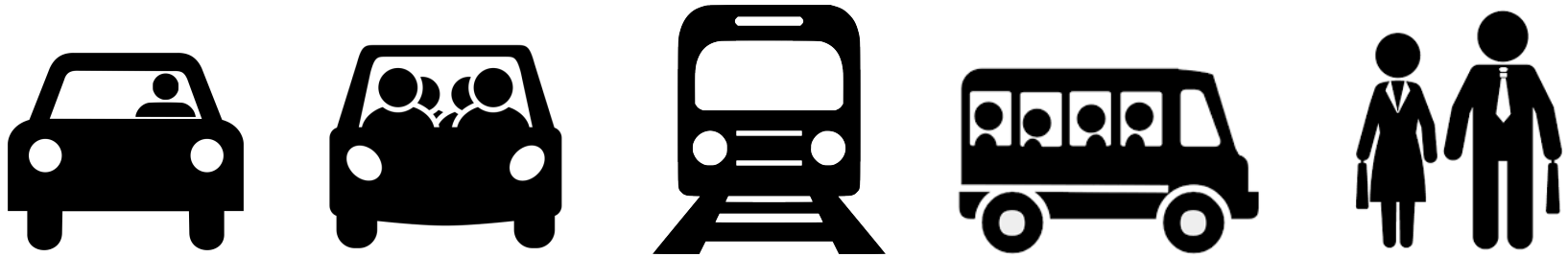
Missouri Commuter Analysis



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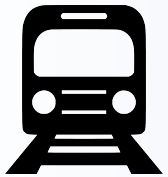
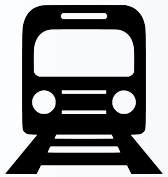
Washington University Data Analytics Boot Camp
Fall 2018

Motivation & Summary



- **Our Questions**
  - How do Missourians commute?
  - What differences exist for commuting types across counties in Missouri?
  - What differences exist for commuting types within metropolitan areas in Missouri?
- **Hypotheses**
  - H0 = No differences exist between commuting types in metro versus rural counties across Missouri.
  - H1 = Differences exist between commuting types in metro versus rural counties across Missouri, where usage of public transit in metro counties is higher.

