U.S. CENSUS TRANSPORTATION DATA

Years: 2012 - 2016

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DATA EXPLANATION

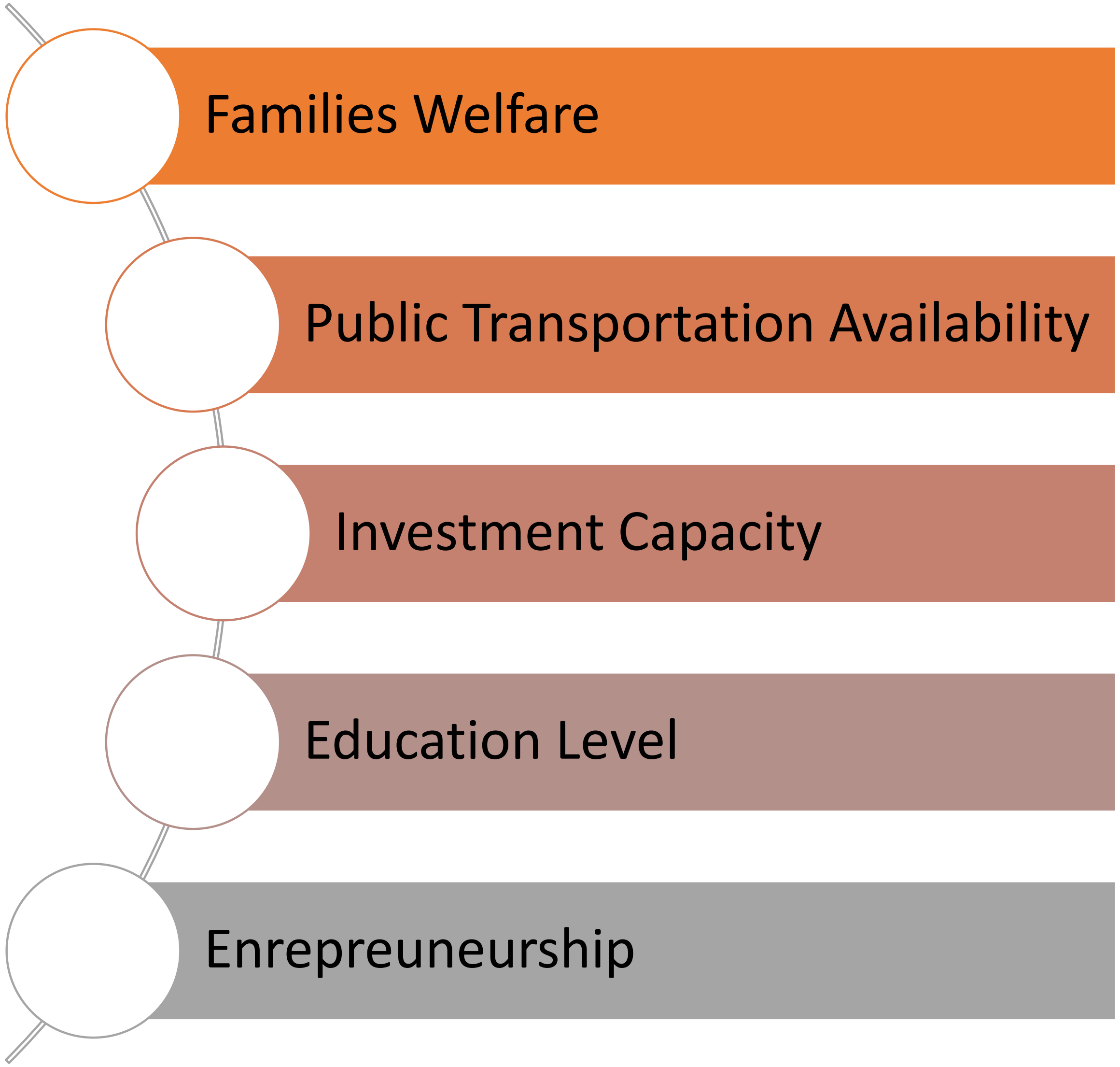
CTPP DATA PRODUCT BASED ON 2012 – 2016 5-YEAR AMERICAN COMMUNITY SURVEY (ACS) DATA

DESIGNED TO HELP TRANSPORTATION ANALYSTS AND PLANNERS UNDERSTAND WHERE PEOPLE ARE **COMMUTING TO AND FROM**, AND **HOW** THEY GET THERE. THE INFORMATION IS ORGANIZED BY **RESIDENCE**, **WORKPLACE**, AND BY THE COMMUTE FROM HOME TO WORK.

