

E-commerce hotspots:

Predicting E-commerce Adoption
Potential with Grocery Trends & Tech
Adoption

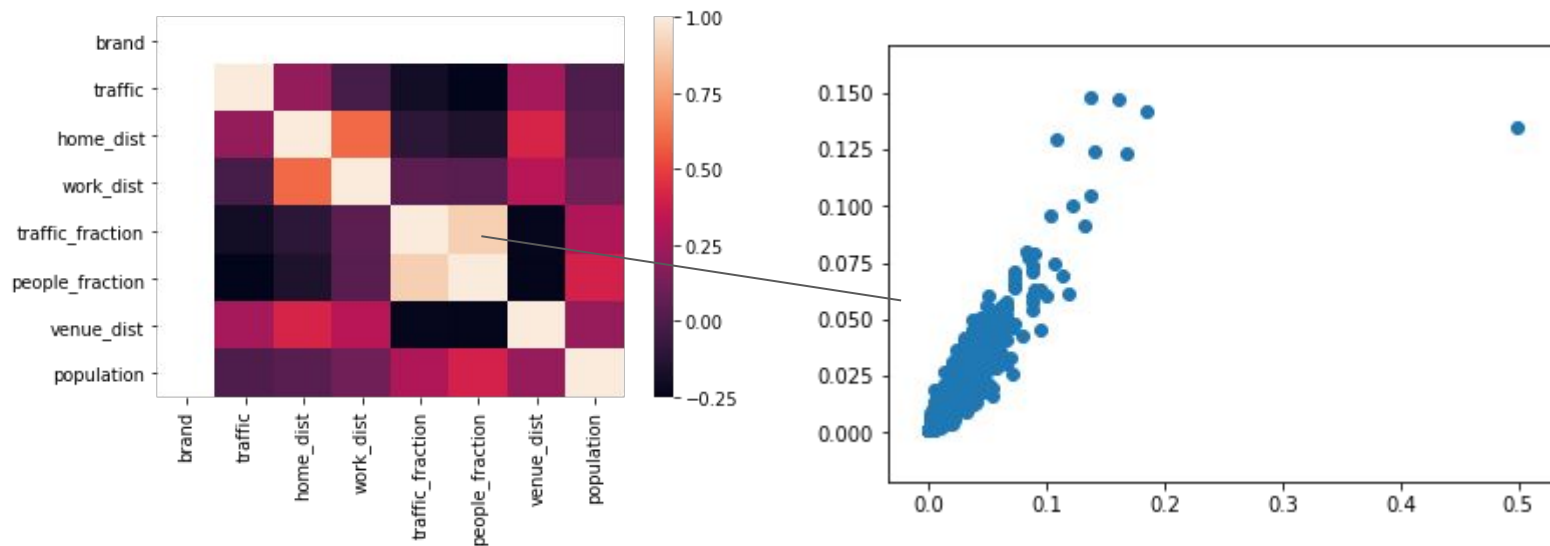
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Jog

What we're interested in

- Correlation between grocery shopping trends and interest in e-commerce, i.e. “e-commerce penetration”
- Correlation between e-commerce penetration and popularity of other forms of technology, i.e “tech penetration”
- What could it mean in regions where tech penetration is high, but e-commerce penetration is low?
- Ultimate goal: find some practical & novel insight for e-commerce companies to identify key areas of opportunity

