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Flight Delay Predictions

🛰️ **Soarroute Inc Flight Delay Predictions** 🛫

Authors: Neha Korrapati, Leela Josna Kona, Sammie Srabani, Devangi Samal

A Streamlit App to analyze and predict the expected Flight Delays based on weather, airlines and flight origin-destination

- **Libraries Used:** Streamlit, Pandas, Scikit-Learn, Plotly, Altair
- **Data Source:** Bureau of Transportation Statistics bts.gov

Example Image

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- **Date Range:** 06/01/2024 to 06/30/2024

| Dataset Preview | Decision Tree Classification | KNN Classification | Delay Reasons Chart |

Dataset Preview:

Dataset Shape: `(611132, 36)`

	FL_DATE	CARRIER	OP_CARRIER_FL_NUM	ORIGIN_AIRPORT_ID	ORIGIN_AIRPORT_SEQ_ID	ORIGIN_CITY_MARKET_ID	ORIGIN	DEST_AIRPORT_ID	DES
0	6/1/24 0:00	19,393	1	11,259	1,125,904	30,194	DAL	12,191	
1	6/1/24 0:00	19,393	1	12,191	1,219,103	31,453	HOU	11,140	
2	6/1/24 0:00	19,393	10	12,191	1,219,103	31,453	HOU	11,259	
3	6/1/24 0:00	19,393	1,001	13,204	1,320,402	31,454	MCO	12,339	
4	6/1/24 0:00	19,393	1,002	13,204	1,320,402	31,454	MCO	10,821	

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Decision Tree Classification Report:

Decision Tree Accuracy: 0.87

	precision	recall	f1-score	support
CARRIER DELAY	0.3642	0.376	0.37	9,352
LATE AIRCRAFT DELAY	0.5198	0.496	0.5076	12,413
NAS DELAY	0.6805	0.6873	0.6839	6,661
NO_DELAY	1	1	1	92,531
SECURITY DELAY	0.0204	0.0238	0.022	84
WEATHER DELAY	0.0547	0.0632	0.0587	1,186
accuracy	0.8743	0.8743	0.8743	0.8743
macro avg	0.4399	0.4411	0.4404	122,227
weighted avg	0.8753	0.8743	0.8748	122,227

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KNN Classification Report:

KNN Accuracy: 0.89

	precision	recall	f1-score	support
CARRIER DELAY	0.3825	0.416	0.3985	9,352
LATE AIRCRAFT DELAY	0.5253	0.5863	0.5541	12,413
NAS DELAY	0.852	0.7026	0.7701	6,661
NO_DELAY	0.9985	0.999	0.9988	92,531
SECURITY DELAY	0	0	0	84
WEATHER DELAY	0.1343	0.0152	0.0273	1,186
accuracy	0.8861	0.8861	0.8861	0.8861
macro avg	0.4821	0.4532	0.4581	122,227
weighted avg	0.8863	0.8861	0.8851	122,227

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Flight Delay Reasons Distribution

	Reason	Count	Percentage (%)
1	LATE AIRCRAFT DELAY	62,854	41.92
2	CARRIER DELAY	46,854	31.25
3	NAS DELAY	33,756	22.51
4	WEATHER DELAY	6,081	4.06
5	SECURITY DELAY	400	0.27