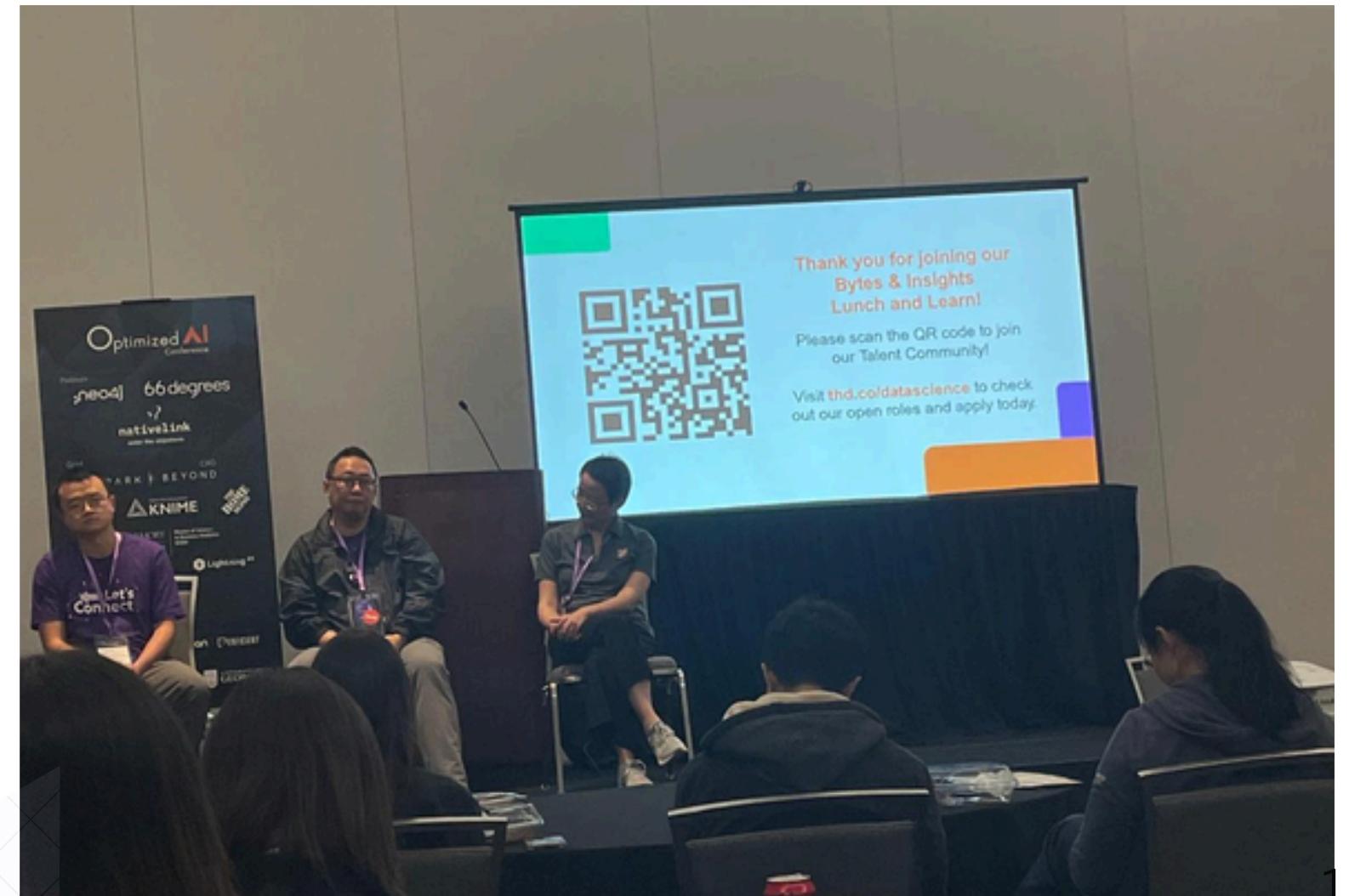