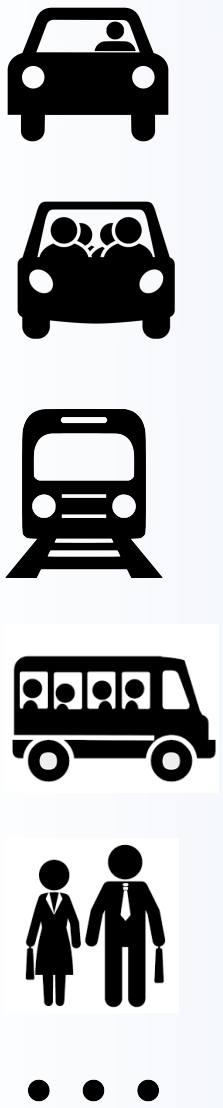
Questions & Data



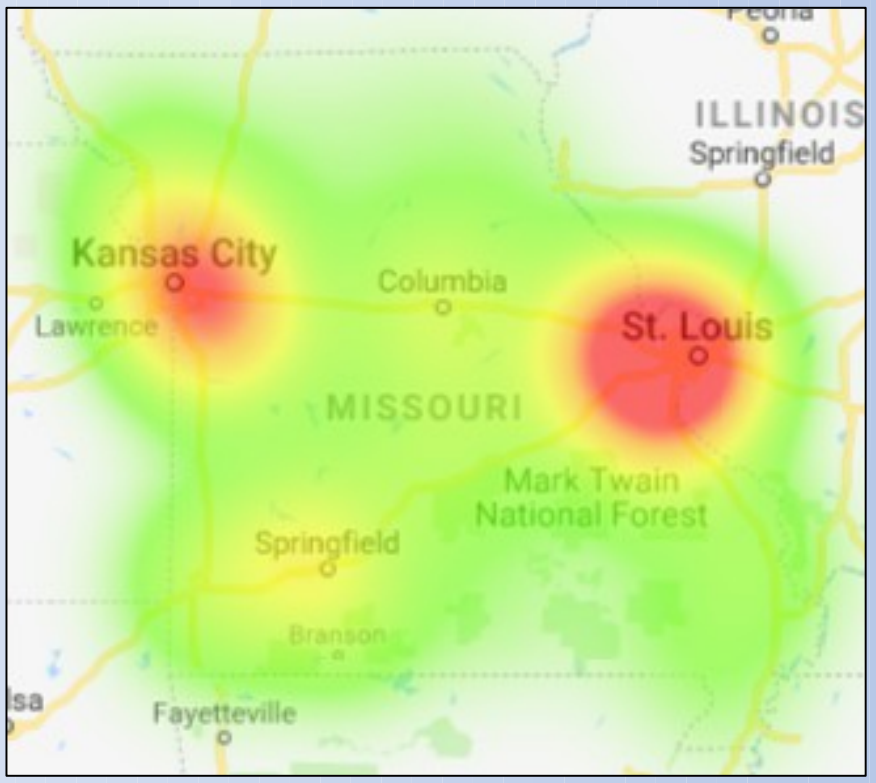
- **What kinds of data were needed?**
  - Missouri-wide commuting data at the county level
  - Defined Metropolitan Statistical Areas (MSAs) for Missouri
  - Geocoordinates for each county

- **Data sources**
  - US Census API
  - Wikipedia
  - Wikilou.com
  - MARC.org (Mid-America Regional Council)
  - Google Maps Geocode API

