Visualizing Platform Power:

how third-party delivery platforms control
the movement of people and food around Denver

Patrick Hall
Master's Candidate in Applied Geography and Geospatial Science

Hillary Quarles
PhD Candidate in Geography, Planning and Design

Gregory Simon
Professor, Dept of Geography & Environmental Sciences
University of Colorado Denver

Third-Party Food Delivery

- **Three-sided Marketplaces**: connects Restaurants, Drivers & Customers.

- **Doordash**, increased revenues 33% between September 2021 and September 2022 (Doordash Inc., 2021 & 2022)

- The entire food delivery app industry is expected to reach $320 b revenue by 2029 up from $140 b in 2022 (Curry, 2021)

Overarching Research

- Pilot Research sponsored by CU Denver Presidential Initiative Seed grant

- How do food delivery platforms use physical, digital, and virtual spaces to Increase profit and growth?

- How do users encounter third-party food delivery in these strategically articulated and often blurred spaces?
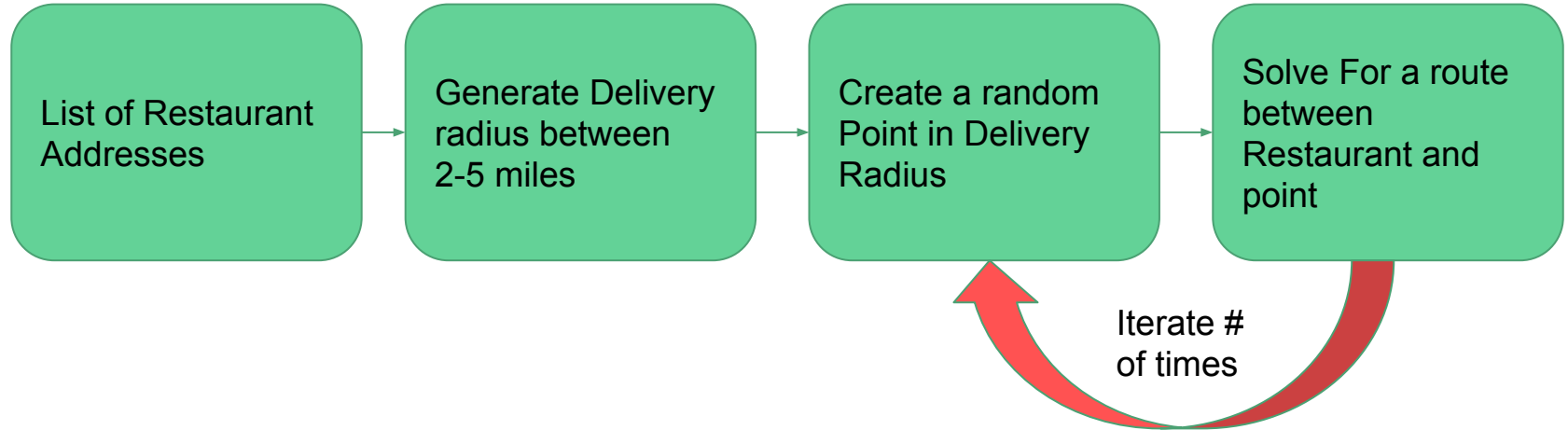
Physical Space