(HTTPS://CTPP.TRANSPORTATION.ORG/2012-2016-5-YEAR-CTPP/)

PROJECT APPLICATIONS

- Transportation policy and planning efforts.
- Socioeconomic factors
- Recognizing capacities
- Recognizing needs



Families Welfare

Public Transportation Availability

Investment Capacity

Education Level

Enrepreuneurship

DATA PREPROCESSING

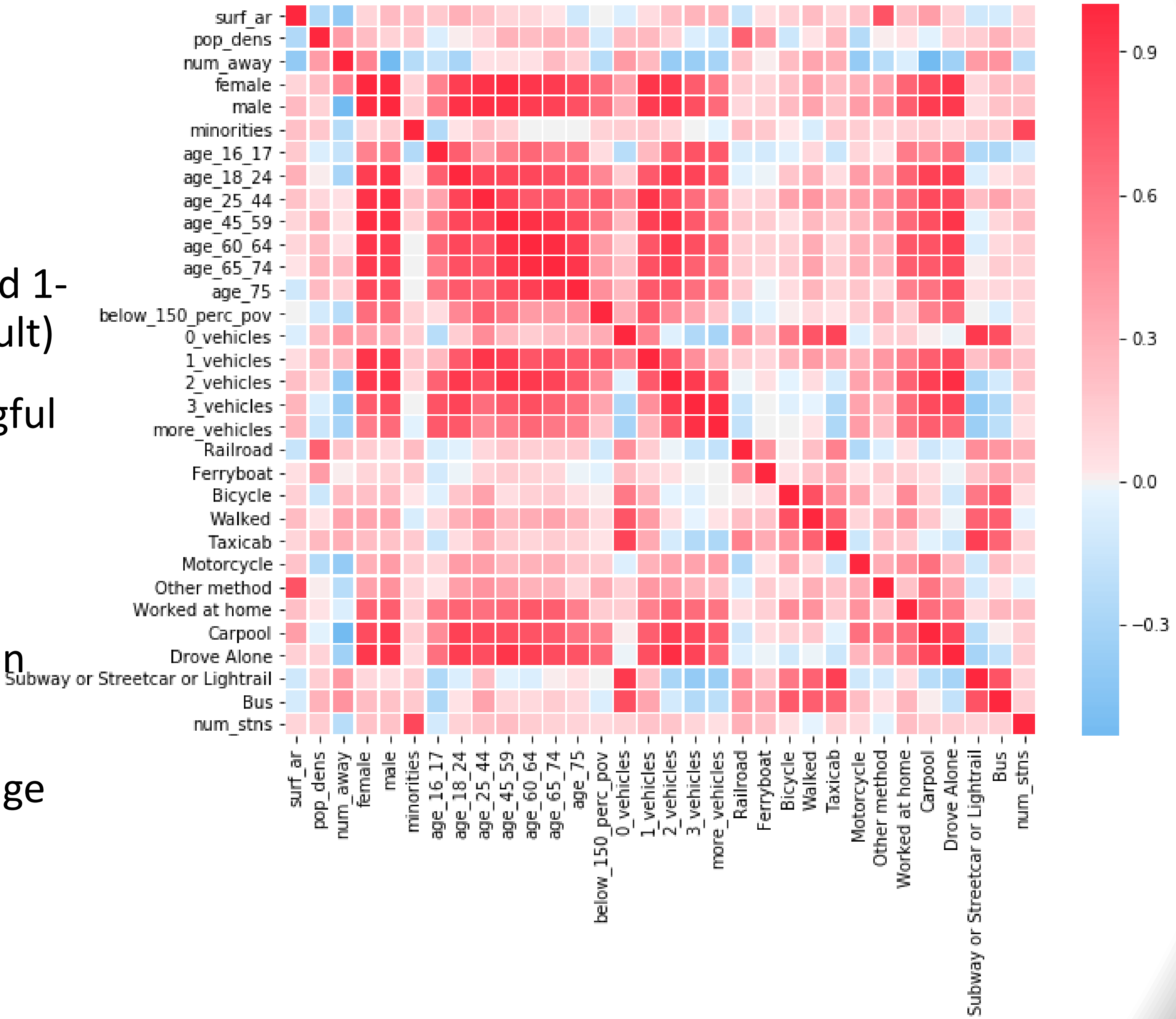
- Data not aimed for one specific task like classification or regression
- No certain response variable
- Required to set a goal for data preprocessing
- Acquired and merged data from many tables
- Initial downloaded data size: 114 Mg

ANALYSIS

- Many columns for a small number of states and districts (52)
- Need to explore the relationships between the columns and find the effective ones
- Every factor can be analyzed separately
- As examples, a number of initial guesses has been explored.