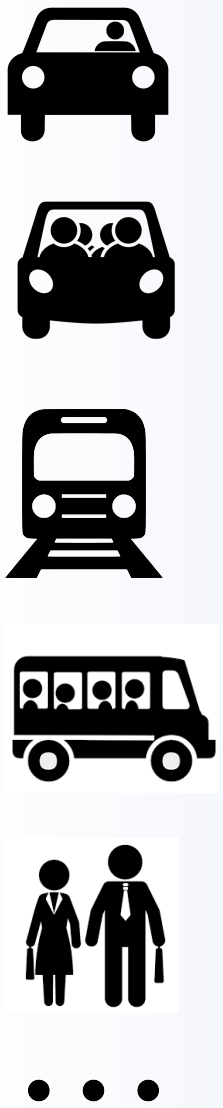
Data Exploration & Cleanup



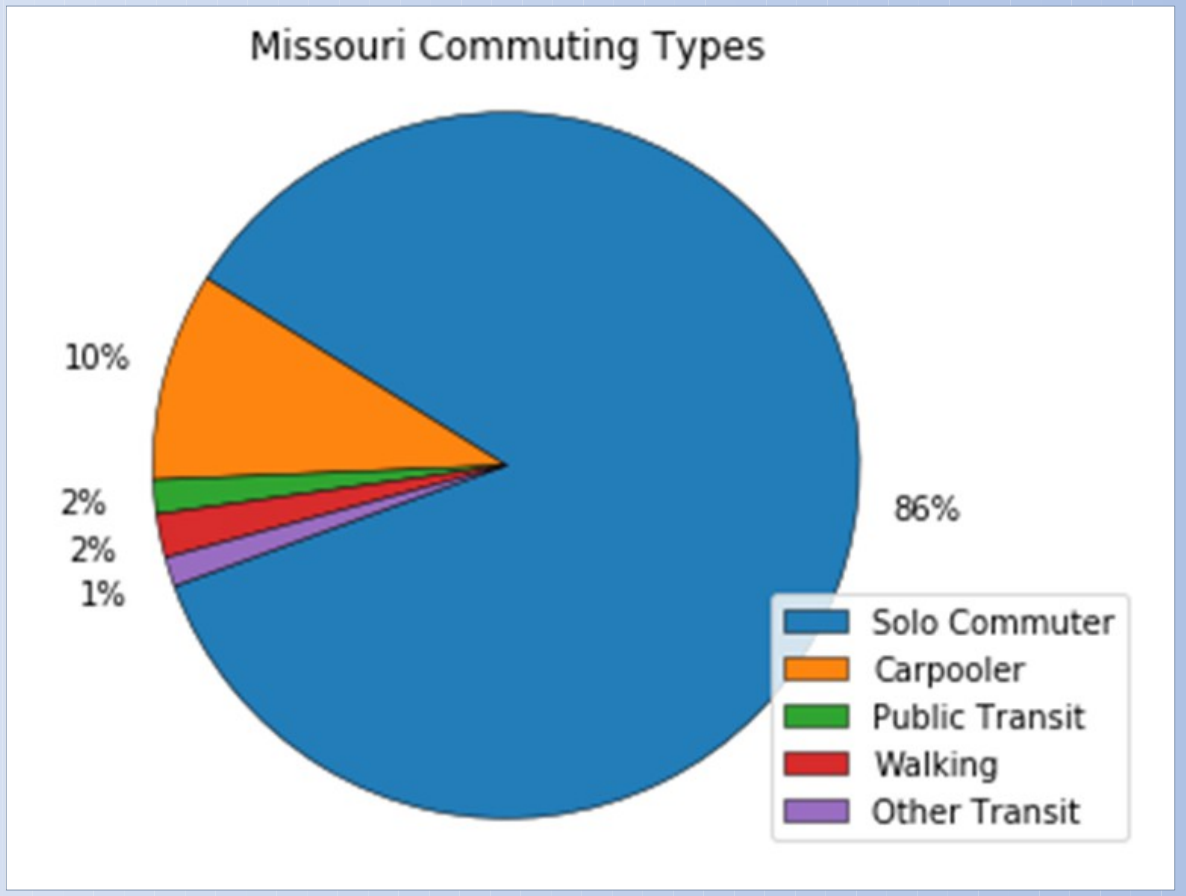
- Used census wrapper to make API calls to get commuter data for each county in MO
- Calculated commuter type %s
- Made calls to the Google Maps Geocode API to get coordinates for each county
- Created heat map of commuter concentrations
- Looked up counties in STL, KC and Springfield MSAs and repeated process for counties outside of MO



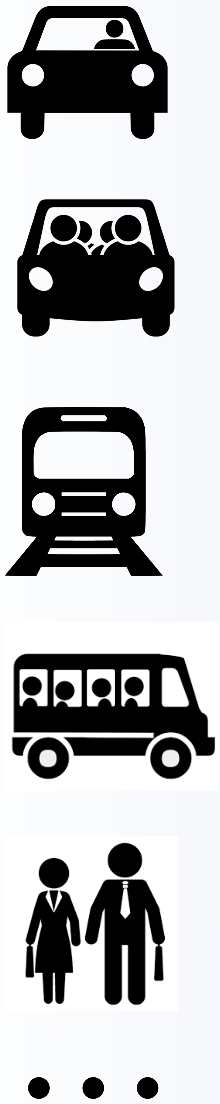
Data Analysis: Statewide



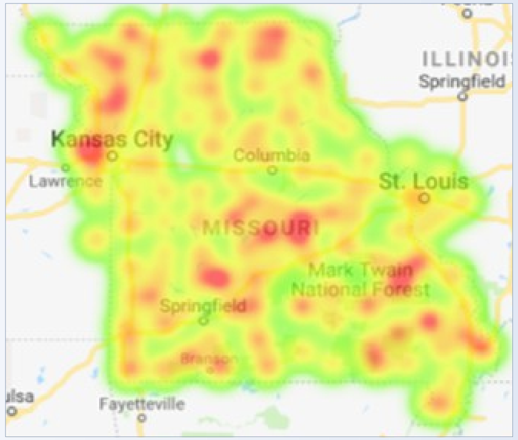
- As expected, a massive majority of Missouri commuters are “Solo Commuters”
- Commuter proportions very similar county to county. Highest numbers of commuters located in Kansas City, St. Louis and along I-44.
- A very small amount of commuters represented who use public transit, walk or are listed as using “other transit”.
- We love our cars!



