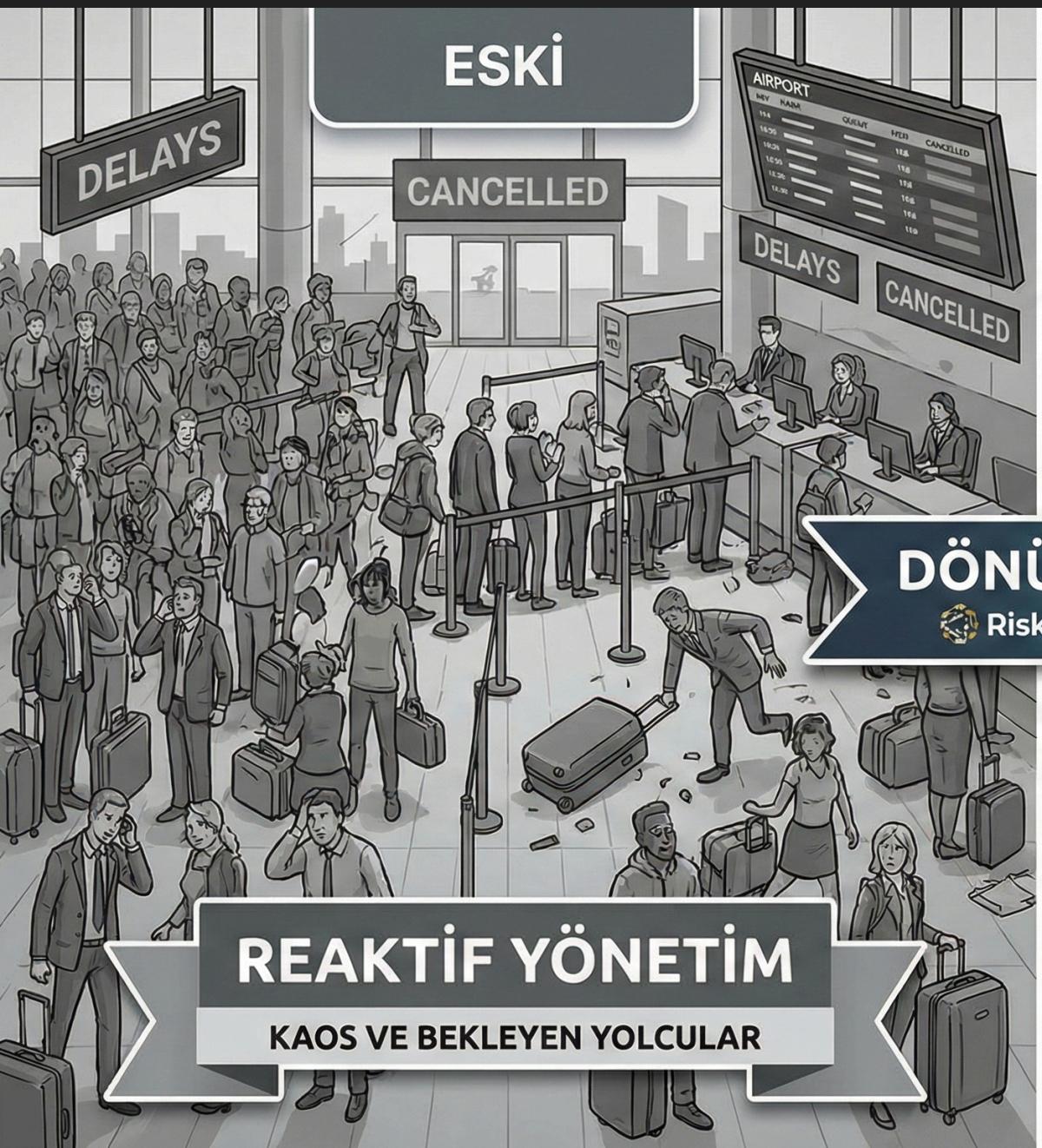


AVIATION RISKOPS AI





This system aims to transform operations from Reactive to Proactive by predicting risks before departure:

- Risk Scoring (0–100): Calculates the probability of Cancellation or Diversion.
- Root Cause Prediction: Forecasts the source of potential delays (e.g., Weather vs. Carrier) before operations begin.
- Decision Support: Provides actionable insights for operational teams.