ANALYSIS: CORRELATION HEATMAP

- High correlation of public transportation with 0-vehicle and 1-vehicle households (obvious result)
- The effect of age not as meaningful
- Manipulation of the columns
- Making more general columns
- Example: all public transportation means in one column,
- Dividing ages to young, middle age and over 65



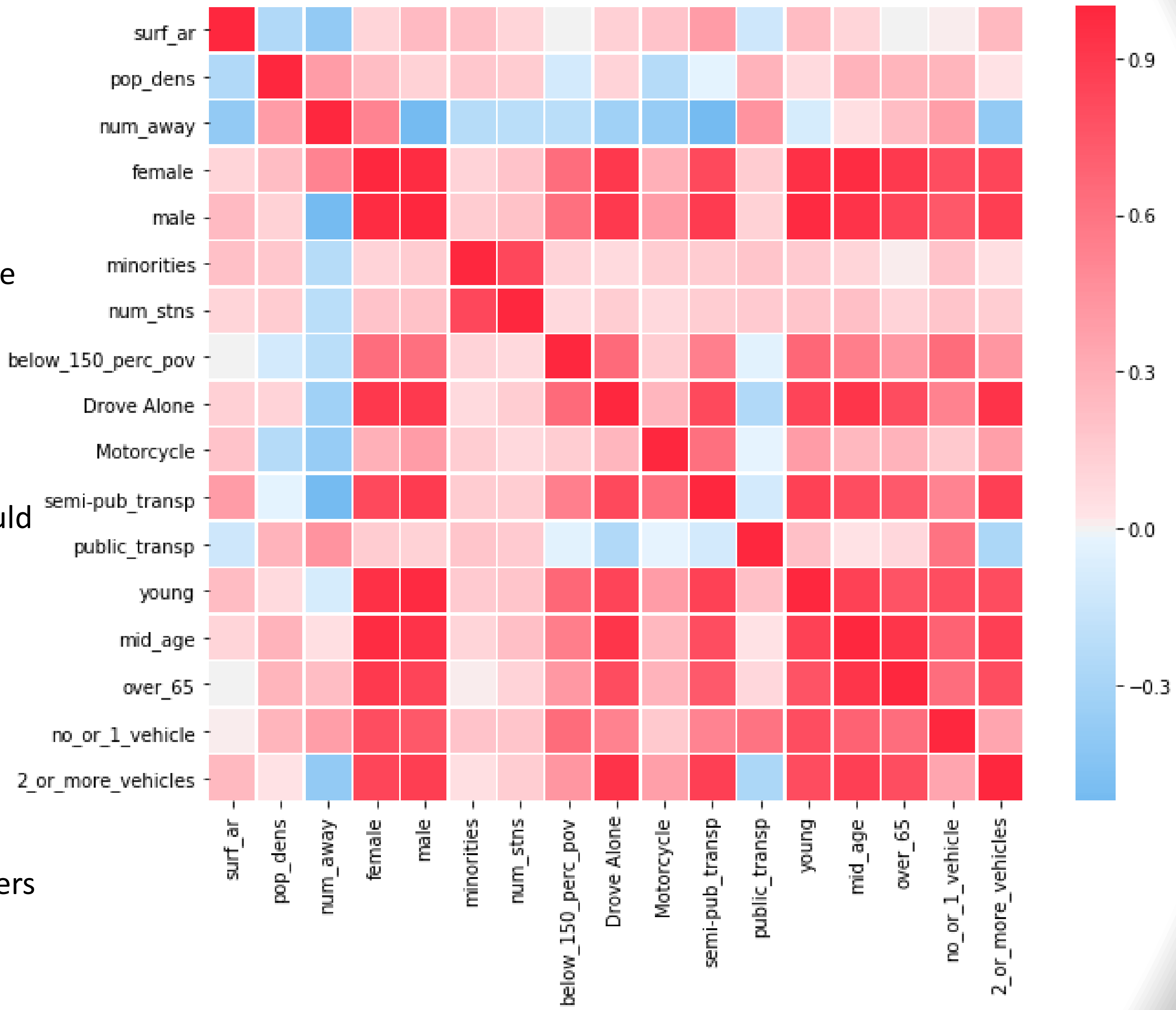
ANALYSIS: CORRELATION HEATMAP

1. The number of vehicles in a household: 2 or more vehicles , a high positive correlation with driving alone and semi-public transportation , negative correlation with public transportation, One or no vehicles highly and positively correlated with public transportation

