



San Francisco, USA

# Automated Ticket Trading



Michael Li



Charles Hermann

*Advised by: Prof. Georgia Perakis, Max Briggs, and Rim Hariss*

NBA Sales 2014-2017  
MLB Sales 2018.05-2018.08

2018.2-2018.4



## Feature Generation

- The ticket reselling market is constantly changing, demanding market awareness
- Generated 20 market features, 6 game features and 3 environment state features
- Eg. Median listed price in game, win/loss ratio of home team, total value sold in section, etc...

## Covariate Unbiasing

- We would like to buy high and sell low, but the price variable is confounded with others
- Created novel estimation method “Dual Machine Learning” to debias price
- Price sensitivity of resulting model almost doubled

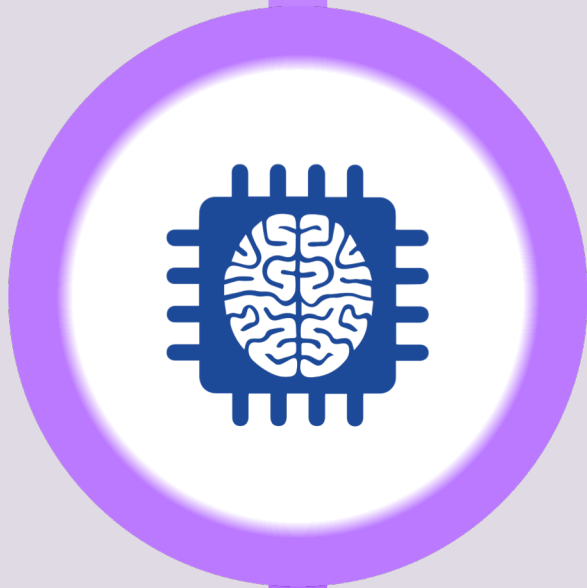


2018.7-2018.8

## Estimation of Sales

- We try to predict whether a ticket eventually sold on StubHub or not as classification
- Tested 5 different prediction methods ranging from logistic regression to neural networks
- Random Forest + Gradient Boosted Trees performed best [AUC: 0.86 (NBA) / 0.81 (MLB)]

2018.5-2018.7



## Price Optimization

- We would like to optimize our tickets over price to achieve best revenue
- We introduced multiple variance constraints to control for uncertainty
- Variance estimation was explored but eventually removed – scalability remains weak



2018.6-2018.8

NBA Trading Profit: \$6.7 Million/yr  
MLB Trading Profit: >\$20 Million/yr