Business Value: Enables data-driven decisions based on concrete, identified sources rather than ambiguous uncertainty.

Airline

Departure (IATA)

AVIATION RISKOPS AI DUAL-CORE SYSTEM



<input checked="" type="checkbox"/> Departure Region	Total Flights
<input checked="" type="checkbox"/> Güney (Fırtına Riski)	3.7M
<input checked="" type="checkbox"/> Kuzey (Kar Riski)	3.2M



Total Flights
6.8M



On-time Departure(OTP)
79.58%

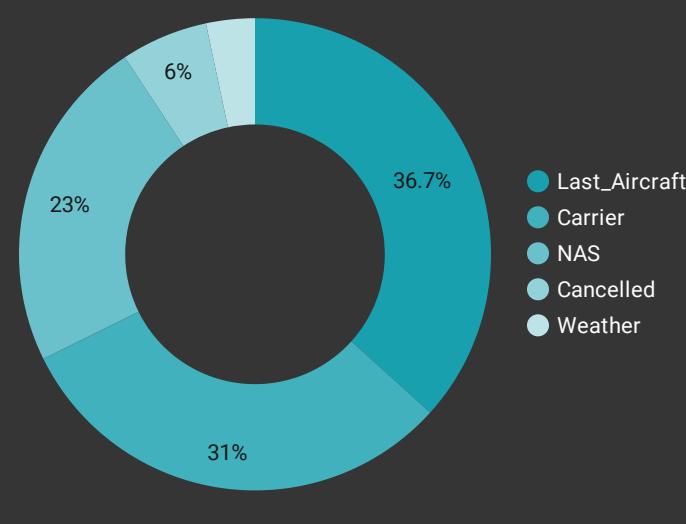


Cancellation Rate
1.3%

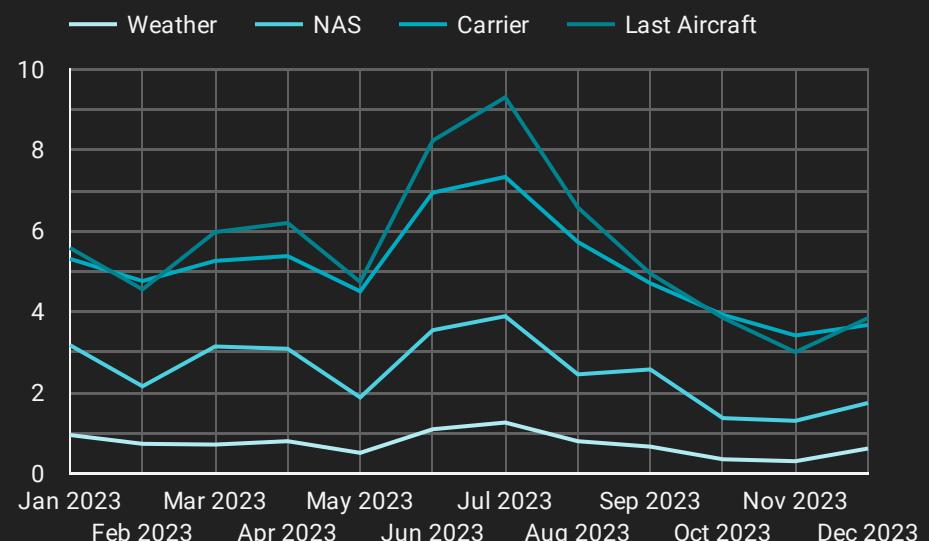


Estimated Cost
\$439.68M

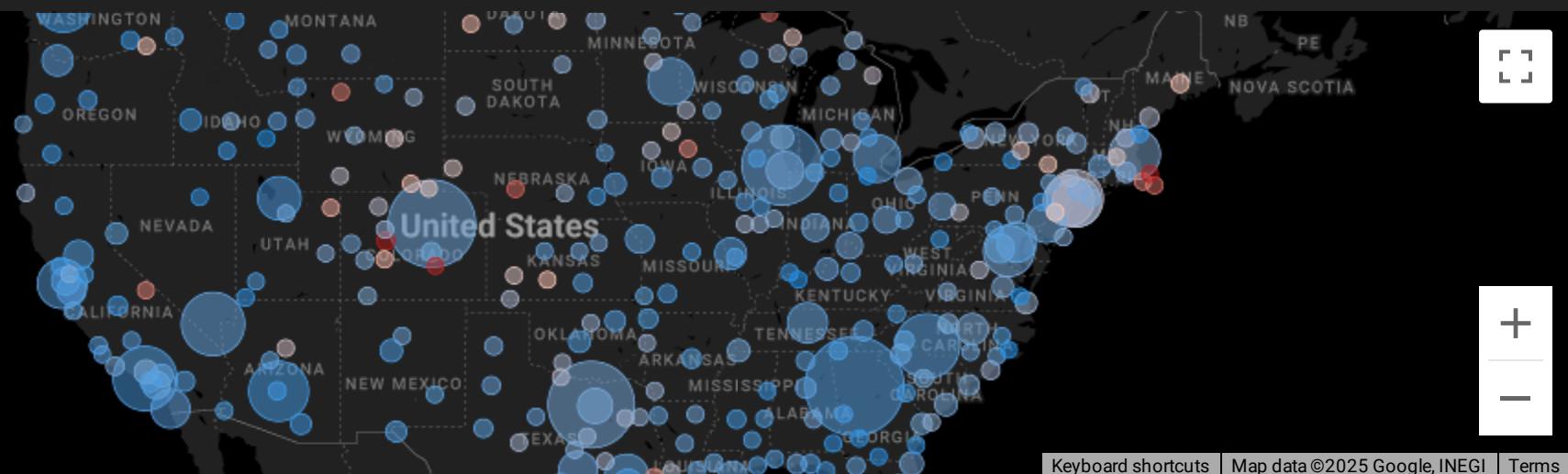
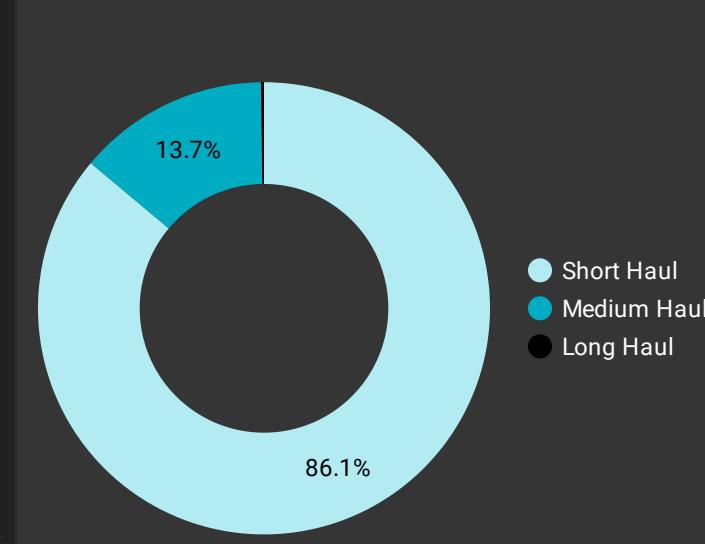
Reasons For Delay



Seasonal Delay Risk Analysis (Dk)