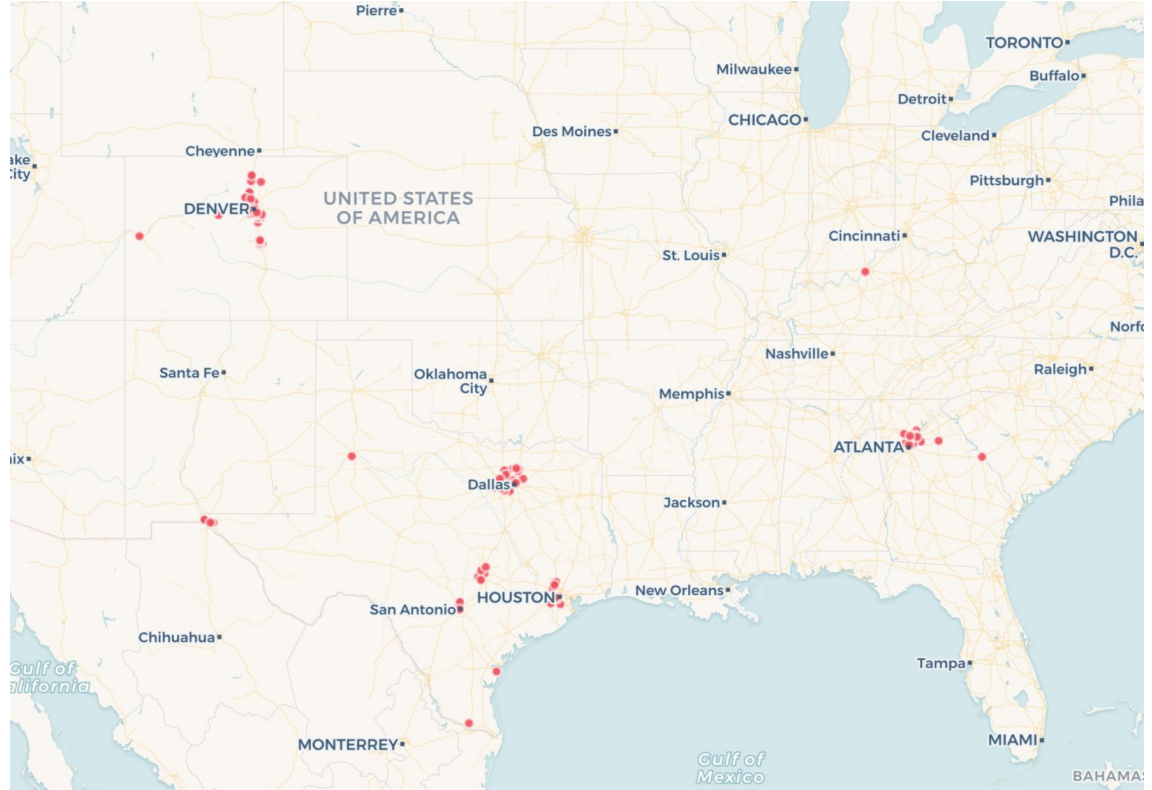
Methodology - what got us thinking

-There's a high correlation between `traffic_fraction` and `people_fraction` (to be expected)--but what could it mean that it's *this* high? It appears that there are certain regions with very few grocery shoppers; what could they be up to?



What got us thinking (2)

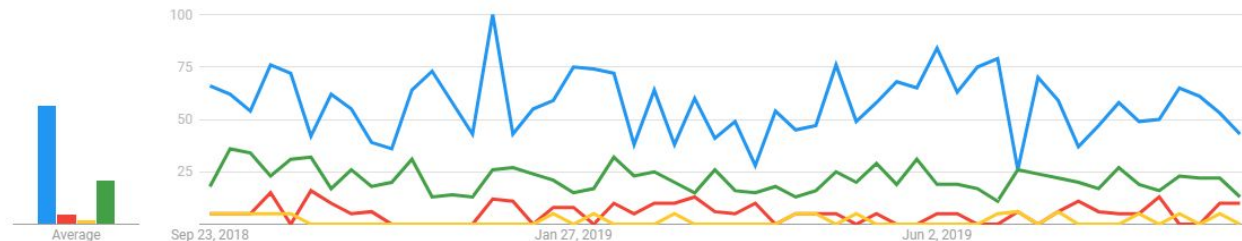
- Data is highly clustered;
so it would make sense to
explore trends by cities
- Moreover: little to no
clustering of brands within
cities



Methodology - alternatives to groceries (e-commerce)

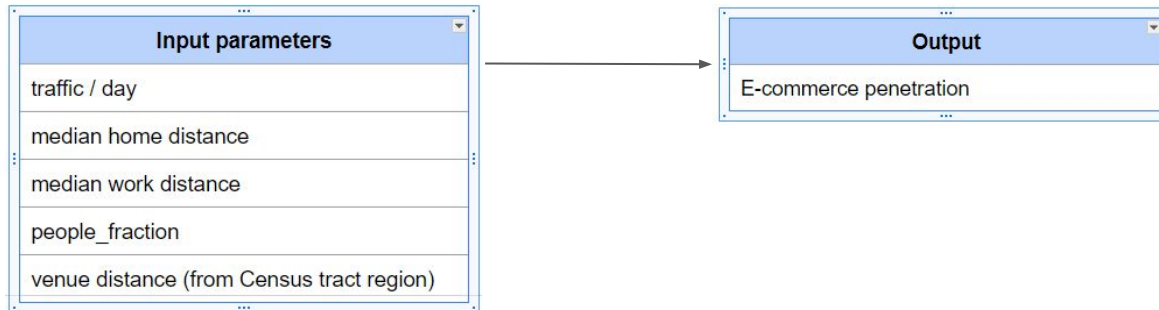
- We decided to look for correlations between frequency of grocery shopping and interest in e-commerce by Census tract region
- Data on e-commerce is limited (Amazon and Instacart are particularly sneaky); so we got creative
- Collected Google trends search data for 8 most popular cities to gauge interest in e-commerce brands