Digital Space

Virtual Space
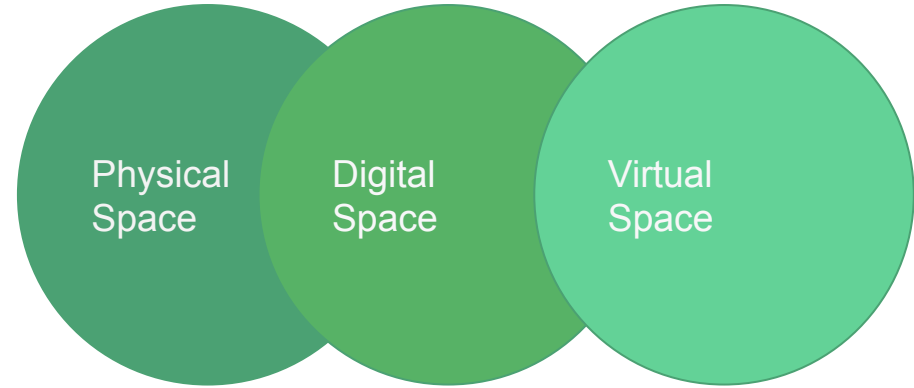
Research Questions

- Using a modeling approach, how do third-party platforms change the movement of vehicles across a city?
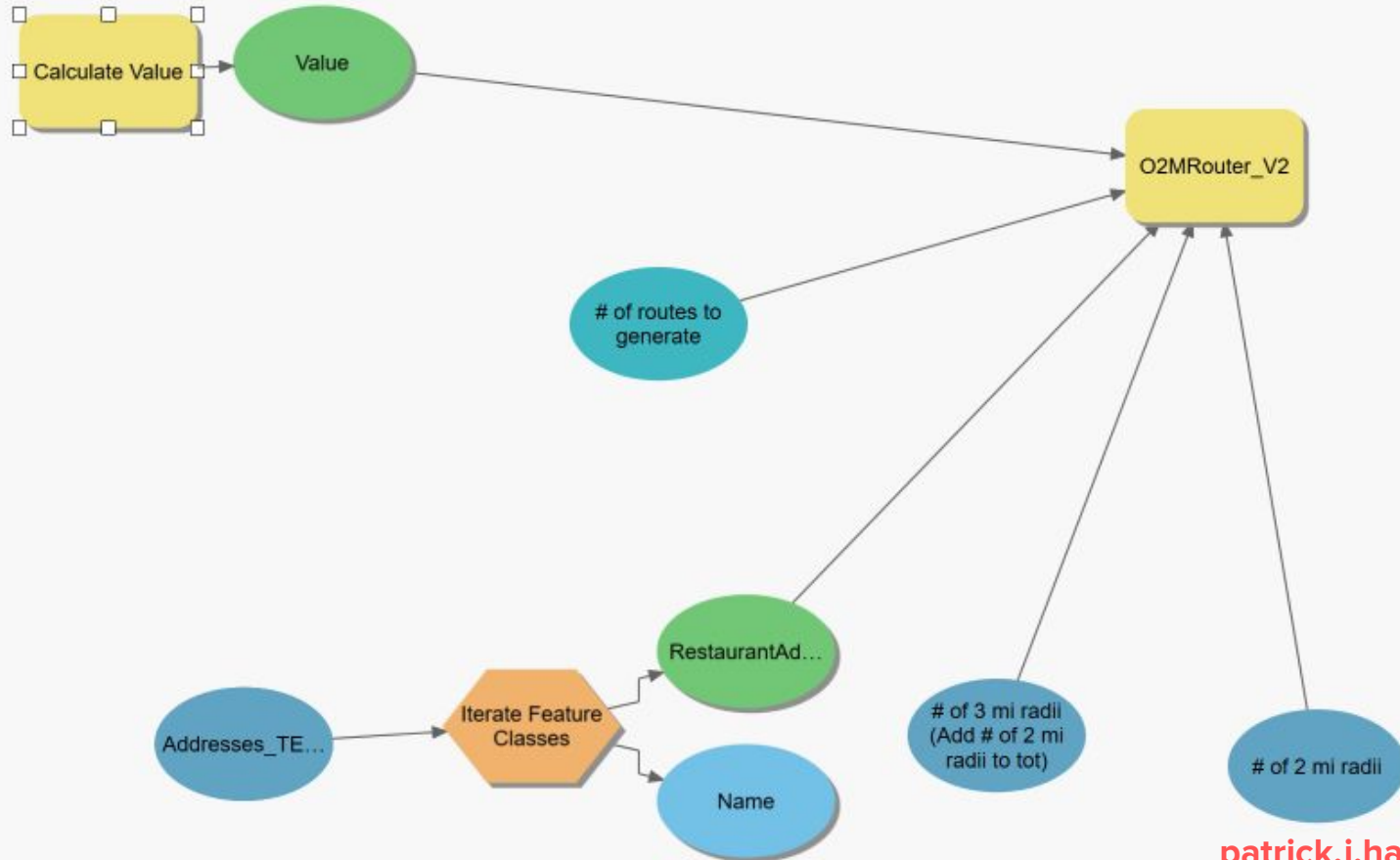
Physical Space
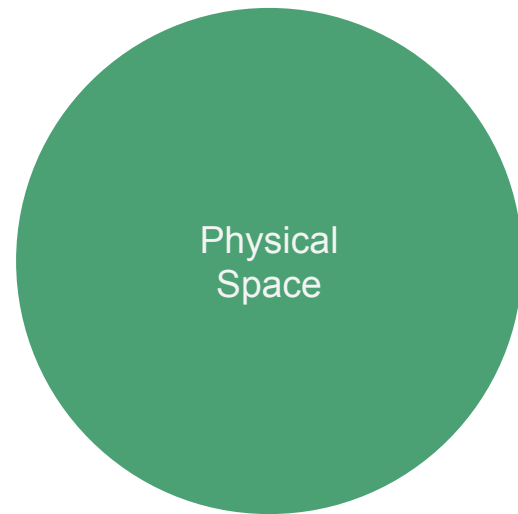
Methods