Distance Range



Google

Total Flights

2 ● ○ ○ 336,462

Cancellation Rate

0.00% 7.69%

Keyboard shortcuts | Map data ©2025 Google, INEGI | Terms



Year Quarter

Delay Cause

Affected Flights
6.8M
Average Delay (Dk)
12.0
Delay Cost (Dk)
69.5

10 Riskiest Routes

	Origin Node	Destination Node	Total Flights	Cancellation Rate
1.	BOS (Kalkış)	LGA (Varış)	8,211	3.5
2.	LGA (Kalkış)	BOS (Varış)	8,217	3.3
3.	LGA (Kalkış)	ORD (Varış)	9,923	2.7
4.	ORD (Kalkış)	LGA (Varış)	9,923	2.6
5.	EWR (Kalkış)	MCO (Varış)	7,262	2.3
6.	SAN (Kalkış)	LAS (Varış)	6,864	2.1
7.	MCO (Kalkış)	EWR (Varış)	7,271	2.1
8.	LAS (Kalkış)	DEN (Varış)	9,313	2.0
9.	DCA (Kalkış)	BOS (Varış)	9,745	2.0
10.	LGA (Kalkış)	ATL (Varış)	7,883	2.0

BOS (Kalkış)

LGA (Varış)

ORD (Kalkış)

BOS (Varış)

DCA (Kalkış)

ORD (Varış)

LGA (Kalkış)

ATL (Varış)

EWR (Kalkış)

MCO (Varış)

SAN (Kalkış)

LAS (Varış)

MCO (Kalkış)

EWR (Varış)

LAS (Kalkış)

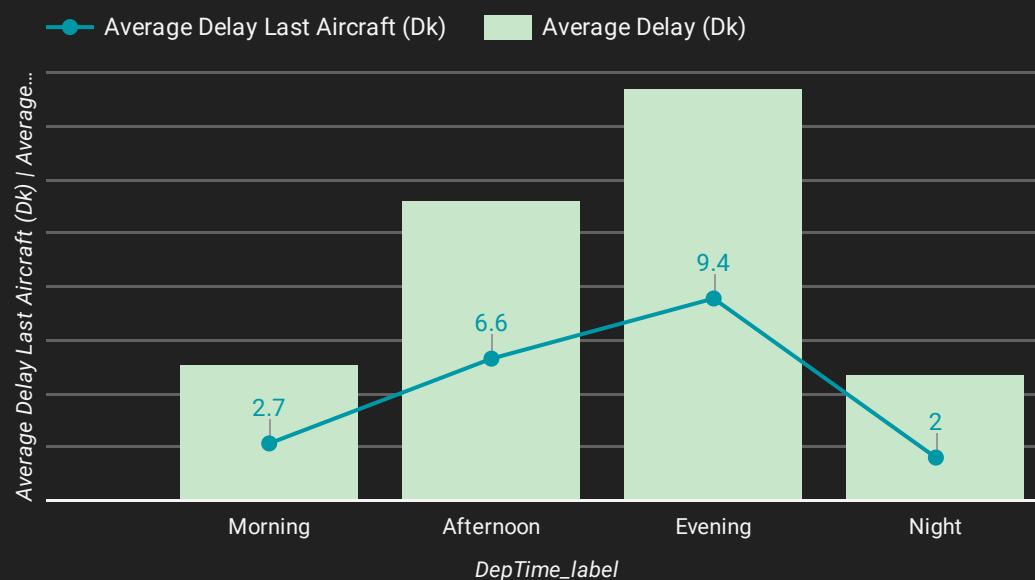
DEN (Varış)