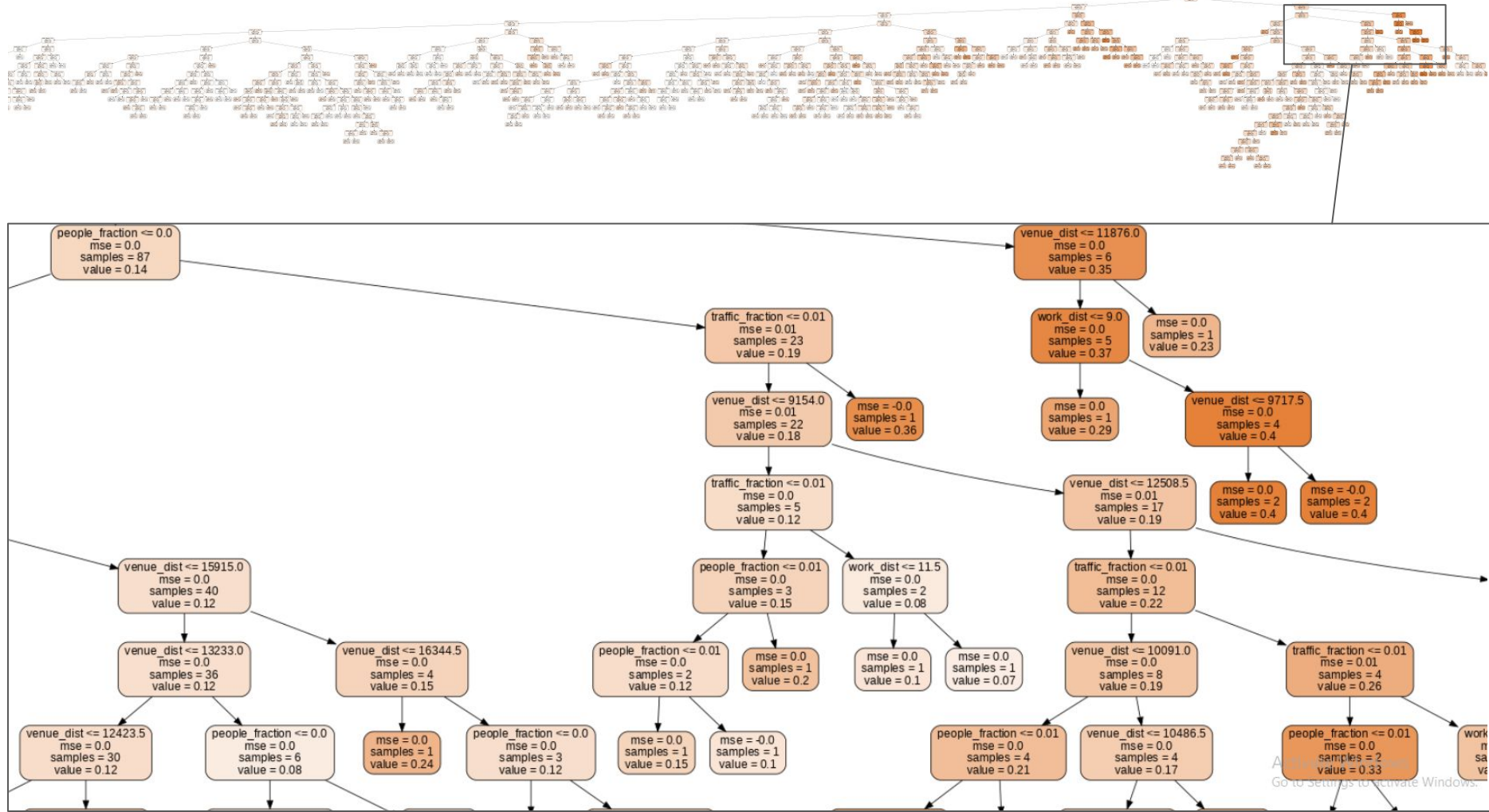
Google Trends interest over time for **Instacart**, **Amazon fresh**, **Peapod**, and **Shipt** in Austin, TX (over the past year)



Methodology - finding “e-commerce penetration”

- We tried several models (decision tree regressor, random forest regressor, multi-layer perceptron) to determine the relationship between the factors in the grocery dataset and the relative interest in e-commerce in each region
- Each data point is a unique (venue_id, fips_code) pair; ~few hundred to 1000 / city
- Goal: given data on grocery shopping behavior & trends of a particular region, estimate the relative interest in e-commerce within that region





Methodology - the other side of the coin

How can we make use of this data?

