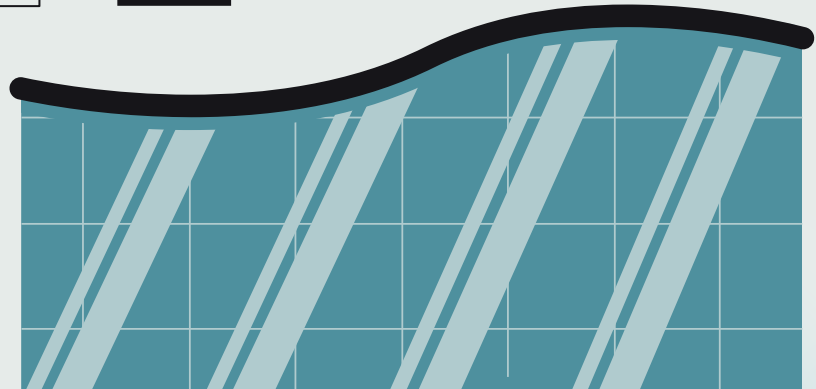# Optimizing Airport Arrival Times
Using Policy Trees

Iris Brook and Mackenzie Lees

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Arrival Times

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Data

Where and how we got
our data

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Impact

How can our project be
applied

01

Problem Statement

Problem ↘

When do I arrive at the airport
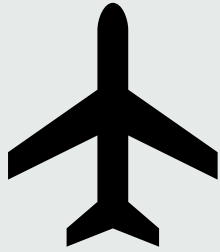to minimize time in airport
without missing the flight

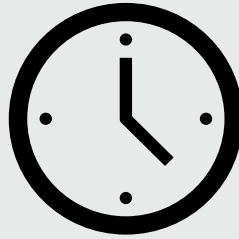Overall aiming to reduce stress
associating with traveling
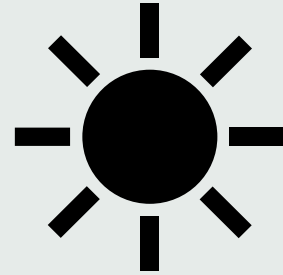
02

Data Collection and Preprocessing

Data

Massport

Date, Flight Number, Destination Airport, Carrier Code(Airline), Scheduled Departure Time, Delayed minutes

TSA

Security Wait Time, Baggage claim Time

NWS

Precipitation, Visibility, minimum(temperature), maximum(temperature), Average Temperature

Calculated Columns

Treatments

- Range from 60 to 90 minutes in 5 minute intervals
- Worse weather → earlier arrival time on average

Outcomes

- Outcome: Treatment – security wait time – baggage wait time – 30(buffer) - delayed minutes
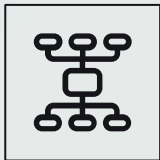- If negative: + 90