2. Percentage of minorities: high positive correlation with the number of amtrak stations ('num_stns'). Could be due to the culture and pupulation combination of many northern and west-side states

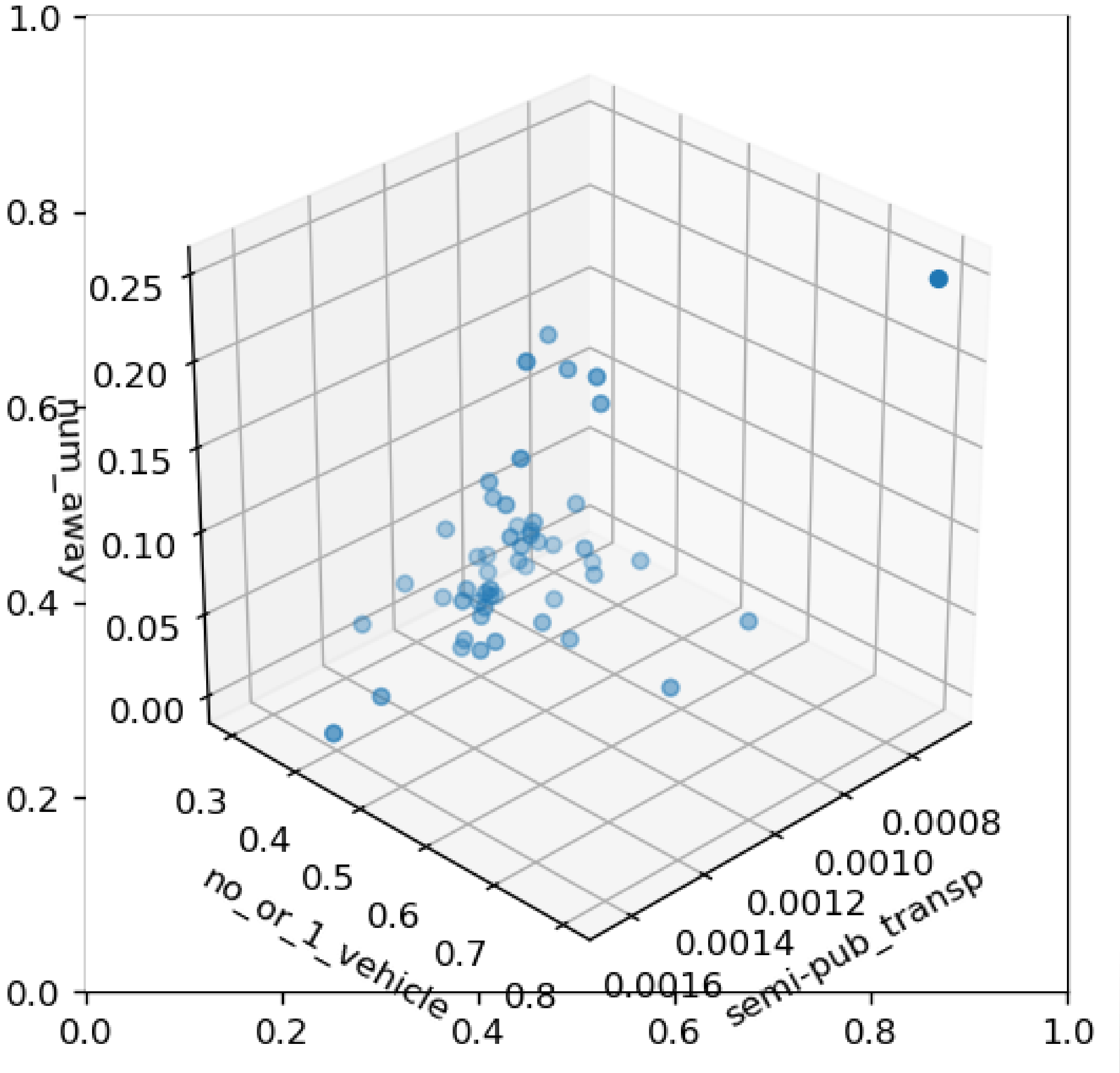
3. The number of Amtrak stations:
No positive correlation with the percent of away workers. A better metric:
number_of_stations/surface_area