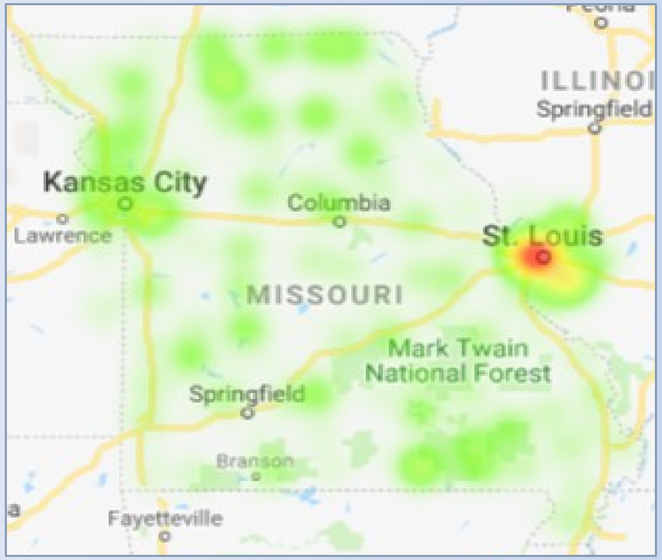
Data Analysis: Commute Type Concentrations in MO



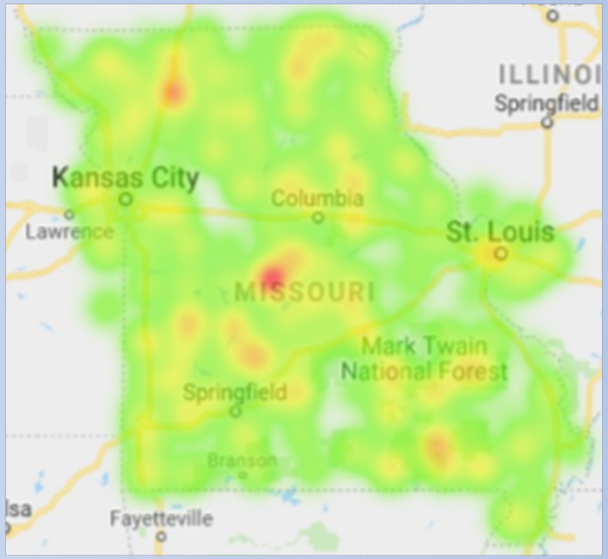
- Carpooler %
- (max. 19%)
- - Kansas City
- - Jefferson City
- - Farmington



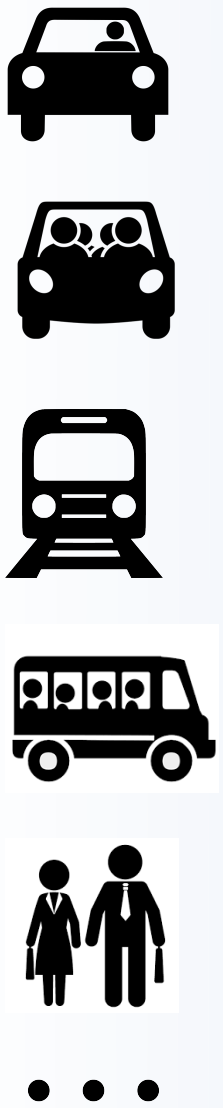
- Public Transit %
- (max. 10%)
- - St. Louis



