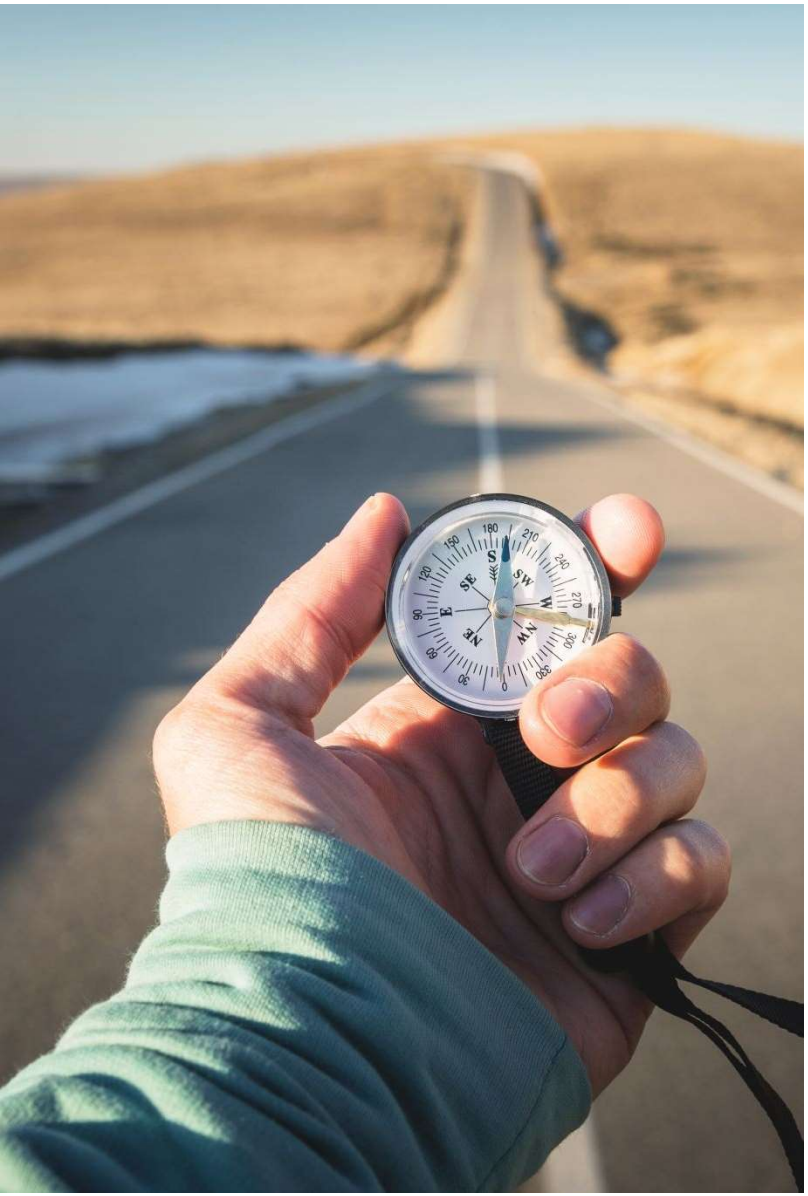
MAPIFY

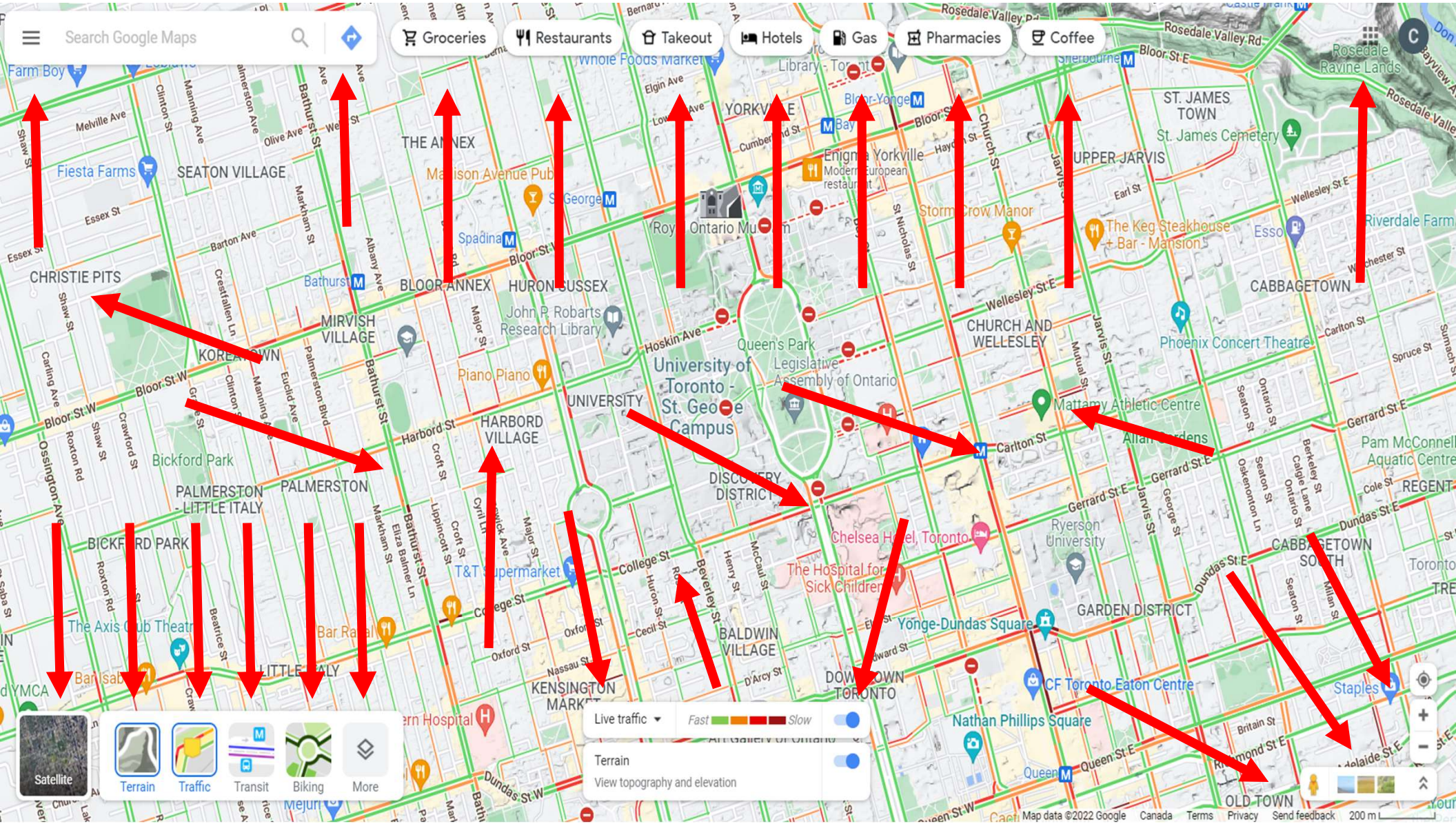