1. List of 126 Small and medium sized independent Restaurants inventoried by Hillary Quarles in Spring 2021
2. ArcGIS Pro Model Builder
3. Create Points along a Line
4. Intersect + Statistics Summary
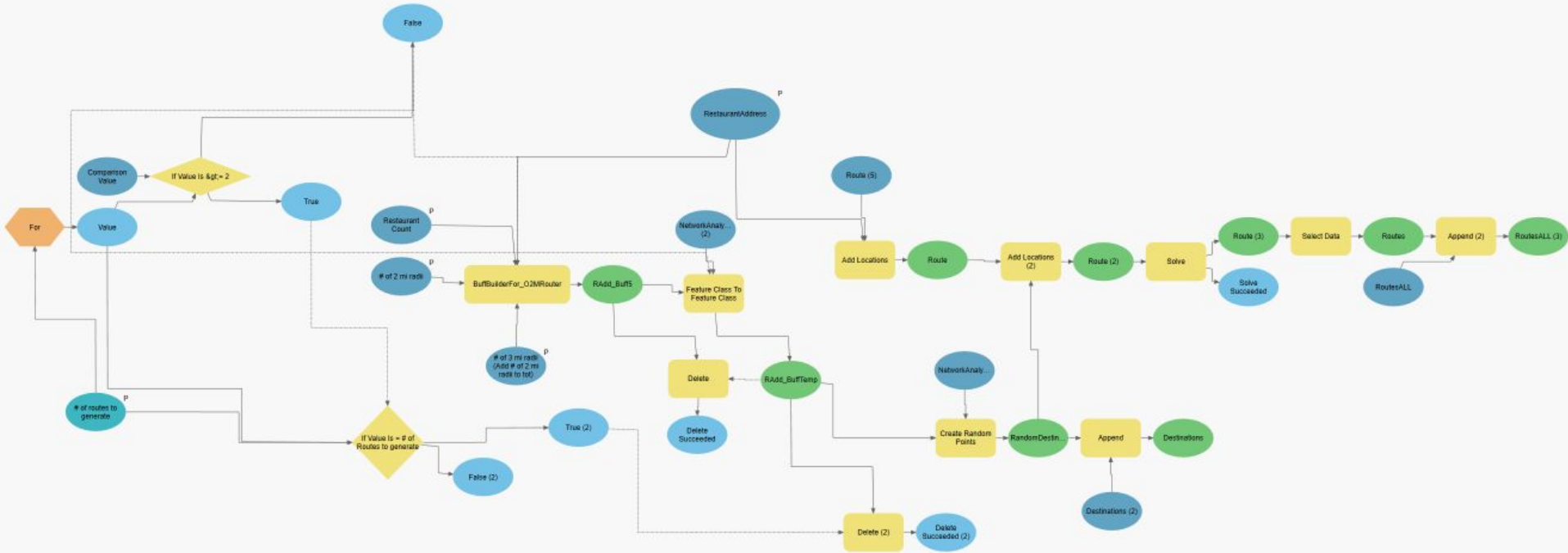5. Create Raster symbolizing frequency of intersection