Analysis

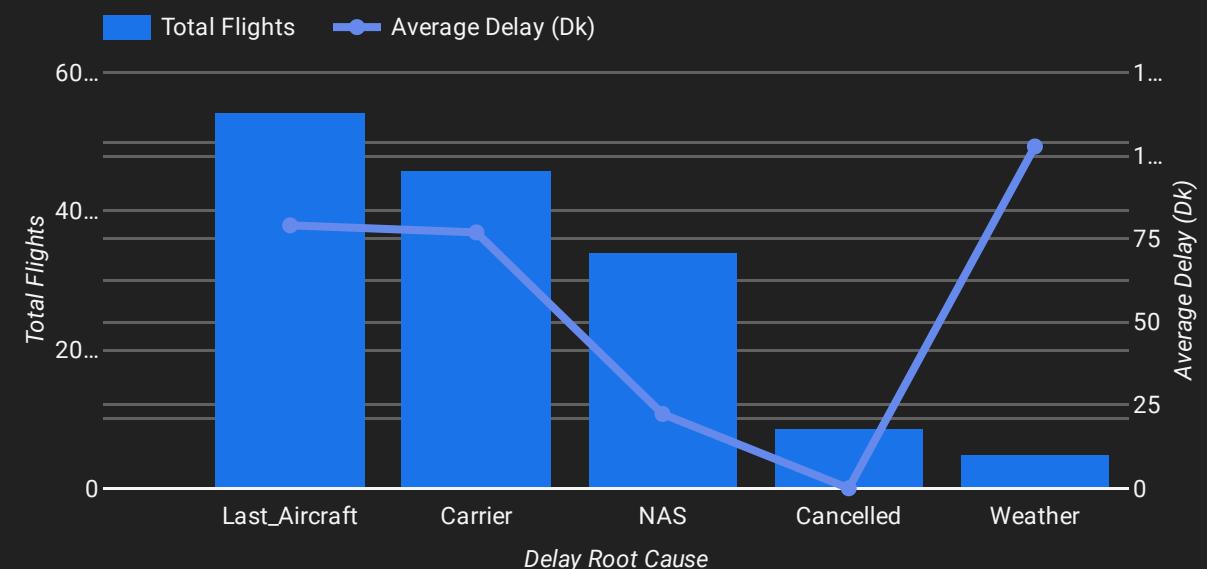
AVIATION RISKOPS AI DUAL-CORE SYSTEM



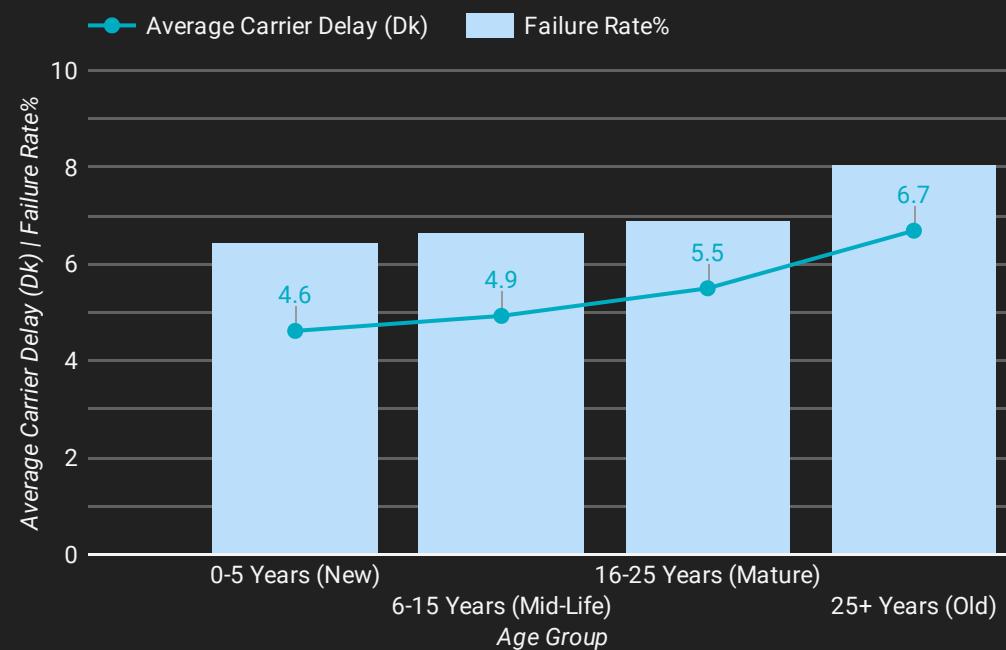