03

Methodology

Baseline

Decision Tree

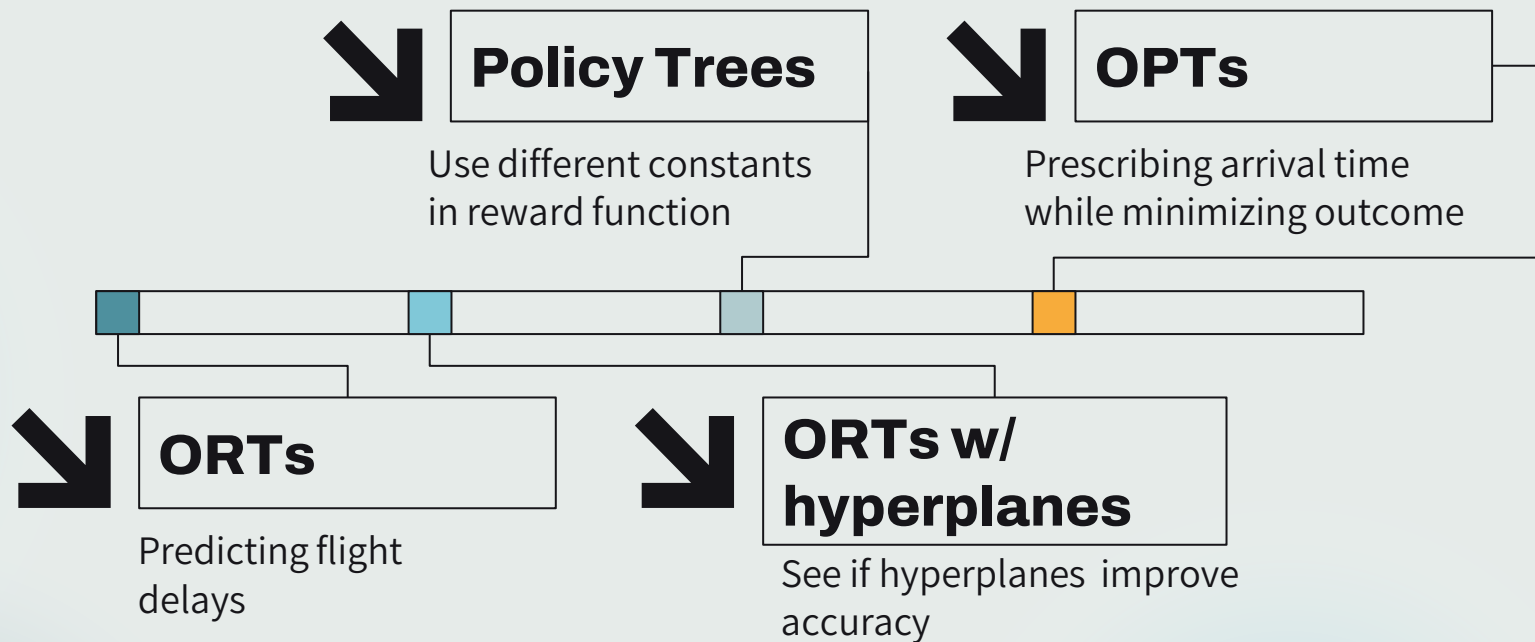CART
3-fold cross validation
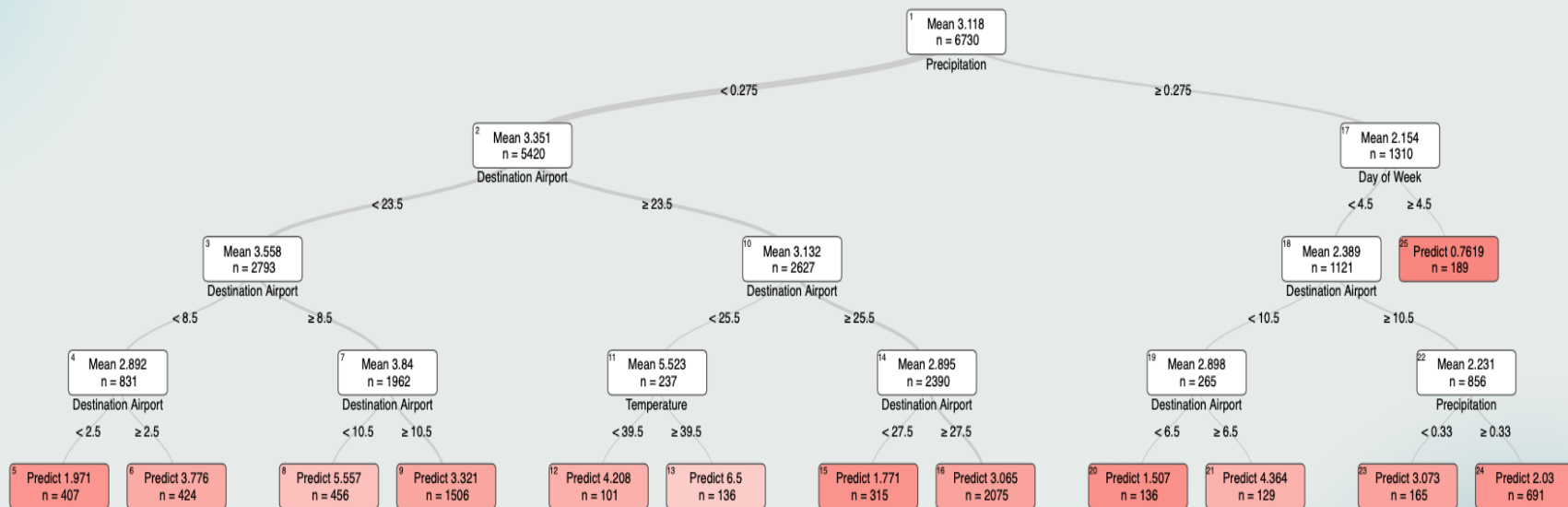**Average MSE: 17.33**