How to Play Dispatcher
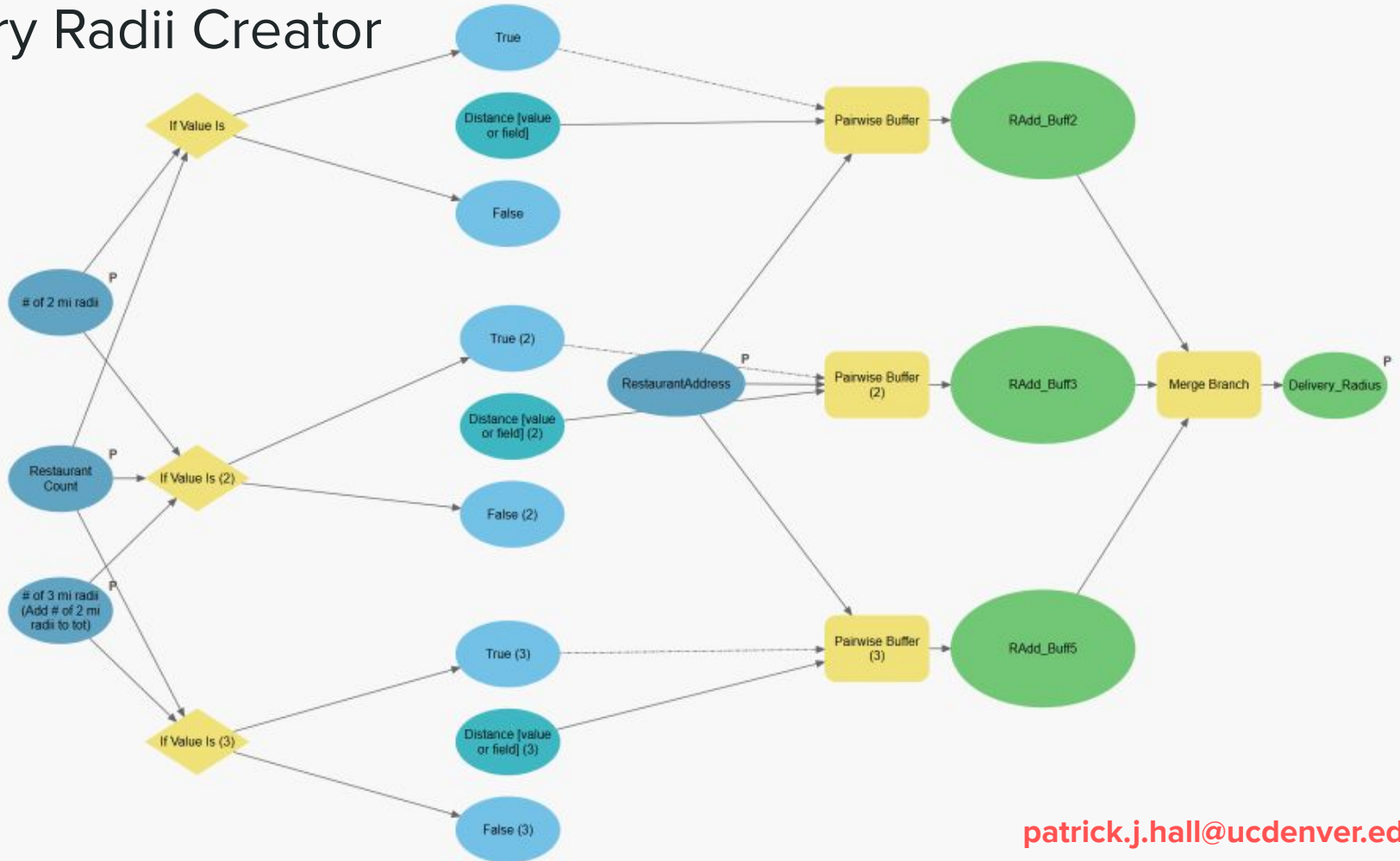
List of Restaurant Addresses	→	Generate Delivery radius between 2-5 miles	→	Create a random Point in Delivery Radius	→	Solve For a route between Restaurant and point