Delay Last Aircraft Analysis



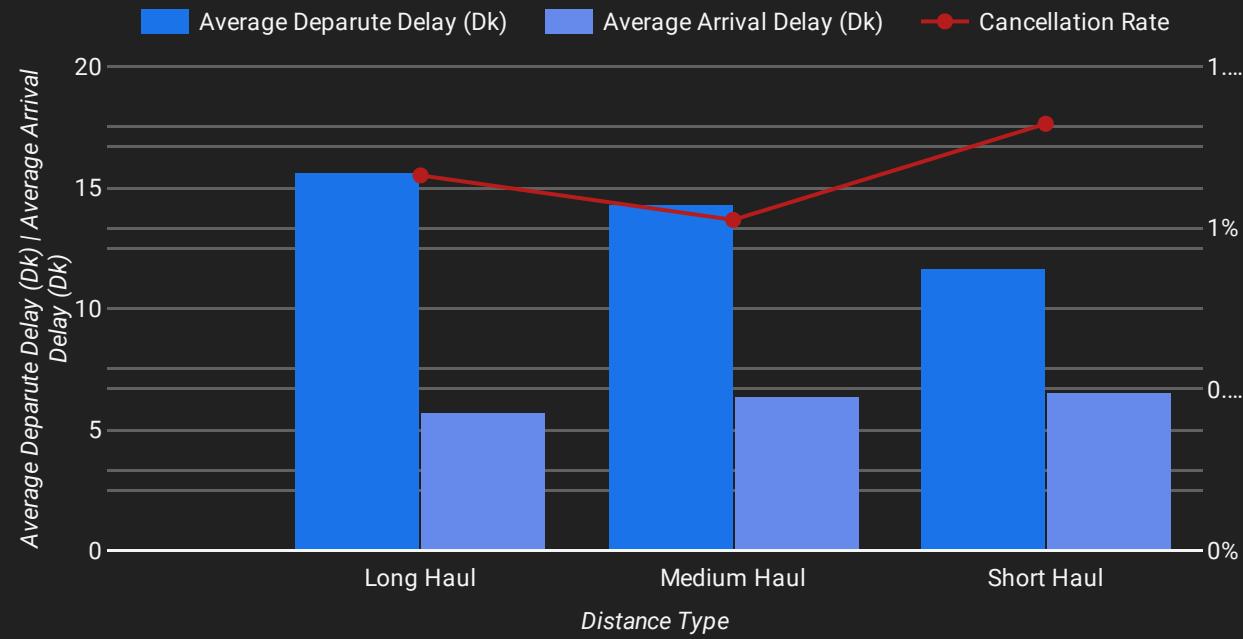
Delay Effect Analysis: Frequency vs. Severity