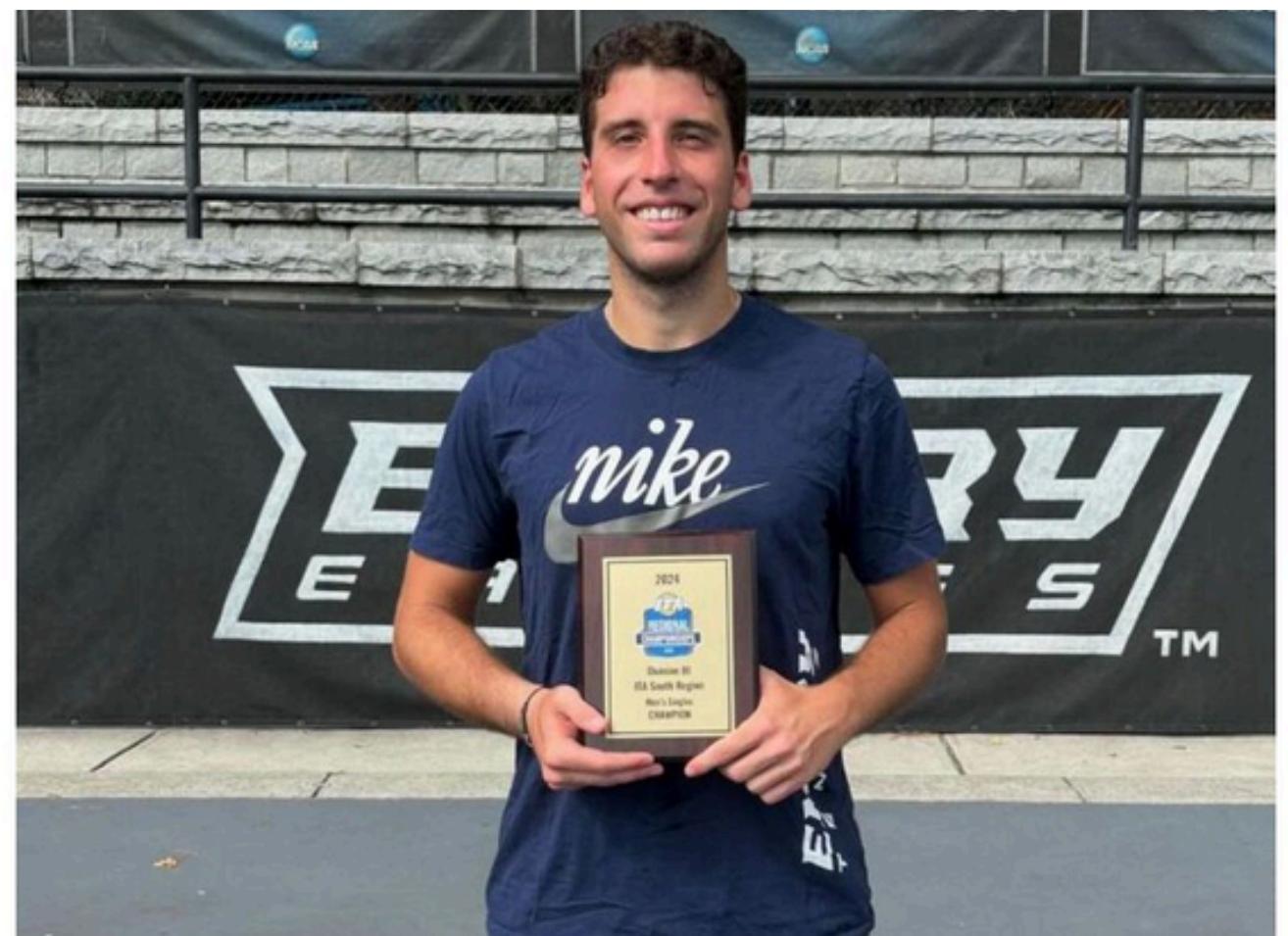