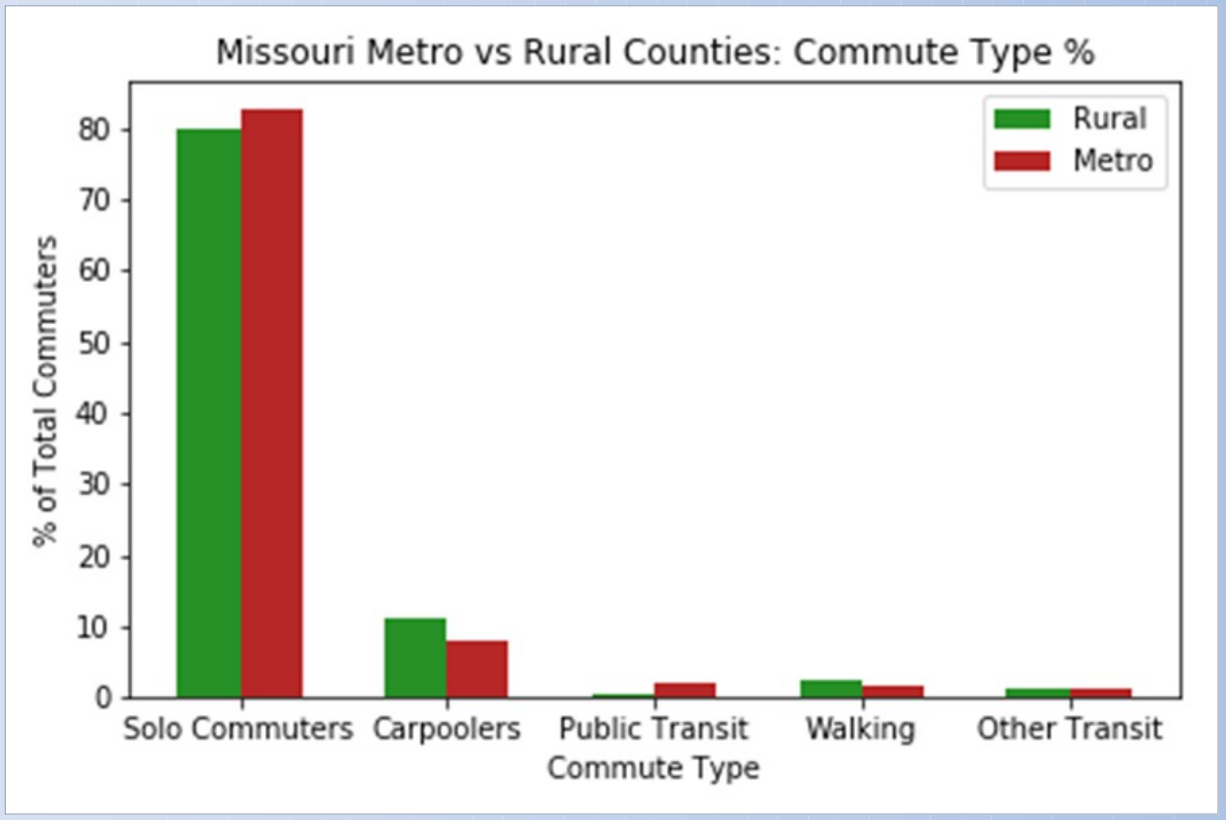
Other Transit %
(max. 5%)
- Ozarks



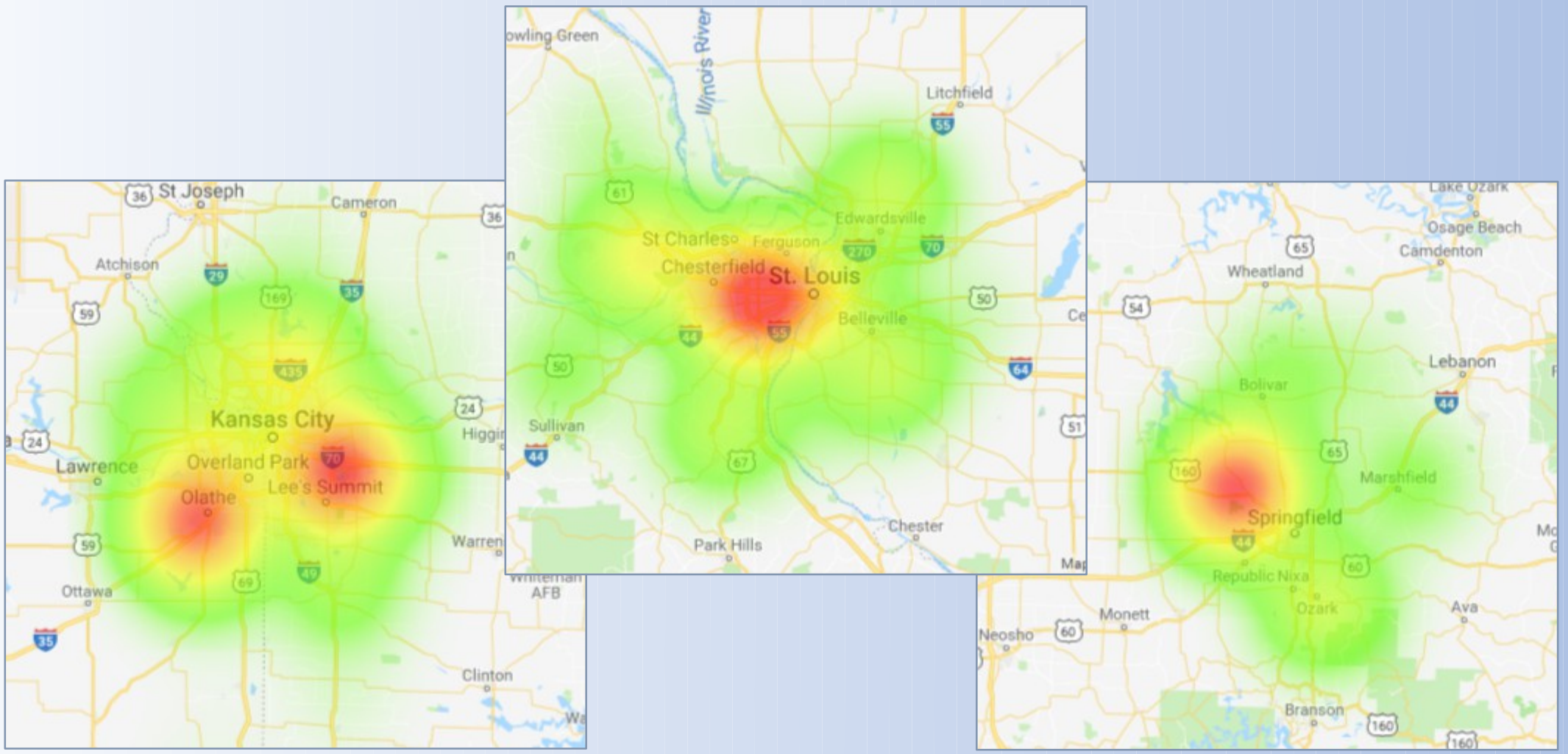
Data Analysis: Urban vs. Rural



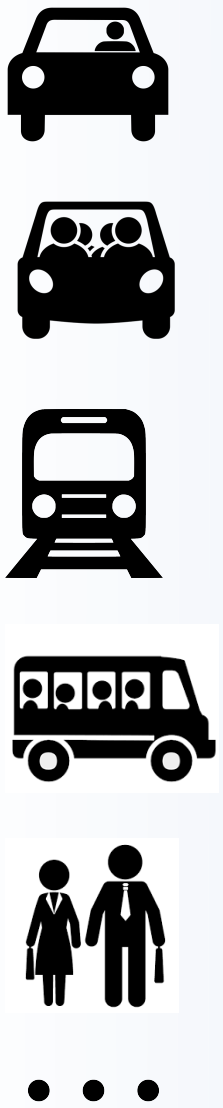
- Not a very significant level of difference.
- By conducting an Independent T-Test it was found that rural areas do have a decently higher amount of carpoolers and walking commuters.
- This could be due to people living in closer proximity to their place of work in rural areas.



