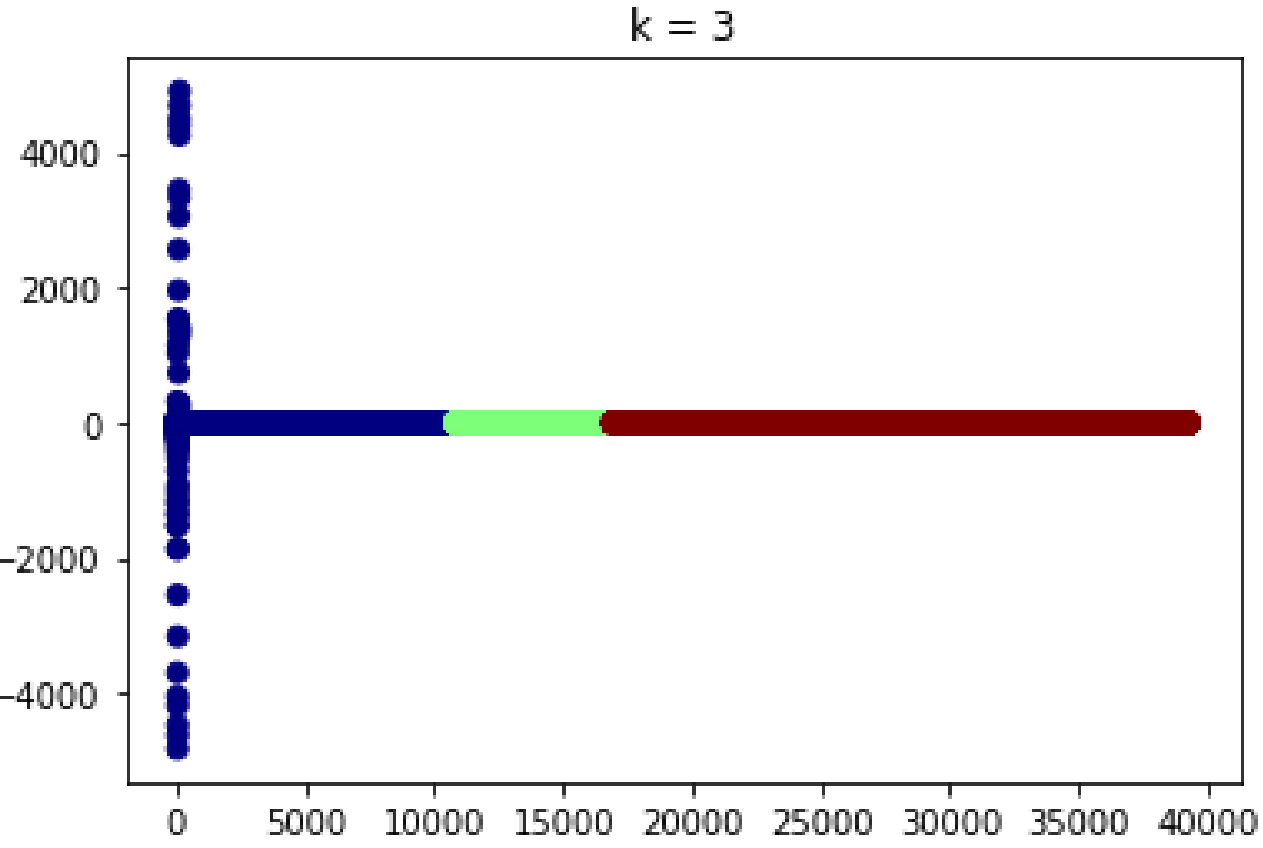


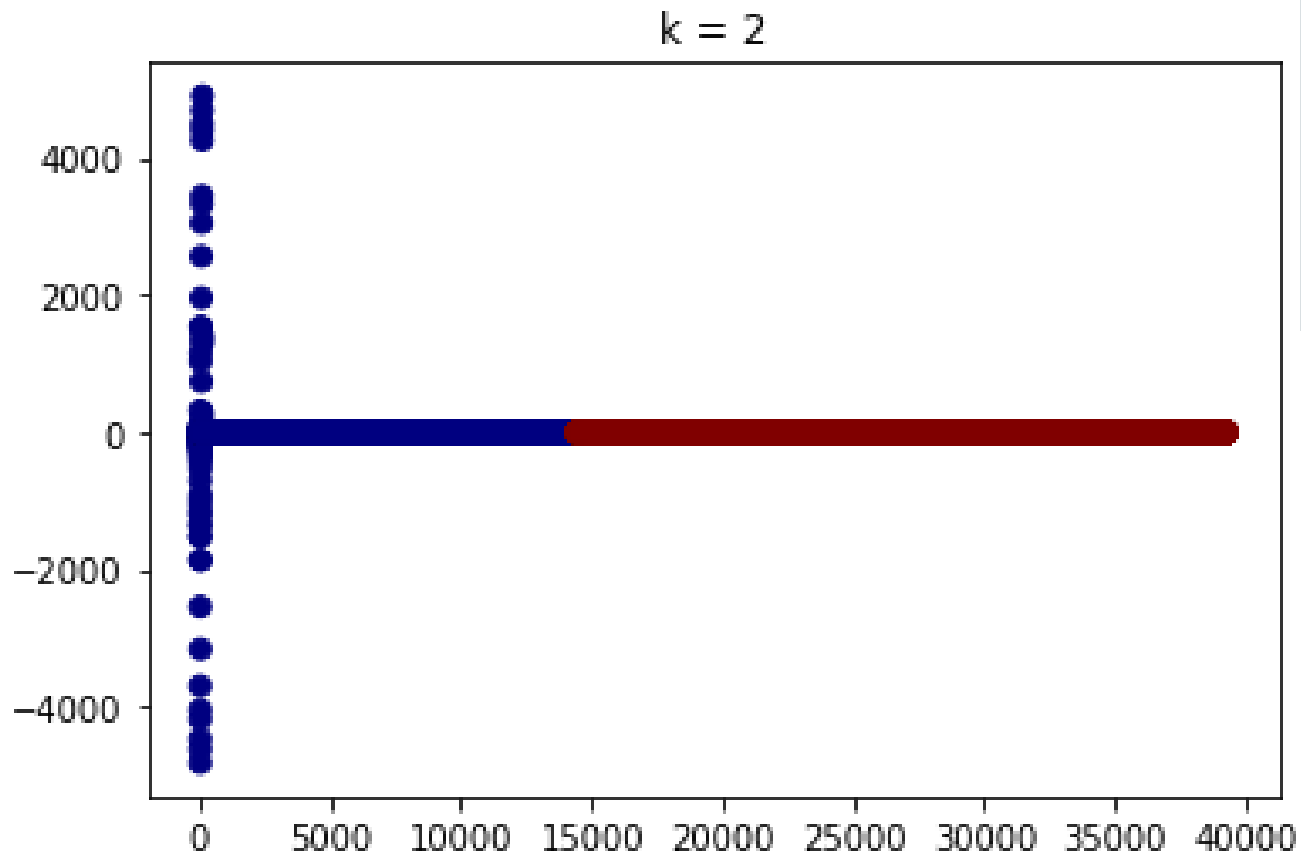


Calinski-Haribasz Index

Suggested number of Cluster 2

GMM Silhouette Plot





Performance Metric

- 80/20 Train-Test Dataset split

- Train Dataset

Accuracy: 0.9335 F1_score: 0.96

Precision: 0.999 Recall: 0.9289

- Test Dataset

Accuracy: 0.9316 F1_score: 0.9619

Precision: 1.0 Recall: 0.9266