4. Surface area: Negative correlation with away workers and public transportation (expected)



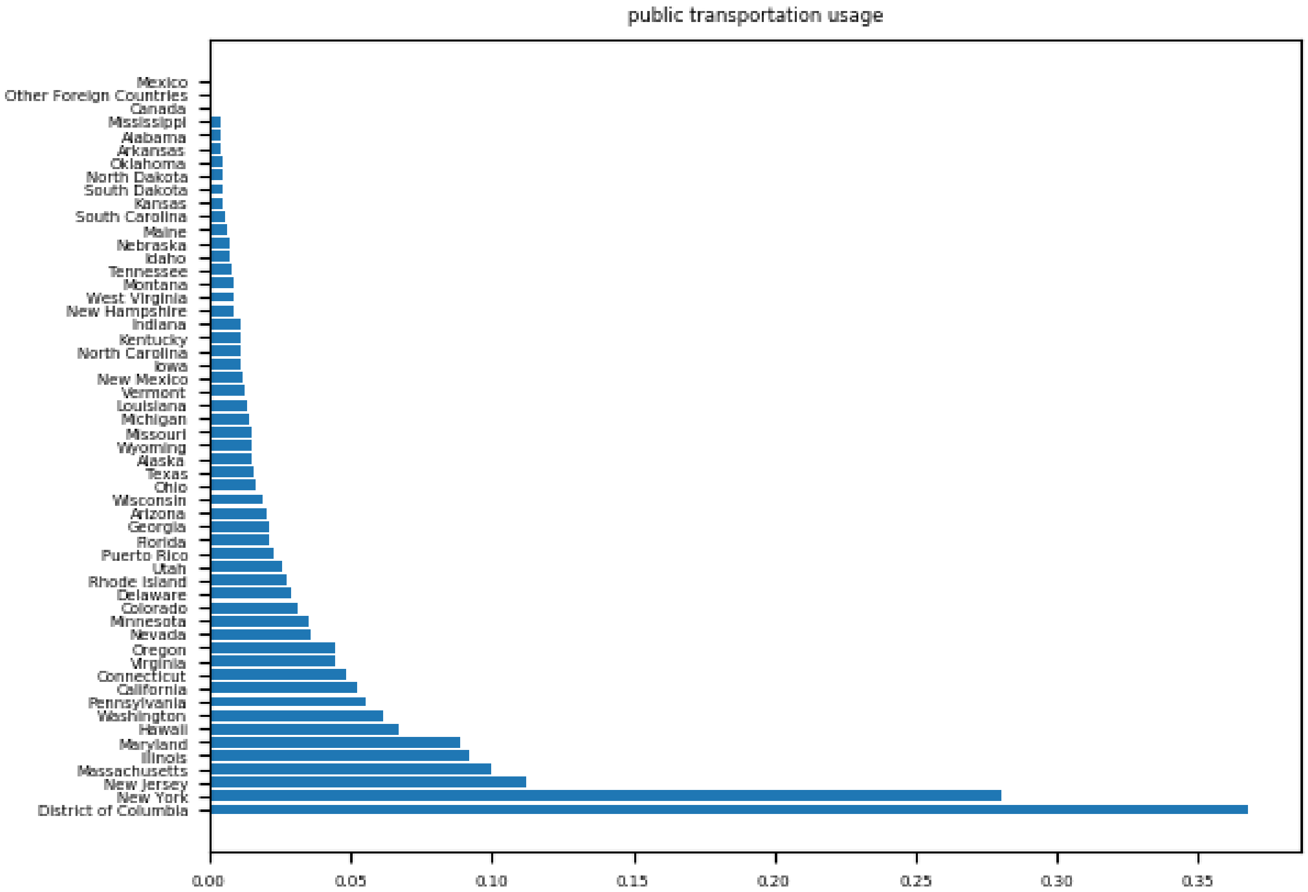
ANALYSIS: BAR CHART

- A somewhat linear relationship between the number of away workers with semi-public transportation users