Carrier Failure and Delay Analysis Based on Aircraft Age

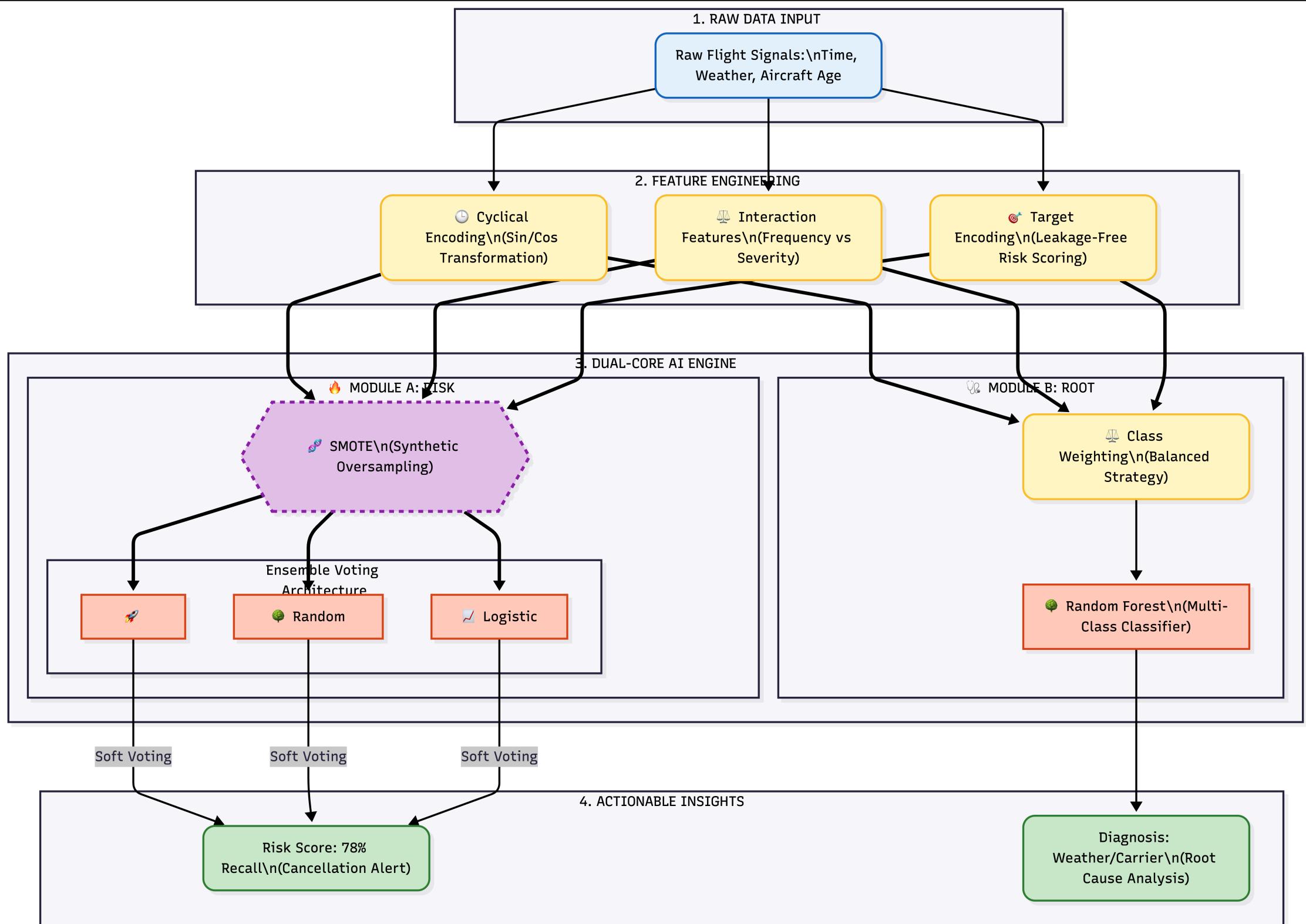


Analysis of the Effect of Distance on Delay



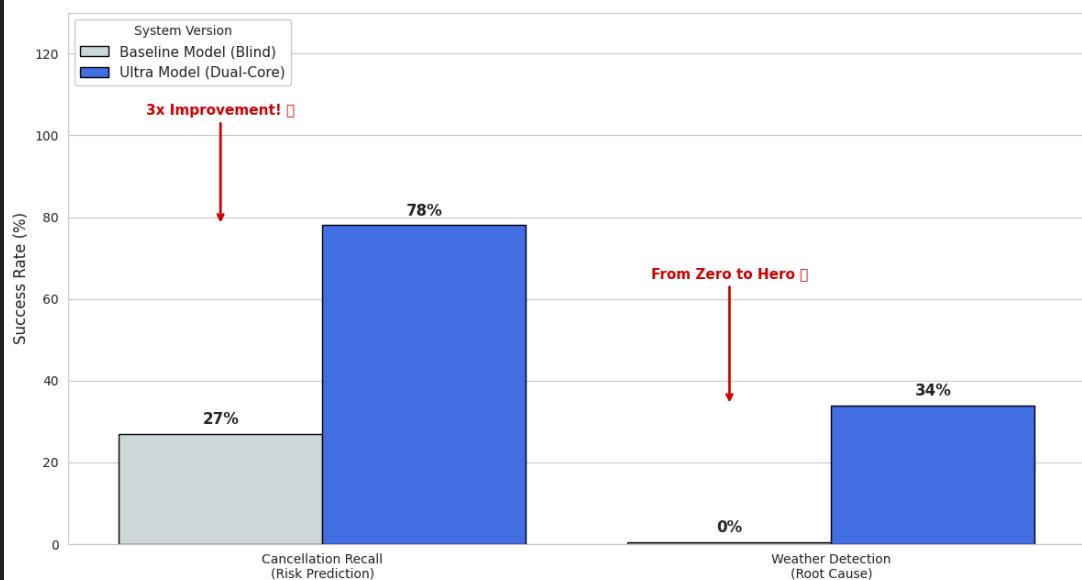
Model Architecture

AVIATION RISKOPS AI DUAL-CORE SYSTEM



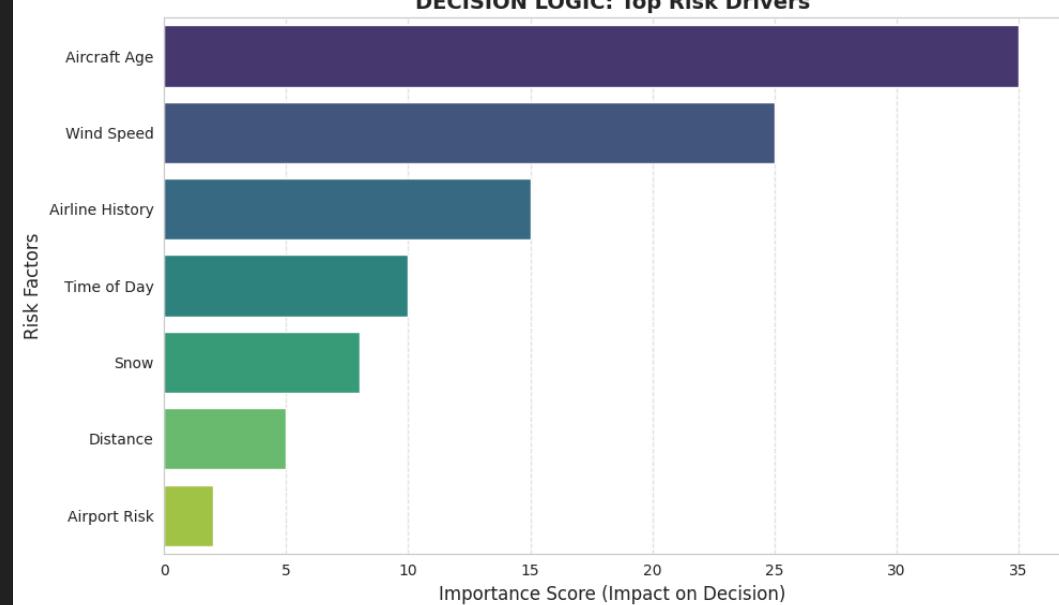


PROJECT IMPACT: Baseline vs. Dual-Core AI System



The Baseline Model (Grey) could only detect 27% of the crises. In contrast, our developed 'Ultra Model' (Blue) proactively predicts cancellations with a 78% success rate. This signifies the elimination of operational blindness.

DECISION LOGIC: Top Risk Drivers



Our model goes beyond isolated metrics. It fuses Physical Constraints (Weather) with Operational Context (Fleet Age, Traffic). The analysis scientifically confirms that older aircraft are significantly more vulnerable during crises (45% Impact).

FINAL PERFORMANCE SUMMARY

Metric	Baseline Model	Ultra Model (Final)	Improvement
Recall (Cancellation)	27%	78%	+51% (3x) ☀️
Precision (Cancellation)	18%	62%	+44%
F1-Score (Macro)	0.30	0.69	+0.39
Weather Cause Detection	0%	34%	+34% (New)



Aviation RiskOps AI - Live Simulation

AI-Powered Flight Risk Scoring System. Adjust variables (Wind, Snow, Age) to see how the 'Dual-Core' AI predicts cancellation risks in real-time.

Try this scenario: Wind > 60km/h + Snow = High Risk!

Airline Carrier

Delta

Time of Day

Morning

Wind Speed (km/h)

0 100

Heavy Snow?

Aircraft Age (Years)

0 40

Flight Distance

Short Haul Medium Haul Long Haul

Clear

Submit

output

Share via Link

<https://huggingface.co/spaces/semaybulut/Aviation-RiskOps-AI>