Highway Contract Bid Prediction

Helping Contractors Win More Work at the Right Price

NC Department of Transportation

- State DoT releases highway construction contracts
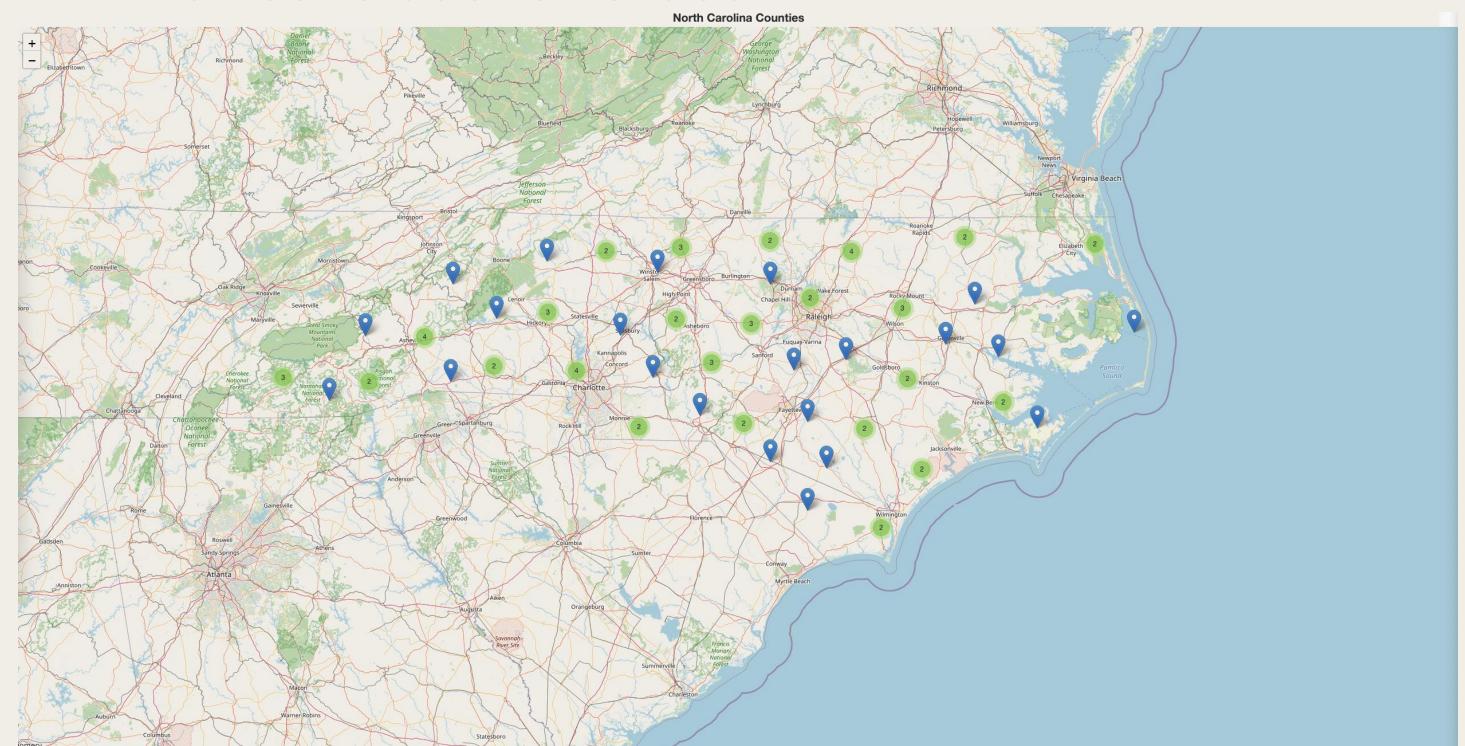- Contractors bid on projects
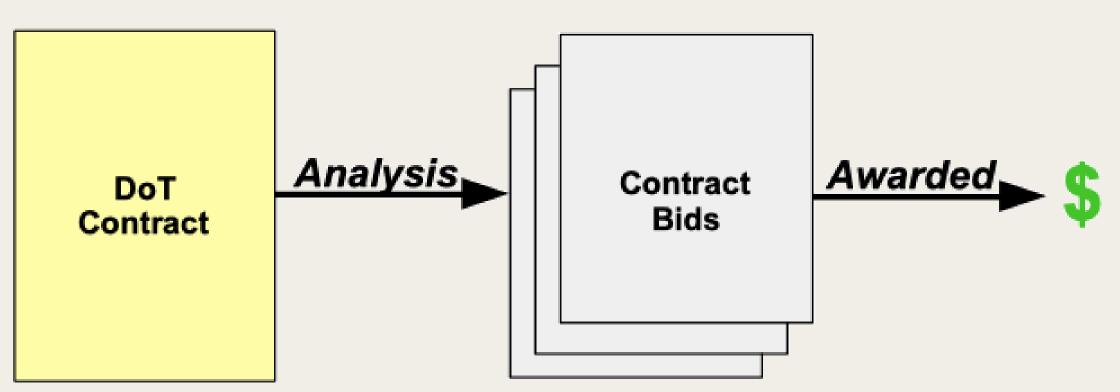- Lowest bidder awarded