Prescribe 75 minutes

Same treatment for
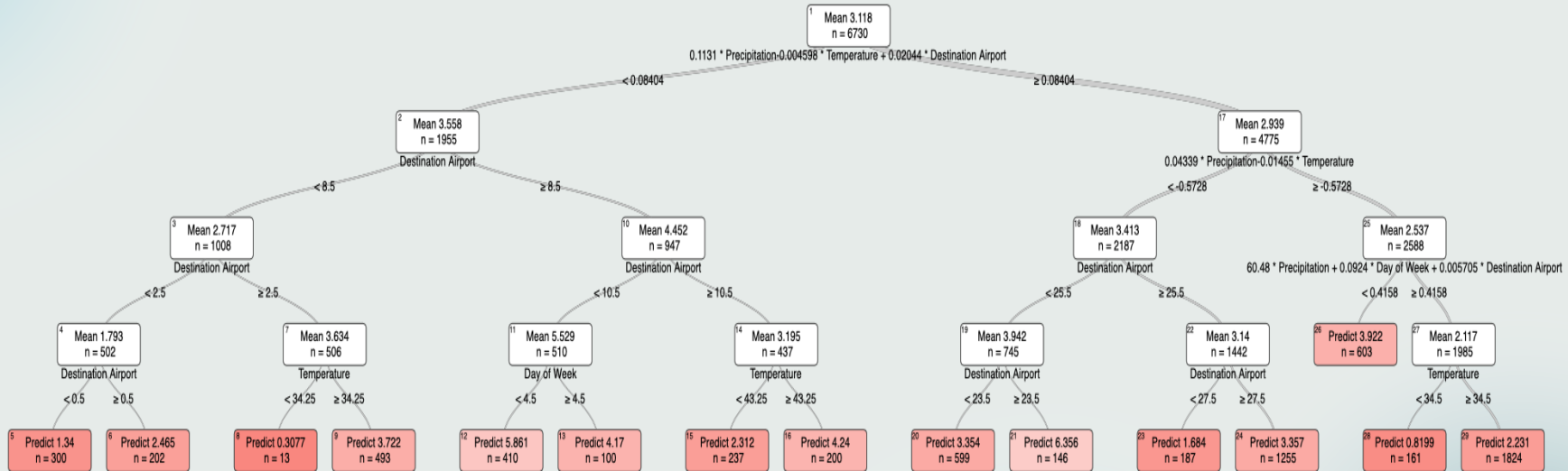each observation
Mean outcome: 21.62