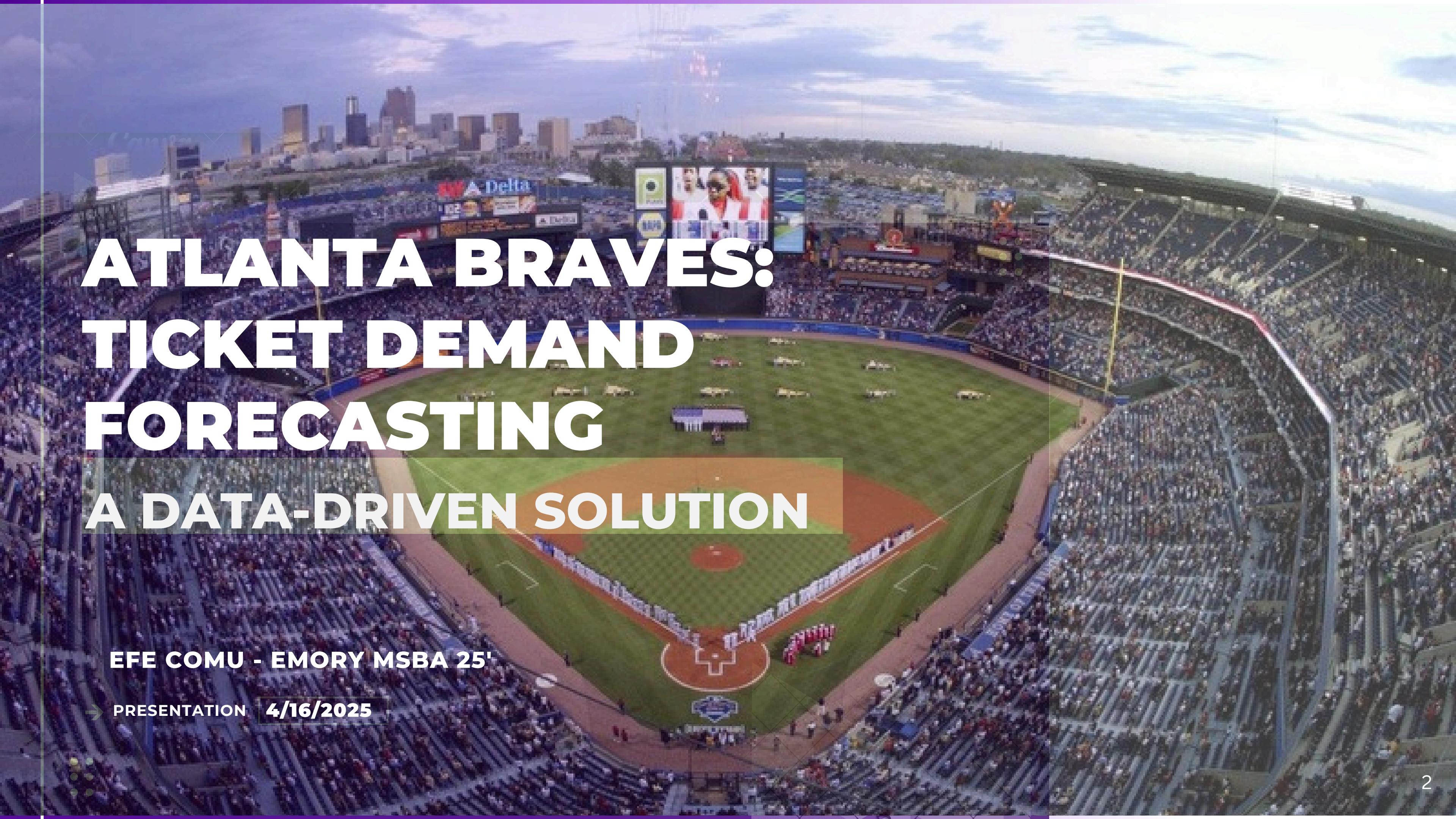