Iterate # of times

patrick.j.hall@ucdenver.edu

Restaurant Address Iterator

patrick.j.hall@ucdenver.edu

Route Iterator Submodel

patrick.j.hall@ucdenver.edu

Delivery Radii Creator

patrick.j.hall@ucdenver.edu

Results
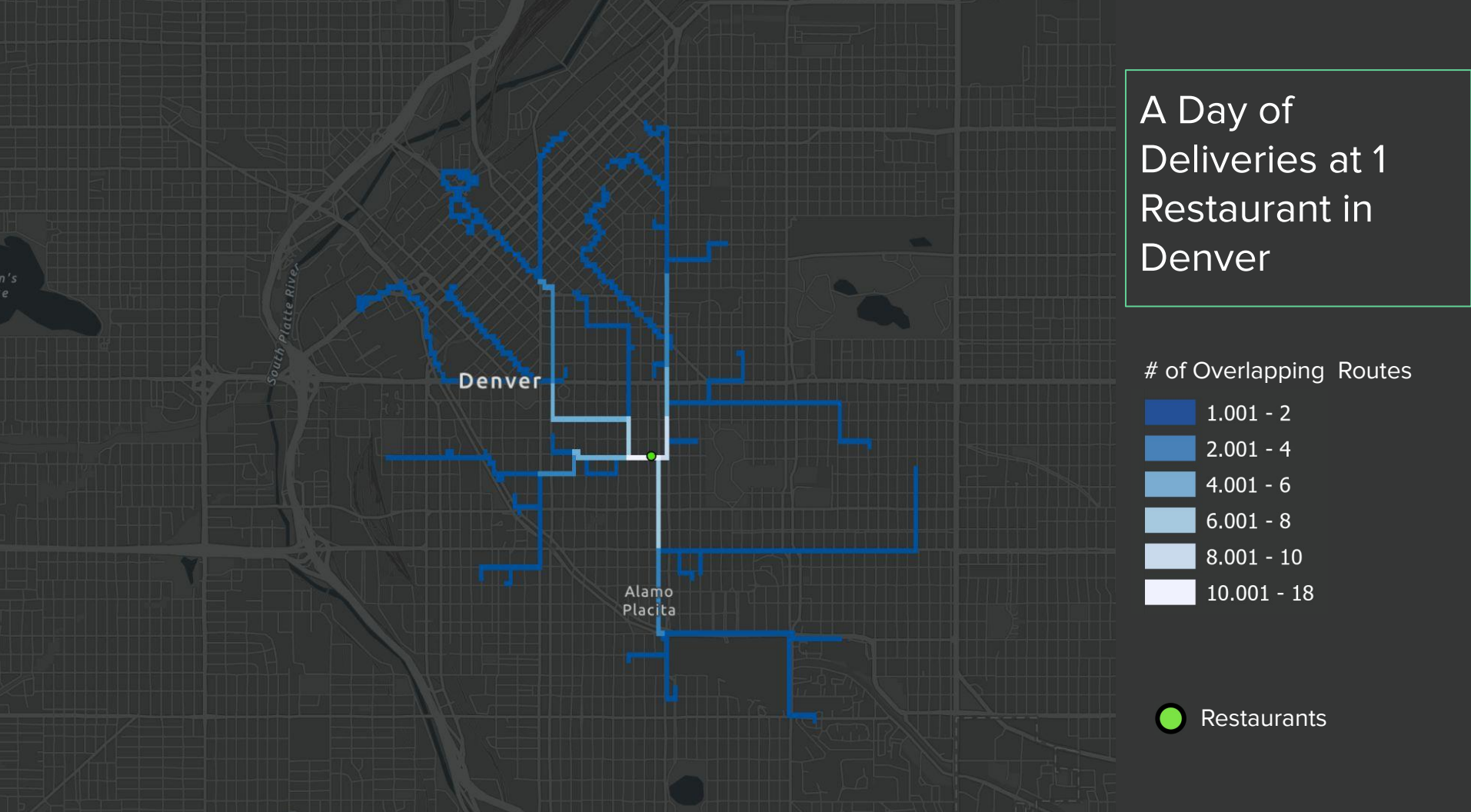
A Delivery from 1 Restaurant in Denver
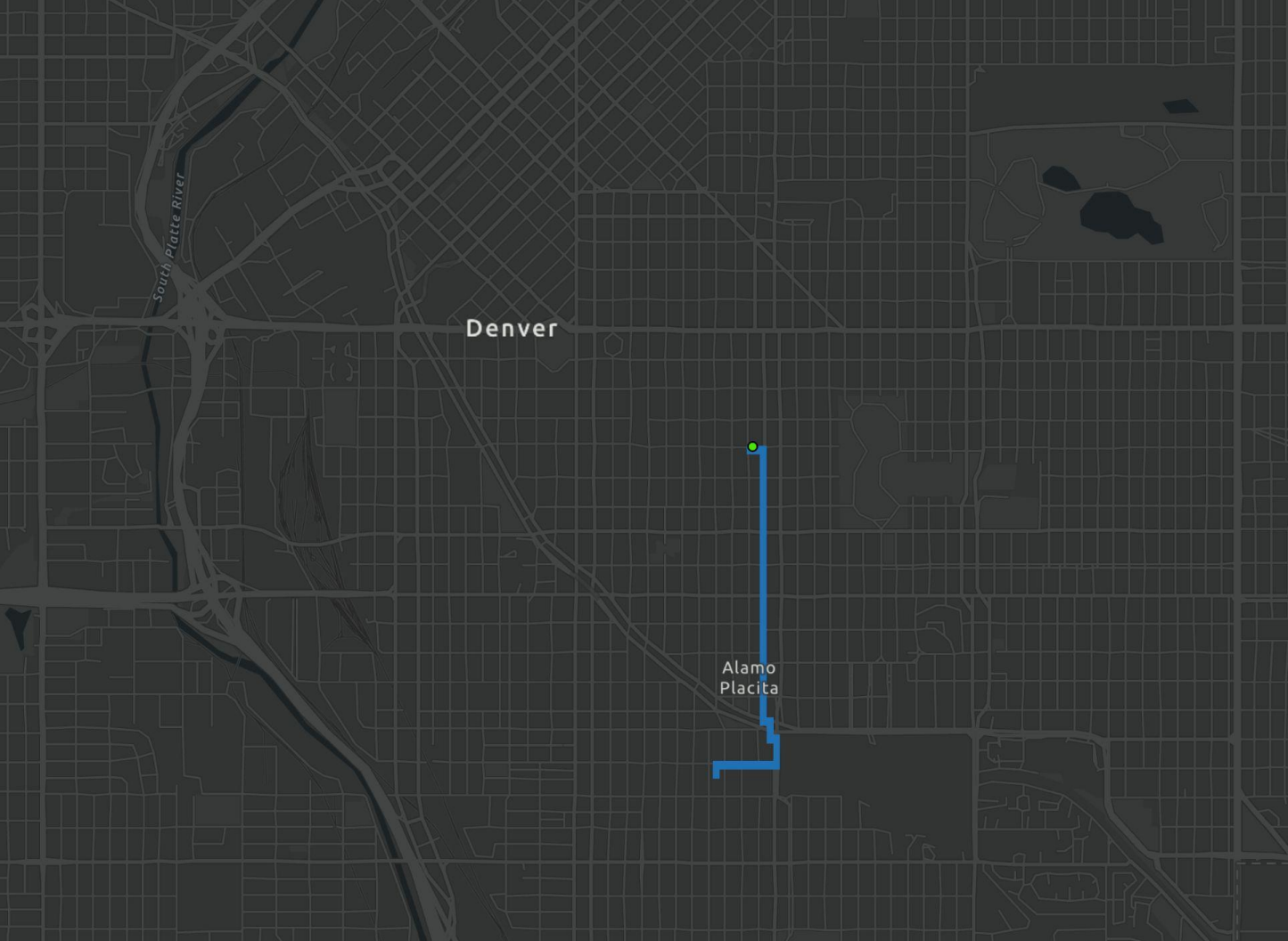
Delivery Route