Fig. 1: NC Counties

Fig. 2: Contract Stages Overview

Contract Overview

- Required Items
- Item Quantities
- Location
- Timeline

Fig. 3: Example Contract Items

Contractor's Perspective

- Employ estimators to review and bid on contracts; time consuming, manual process ~1-2 weeks
- **Contractor's Dilemma**: *Maximize profit* while being *lowest bidder*
- Minimize Money Left on the Table
- Millions of Dollars on the Line

Fig. 4: Contractor's Dilemma

Goal

- Predict competitor pay item prices based on bidding dynamics to minimize money left on the table and maximize contract win percentage

Bidding Dynamics

- Contract Clusters
  - Similar Pay items
  - Similar Contractors
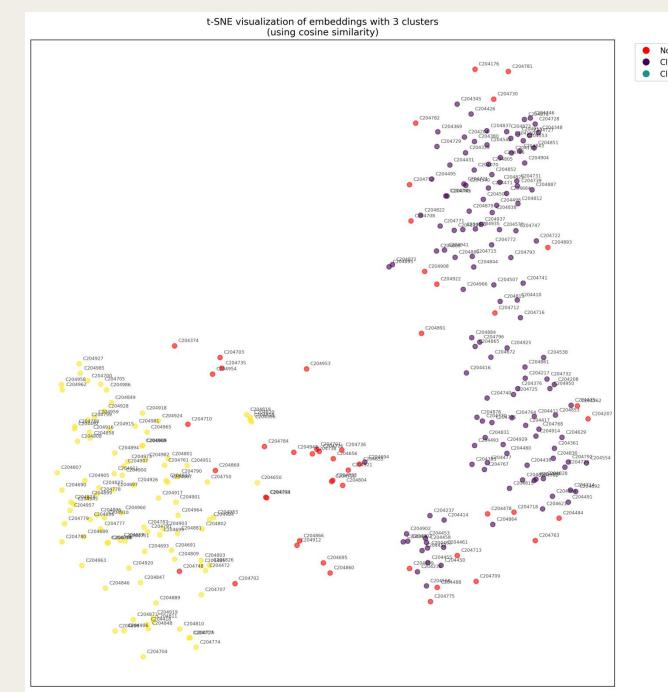 - Similar Location
  - Similar Quantities

Fig. 5: TSNE Dimensionality Reduction Visualizing Contract Embedding Clusters

Data Collection and Processing

- Scrape NCDoT website using Selenium
- Limit Scope of Considered Variables and avoid curse of dimensionality
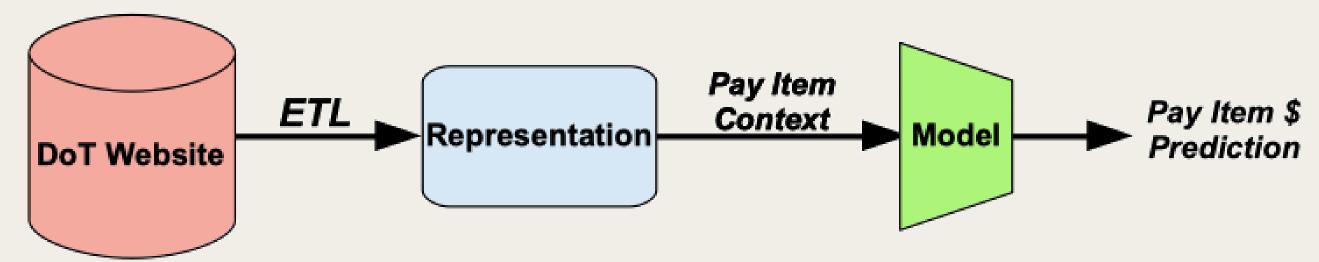- Transform variable representations into form of 'distance' for KNN Regression

Fig. 6: Model Pipeline

Results

- Pay item predictions for each potential contractor on upcoming contract
- Total Bid Price Predictions
- Providing Context: Return Similar Past Contracts
- *Time Savings: Weeks to minutes*!

Fig. 7: Model Output Predictions to Excel File

Fig. 8: Model Output Excel File

Fig. 9: GitHub Repo

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