Models

Policy Trees

Use different constants in reward function

OPTs

Prescribing arrival time while minimizing outcome

ORTs

Predicting flight delays

ORTs w/ hyperplanes

See if hyperplanes improve accuracy

Optimal Regression Tree

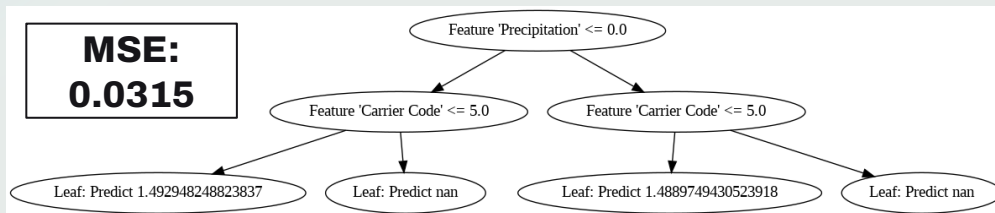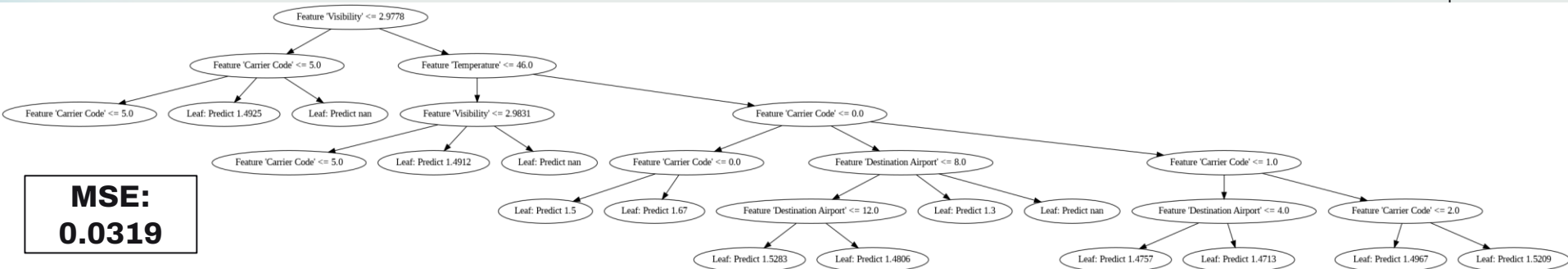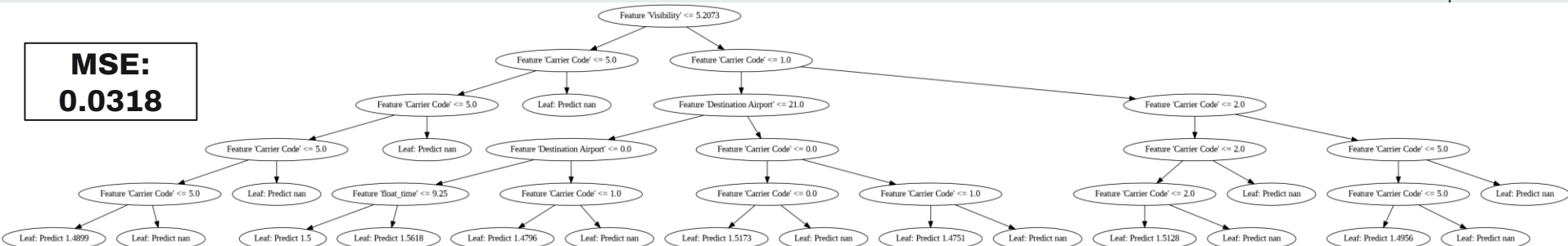**MSE: 0.066**
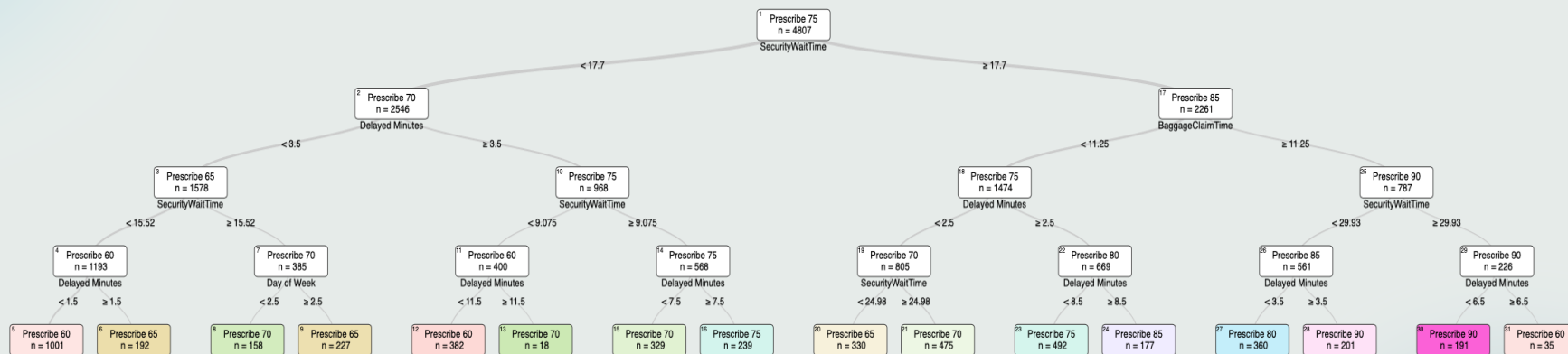
Optimal Regression Tree with Hyperplanes

MSE: 0.064

Policy Trees with Different Constants

Optimal Policy Tree

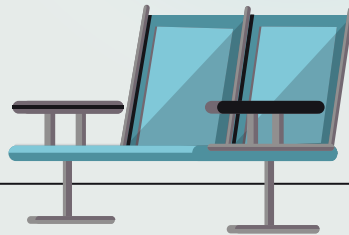

Mean Test Outcome: 10.45

04

Impact and Reccommendations

Reccommendations

Security Wait Times

Prioritize management of security line traffic flow

Day Specific
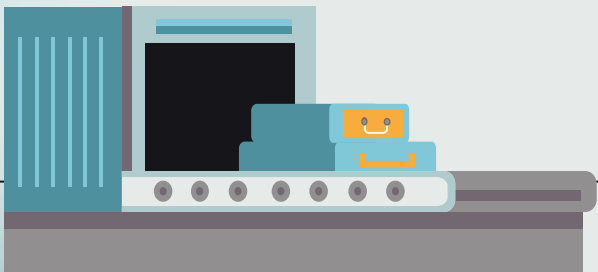
Tailored staffing and resource allocation by day

Communicate with Passengers

With app, mitigate bottlenecks and enhance efficiency of airport operations

Contingency Plans

Operational plans for peak-times or bad weather

Extensions

Passenger Facing App
Input flight details and receive personalized reccomendation for optimal arrival time

Real-Time Data
Integrate real-time weather, security, and baggage check-in data

Case Study
Case study to observe passenger stress levels to use as outcome for the OPT

Thank You!

Any questions?

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