- It's worthwhile to find areas with e-commerce penetration that differs from our expectations; but first, we need to have some expectations!

- “Tech penetration”: the relative popularity/adoption of technology trends (that are similar to e-commerce) by region

 - e.g. social media & internet usage, computer/cell phone ownership

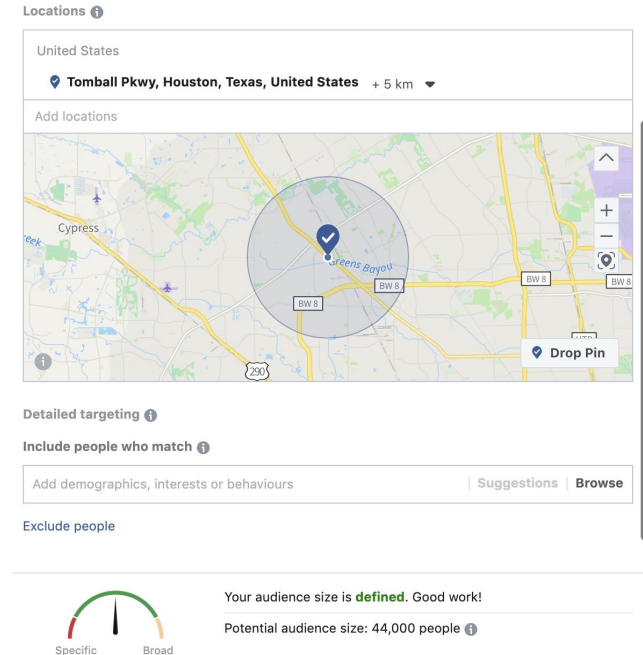
- We expect areas with the infrastructure and culture of tech in place, to be the ones adopting the e-commerce trend

Methodology - determining tech penetration

-Facebook data on usage by location: set up an advertising page & created ads to get estimates of facebook user numbers within store vicinities

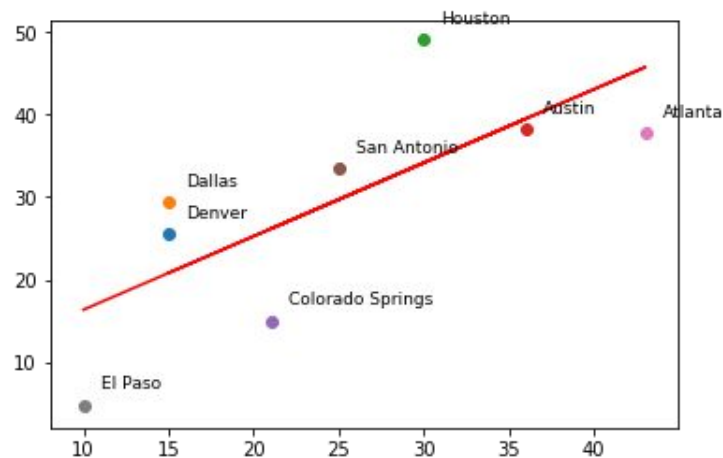
-Manually collected this data for 57 selected stores to obtain an idea of tech penetration in surrounding areas, where we also had e-commerce penetration data (Google trends)

-Census statistics on internet access & computer ownership



Methodology - finally, the grand finale

- We regress e-commerce penetration with tech penetration to spot any outliers
- Areas with e-commerce *lower* than expected by tech penetration could be targets for rapid e-commerce growth potential! (as the infrastructure & culture is already in place)
- First-order sanity checks--clear linear correlation between x & y; bigger cities have higher tech penetration
- Cities of interest: **Dallas, Houston, Denver** (so get on it, e-commerce companies!)
- Remarks: these are all cities which rapidly grew tech infrastructure--maybe e-commerce is soon to come?



Data sources

Provided grocery data in TX, CO, GA

Google trends: <https://trends.google.com/trends/?geo=US>

Facebook public data: <https://www.facebook.com/business/tools/ads-manager>

Census stats on computer ownership/internet access:
<https://www.census.gov/data/tables/2012/demo/computer-internet/computer-use-2012.html>