**Clients:**

* *Colorado Department of Transportation (CDOT)*
* ~~Denver Regional Transit District (RTD)~~
* ~~Municipal governments of the Denver Metro Area~~
* ~~Any user of public transit or alternative transportation means in urban Denver~~

**Question/Need:**

* ~~Which roadways in the Denver Metro Area are ideal candidates for expansion/improvement of bicycle and micromobility infrastructure? Secondarily, how can the traffic signals on these roadways be adapted to create “green waves” for cyclists and microtransit users?~~
* *CDOT has mandates to expand bicycle and micromobility networks. Part of that mandate is to prioritize reaching first/last mile gaps and food deserts. How can they 1) identify those locations and 2) determine where to start?*
* The data science opportunity here is to leverage traffic volume data along with roadway attribution data to be overlaid with RTD/CDOT’s mandates to expand bicycle and micromobility networks, especially in the context of first/last mile gaps and areas designated as food deserts.
* The purpose of EDA on this project will be to understand how the data I have currently scoped is prepared to answer specific questions of roadway speed and traffic volume, what the current infrastructure looks like, what the possibilities for expansion are for a given roadway, where food deserts are, and where the largest first mile/last mile issues are currently occurring.
* The model proposed – *classification –* will serve the project by identifying candidate roadways for bicycle/micromobility network expansion, as well as food desert areas that lack transit equity

**Impact:**

* The impact sought is to identify the best candidate roadways around Denver for bicycle/microtransit infrastructure expansion that will both efficiently expand the overall transit network and bring transit access to currently underserved neighborhoods
* I hypothesize that Denver’s bicycle/microtransit network can be greatly expanded upon by identifying roadways with low (<25 mph) speed limits and low traffic volume (<5,000 trips per hour), while equity can be simultaneously improved by bringing infrastructure to food desert neighborhoods.

**Data Description:**

* Traffic volume and traffic data from RTD, .csv (https://www.denvergov.org/opendata/dataset/)
* US Census data at the block level to identify food deserts
* What is an individual sample/unit of analysis in this project? What characteristics/features do you expect to work with?
* Street – speed limit, zoning type, traffic volume, public transit metrics, geography, intersection metrics
* Neighborhood – public transit metrics, average distance to grocery store, census data

**Data In Use:**

**- Food Access By Neighborhood** (<https://www.denvergov.org/opendata/dataset/city-and-county-of-denver-food-access-by-neighborhood-2021>)

- **Food Access By Census Tract** (<https://www.denvergov.org/opendata/dataset/city-and-county-of-denver-food-access-2020-census-tract>)

- **Denver Traffic Counts** (<https://www.denvergov.org/opendata/dataset/city-and-county-of-denver-traffic-counts>)

- **Denver Metro Area Local Roads** (<https://data-cdot.opendata.arcgis.com/datasets/cdot::local-roads/about>)

- **Denver Food Deserts Map** (https://adean.carto.com/tables/denver\_food\_deserts/public)

**Solution Path:**

* ~~Create a classification model that can identify road corridors that fit the desired parameters for network expansion (speed limit, traffic volume, status of current access to public transit, traffic signal metrics)~~
* Create a clustering algorithm to identify road clusters based on a set of ideal characteristics (TBD) for future exploration
* Conduct interviews/town halls to collect feedback from community about hyper-local bike/microtransit network changes, with interview process being guided by clustering algorithm insights; which solutions to transit access is the community most interested in or best served by?
* Create data-informed expansion proposal (spatial)
* Iterate based on feedback
* Alternatively, explore census data to identify target neighborhoods for expansion, and use spatial traffic signal data to “sketch” network expansions
* Interview communities in neighborhoods identified as good expansion choices

**Criteria for Success:**

* 33% reduction in bicycle/microtransit stops at red lights along major routes (intersection chains with >1000 crossings per hour), measured six months after deployment.
  + Measuring this may require the installation of a trail-camera type apparatus along expansion/redesign corridors
  + Computer vision?
* 33% reduction in average distance walked for groceries
  + Measured six months after deployment
  + Achieved by on-the-ground interviews with households in Denver food deserts selected for piloting bike/microtransit network expansion

**Assumptions and Risks:**

* People will use bikeshare/microtransit options if they are there
* Alteration of traffic signal timings for “green waves” may have meta-impacts on regional traffic dynamics

**Tools:**

* Explore data via Google Sheets
* Create interactive spatial visualizations in Tableau
* Not currently planning on it but I wouldn’t be surprised if that changes.

**MVP Goal:**

* A brief explanation of the distribution of food deserts around the Denver Metro Area as well as mandates for future public transit expansion, highlighting the relevance of improving, supporting, and expanding bikeshare/microtransit networks.
* I’d like to include a figure that shows the average distance to a grocery store from a given intersection, for intersections on roadways featuring a certain set of characteristics (TBD)
* Formulate second/third drafts of solution path and impact hypothesis based on iterative exploration

**Commentary:**

Hi Matt! Here are some comments on your proposal: ~~--I like your list of clients! For the sake of this project, I would pick one client whom you're pitching to. That will also help you tailor your work specifically to that client.~~ --~~I would actually go a little broader on the opportunity: RDT/CDOT has mandates to expand bicycle and micromobility networks. Part of that mandate is to prioritize reaching first/last mile gaps and food deserts. How can they 1) identify those locations and 2) determine where to start? This is pretty much what you said, but a little more focused on the perspective of the client.~~ --~~For a classification model, we need to have a target, some source of truth about whether a road would be a good candidate. How would you get those labels of "yes" or "no"? An alternative here could be clustering; you could take a bunch of features about roads and let clustering algorithms find patterns. You could then identify a cluster or two you'd like to focus on, and for future roads, classify them as one cluster or another, thus determining whether they are a priority.~~ **We can talk about this more if you want!** ~~--How will you know you've identified the best candidate roads? A reduction in use of other methods of transportation? An increase in some metric of equity? Achieving the specifics metrics of the client's mandate? Maybe think of the impact hypothesis as "if solution\_path, then impact" (I'm now seeing that you have some of this in your criteria for success section; I would connect this with your primary impact. Whatever doesn't connect with this metric might be a secondary impact.)~~ ~~--I am always pro interviews, but how do they relate to your data science process? Are they an alternative way to identify roads?~~ --~~Mention how you might measure some of these success metrics! Why 33%?~~ --I'm still not sure exactly what "green waves" means ~~--MVP looks good! Great work overall!~~