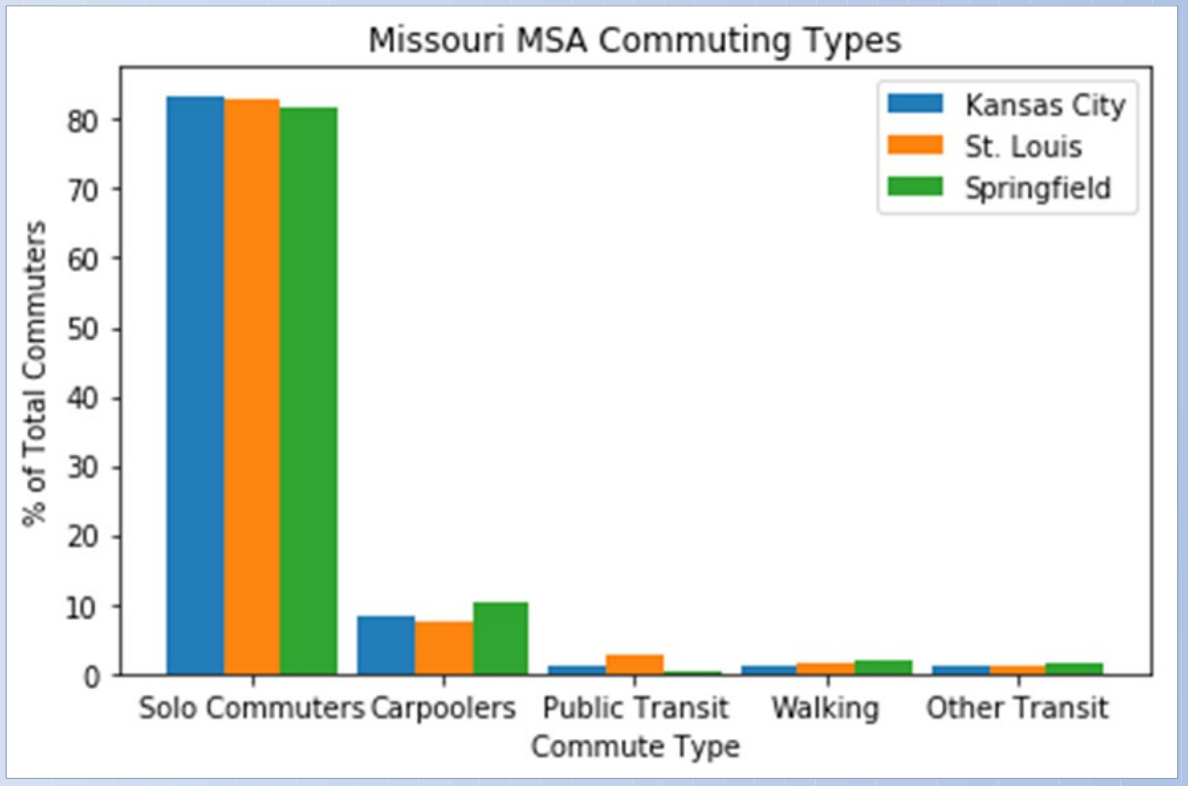
Data Analysis: MSA Comparisons - Commuter Concentrations



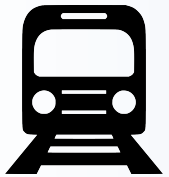
Data Analysis: Metro vs. Metro



- An ANOVA test revealed significant differences for commute types % between the cities.
- A T-Test showed Carpooler % between Kansas City and St. Louis to be significant
- Visually notable differences include amount of carpoolers and amount of walking commuters in Springfield.
    - Could be due to higher percentage of people living near their place of work (i.e. a college campus, manufacturing facility, medical complex).



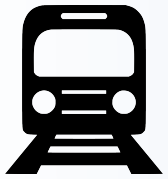
Discussion



- **Results were surprising, but not unexpected**
  - We expected
    - More significant differences between urban/rural commuting types
    - A difference in commuting types between metro areas
    - That public transit was used more

- **Inferences or general conclusions**
  - Driving to work alone is considered the best commuting option.
  - Commuting options other than solo driving are limited statewide.
  - Public transit options exist almost exclusively in urban areas.
  - Even where available, public transit is not significantly used.

Post-Mortem



- **Difficulties during analysis**
  - Defining metropolitan areas for analysis
    - Metro areas in Missouri range from nearly 3 million in population (St Louis) to around 150,000 (Columbia).
    - We chose to classify the three most densely populated areas “metro” or urban and all remaining counties as “rural”
  - How to deal with small numbers of counties when running ANOVA and T-Tests
- **Given additional time further analysis would include:**
  - Time of commute across commuting types
  - Distance of commute across commuting types

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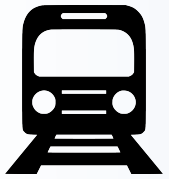
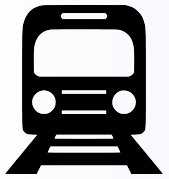
Post-Mortem



- **Other data that could offer relevant information include:**
  - Average commute type across urban and rural regions including age, education, and income data
- **We found that rural and urban regions of Missouri did not differ dramatically in commuting behavior.**
  - Expanding this study to include additional states and regions of different sizes could provide different results

Questions?



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