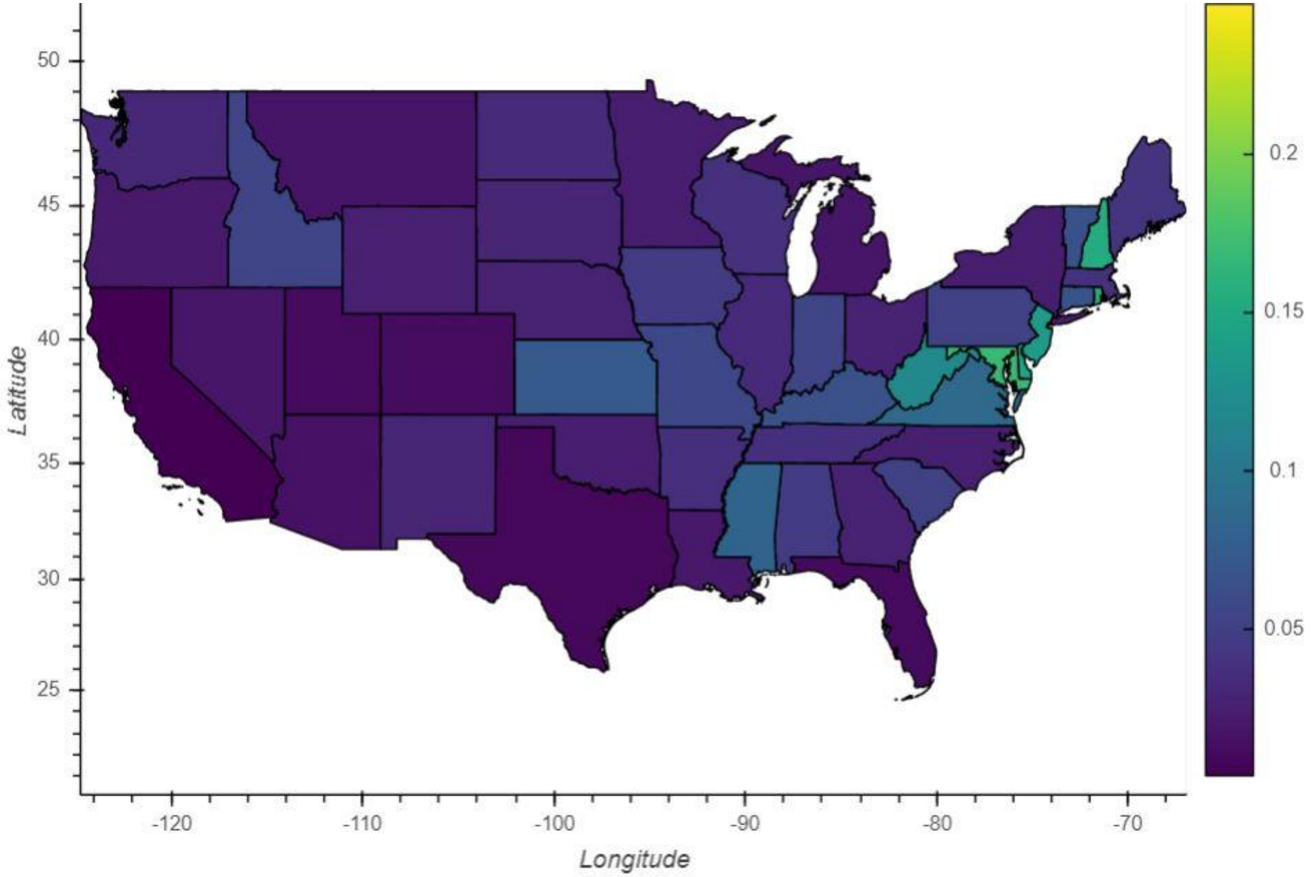
ANALYSIS: BARCHART

- Considerably higher usage of public transportation in New York and District of Columbia



ANALYSIS: HEATMAP

- Texas and : lowest percentage of away workers
- Some north-eastern states: highest percentage of away workers (could be due to the low surface area)