ABOUT ME

- Born & raised in Istanbul/Turkey
- Professional/collegiate level tennis player
- Represented Turkey in European Championships U12, U14, and U16 age groups
- Background in International Business, Computer Science, and Data Analytics
- Passionate about being in the intersection of business, data, and technology





ATLANTA BRAVES: TICKET DEMAND FORECASTING A DATA-DRIVEN SOLUTION

EFE COMU - EMORY MSBA 25'

→ PRESENTATION **4/16/2025**

PROBLEM OVERVIEW



Business Problem: Accurate forecasting of game-by-game ticket sales is crucial for:

- Strategic pricing
- Inventory Management
- Marketing and Staffing Decisions

Project Objective: Build a predictive model that forecasts ticket sales for the Atlanta Braves' 2024 season, using historical ticketing and schedule data.

The Home Depot Relevance: This type of time series forecasting can be used in key decision areas for companies like Home Depot in demand planning and resource allocation. Example use cases could be technician scheduling or promotional timing in the Home Services division.

DATA OVERVIEW

DATA SOURCES AND PREPARATION

Historical Data

- Ticketing Data (2018-2024)
- Game schedule data for the same years

Merging and Cleaning

- Data joined on game date
- Converted dates to standard format
- Handled missing values (e.g., used historical mean for weighted odds 2024)

Feature Engineering

- Label Encoding: Categorical variables like month, day, time of year etc.
- Rolling Averages: Captures recent demand trends using a 3-game rolling average of ticket sales

DATA OVERVIEW

KEY VARIABLES

Target Variable:

- ✓ Tickets (total tickets sold per game)

Key Features:

- ✓ Opponent Team, Game Number
- ✓ Day of the Week, Month & Time of the Year
- ✓ Weighted Playoff Odds
- ✓ Rolling Average of the past 3 games' ticket sales

MODELING APPROACH

Why XGBoost?

- Great performance on structured tabular data
- Captures non-linear interactions between variables
- Handles regularization (reduces overfitting)

Tools Used

- Python
 - pandas
 - numpy
 - sklearn
 - XGBoost

Train/Test Strategy

- Train on 2018-2022
- Validate on 2023
- Predict for 2024

MODEL PERFORMANCE

Validation Results (2023)

- **RMSE:** 2525.74
- **MAE:** 1946.14

Interpretation of Results

- Model performs well given average ticket sales range (around 30k-40k)
- Most errors are within 5-10% of actual values

Model Parameters

- number of estimators = 50
- learning rate = 0.1
- max_depth = 3
- random state = 42

INSIGHTS & LIMITATIONS

Insights

- Rolling average helped stabilize predictions
- Opponent and timing features significantly influenced demand

Limitations

- Did not account for external variables like injuries, weather, promotions.
- Lack of pricing data limited ability to incorporate price elasticity

Opportunities for Improvement

- Incorporate external data
- Explore ensemble with simpler and more interpretable models (ex. Lasso)
- Add game capacity caps or historical max attendance logic
- Test model in real-time deployment



CLOSING



Practical Business Value of the Model:

- Improves season planning accuracy
- Supports decision making in marketing, operations, player/staff salaries
- Identifies low-demand games for promotional efforts

Application to The Home Depot - Home Services:

- Similar modeling can be applied to forecast demand for installation services by region and time of year
- Just like game-level variability, service demand varies by job type, location, and seasonal context
- Predictive models can help optimize technician scheduling, staffing, and promotional offers

Final Thoughts:

- Project combined real-world sports data with machine learning to solve a critical business problem
- Project had strong emphasis on both technical accuracy and business applicability

Painted

**THANK YOU
FOR YOUR ATTENTION**