Restaurant

A Day of Deliveries at 1 Restaurant in Denver

# of Overlapping Routes

- 1.001 - 2
- 2.001 - 4
- 4.001 - 6
- 6.001 - 8
- 8.001 - 10
- 10.001 - 18

● Restaurants

A Day of Deliveries at 126 Restaurants in Denver

# of Overlapping Routes

■	1.001 - 2
■	2.001 - 3
■	3.001 - 5
■	5.001 - 8
■	8.001 - 14
■	14.001 - 106
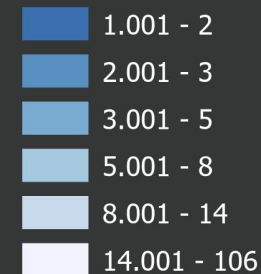
● Restaurants
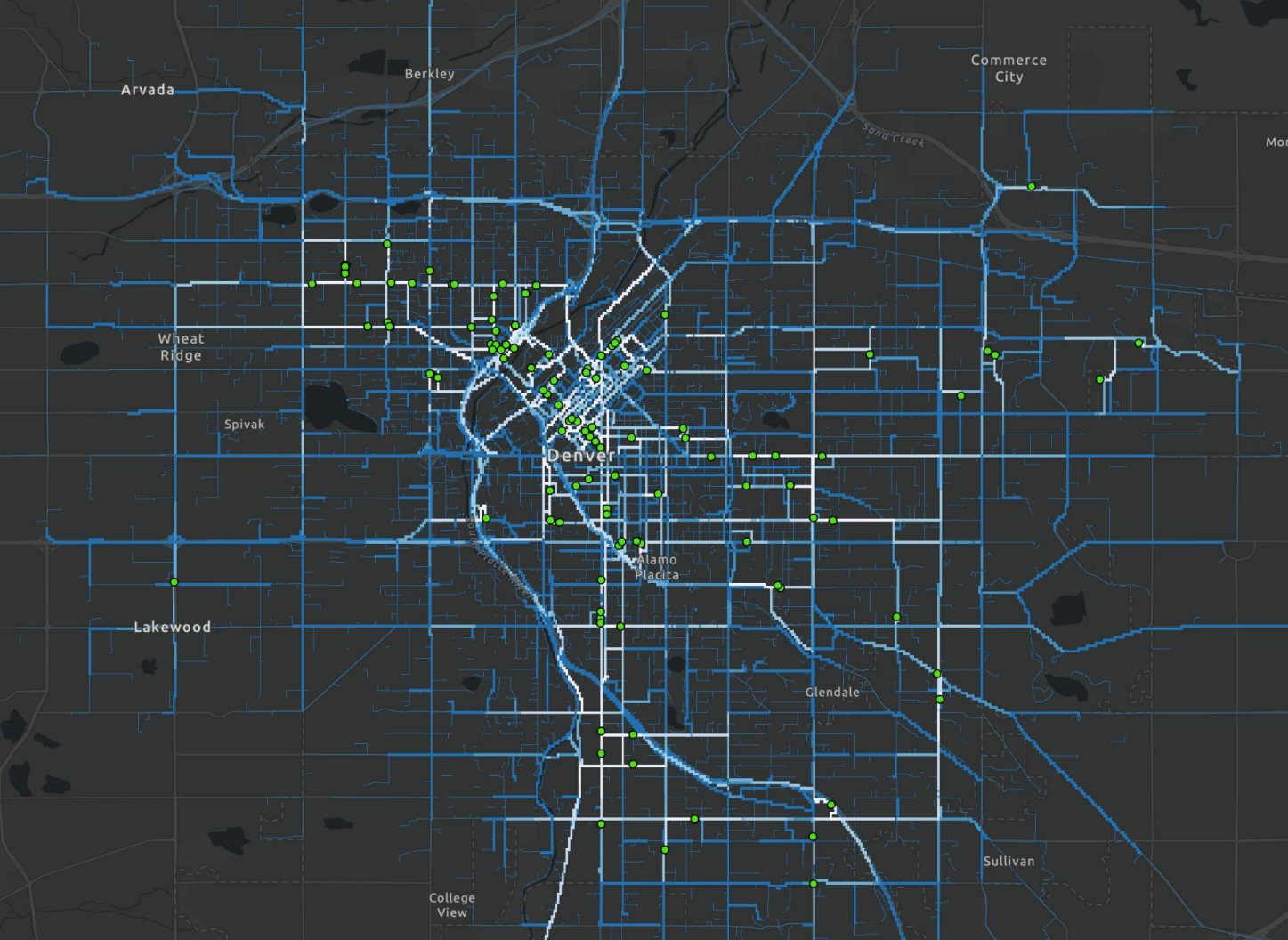
Conclusions

- We can visualize the power of these platforms in tangible way.
- We've created an initial methodology for determining how traffic is modulated across a city by these platforms.

Next Steps

- Tuning the model to more accurately reflect real life:
  - Adding Ghost Kitchens and National Chains
  - Accounting for socio-economic ordering habits
  - Driver Drift- Where drivers exist when waiting between orders

- Drilling Deeper
  - Not Just **How Much** Driving, but **Where traffic is** concentrated, and **Who** is bearing that burden.

patrick.j.hall@ucdenver.edu

Sources:

Doordash Inc. (2021) *Q3 2021 Financial Statements.*
https://s22.q4cdn.com/280253921/files/doc_financials/2021/q3/DASH_Q3-2021-Financials.pdf

Doordash Inc. (2022) *Q3 2022 Financial Statements.*
https://s22.q4cdn.com/280253921/files/doc_financials/2022/q3/DASH-Q3-2022-Financials_FINAL.pdf

"Curry, David. "Projected Food Delivery Market Size Worldwide 2021-2024." Business of Apps, 9 Jan. 2023,
https://www.businessofapps.com/data/food-delivery-app-market/#:~:text=Share-,Projected%20food%20delivery%20market%20size,due%20to%20the%20coronavirus%20pandemic. Accessed 25 Mar. 2023.