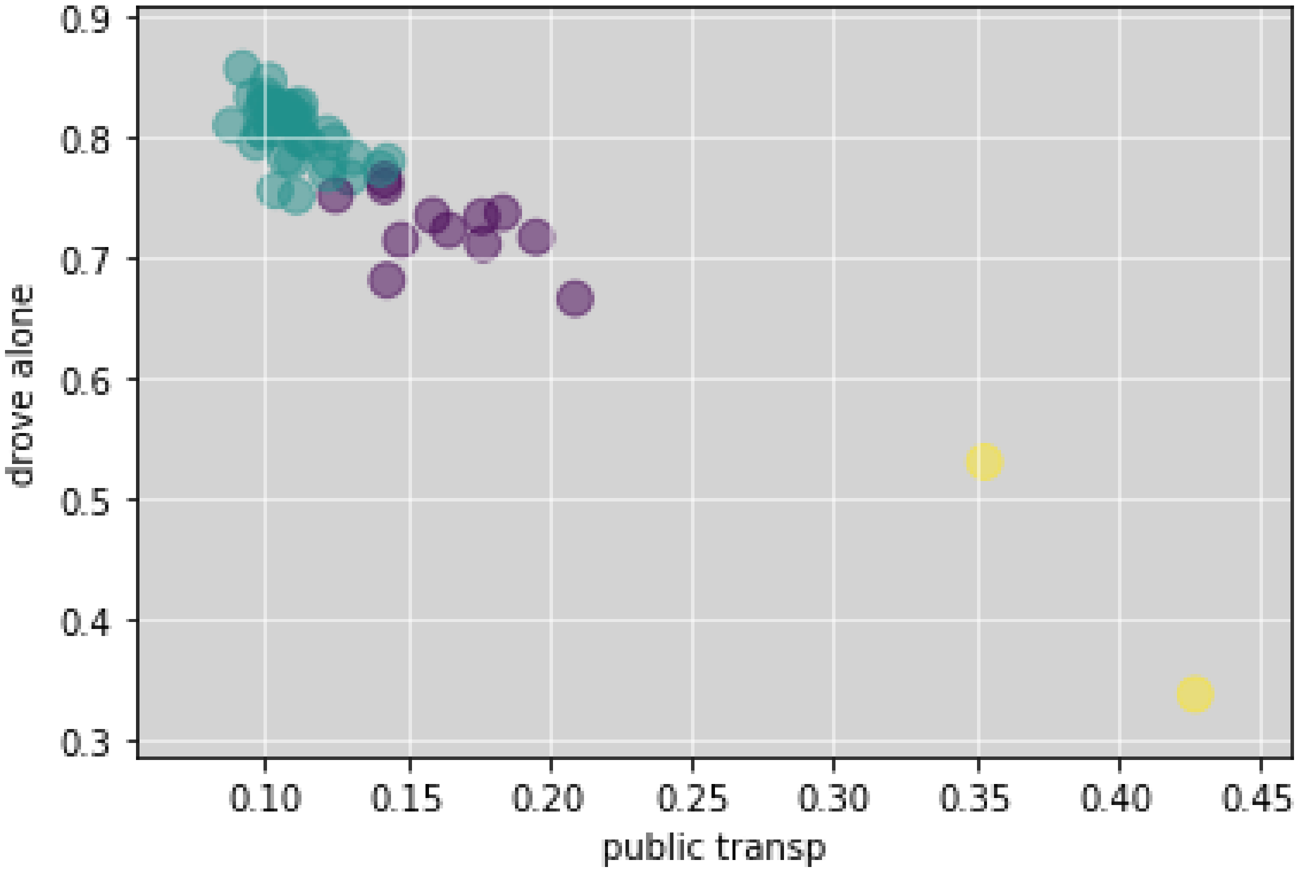


FORECAST

- Clustering (Healthy Transportation)
- Ridge Regression
- Lasso Regression
- Different Response Variables

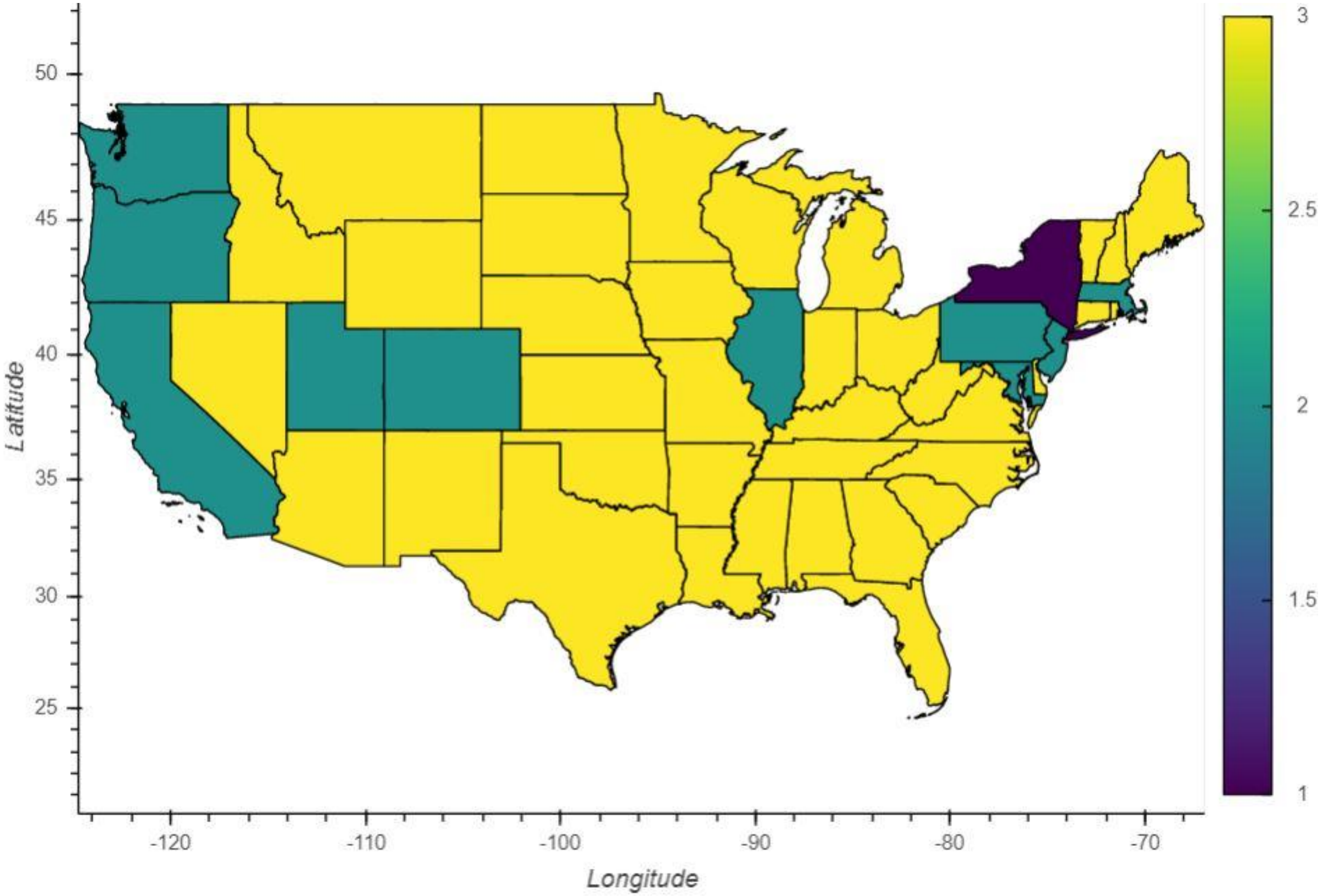
CLUSTERING: PUBLIC TRANSPORTATION USAGE

- The two yellow dots 'New York' and 'District of Columbia‘: Remarkably healthier transportation method than all other states



CLUSTERING: HEATMAP

- The two yellow dots 'New York' and 'District of Columbia‘: Remarkably healthier transportation method than all other states



REGRESSION: PUBLIC TRANSPORTATION

- Independent var’s: 'surf_ar','pop_dens','young','minorities','num_stns','no_or_1_vehicle','num_away','semi-pub_transp'

- Lasso: Public transportation usage can be explained through a linear regression based on the number of away workers.

MSE: 0.0071, Coef = [-0., 0. , 0. , 0. , -0. , 0. , 0.183, -0.]

- Ridge: Also gives importance to having no or one vehicle and semi-public transportation.

MSE: 0.0065, Coef = [-6.63e-09, 4.23e-06, 6.85e-03, 7.40e-11, -3.95e-05, 2.14e-02, 6.44e-02, -1.62e-02]

REGRESSION: NUMBER OF AWAY WORKERS

- Independent var’s: 'surf_ar','pop_dens','young','minorities','num_stns','no_or_1_vehicle','public_transp','semi-pub_transp‘
- Highly correlated data; Ridge seems a better choice
- Usefulness of Lasso variable selection
- Lasso: number of away workers explained mostly by public transportation.

MSE: 0.0040, Coef = [-2.53e-08, 3.78e-05, 0.0, -3.04e-10, -0.0, 1.47e-03, 4.48e-01, -0.0]

- Ridge: Also gives importance to semi-public transportation. Reason: Correlation

MSE: 0.0022, Coef = [-5.16e-08, 3.80e-05, 2.64e-02, -3.25e-09, -2.45e-04, 5.47e-02, 2.38e-01, -1.28e-01]