Simplify your navigation UI



AIM

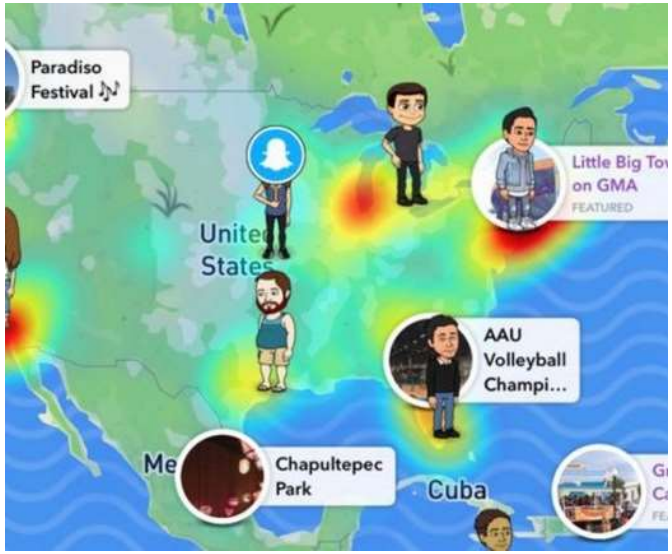
- Go from point A to B[1]
- Best route

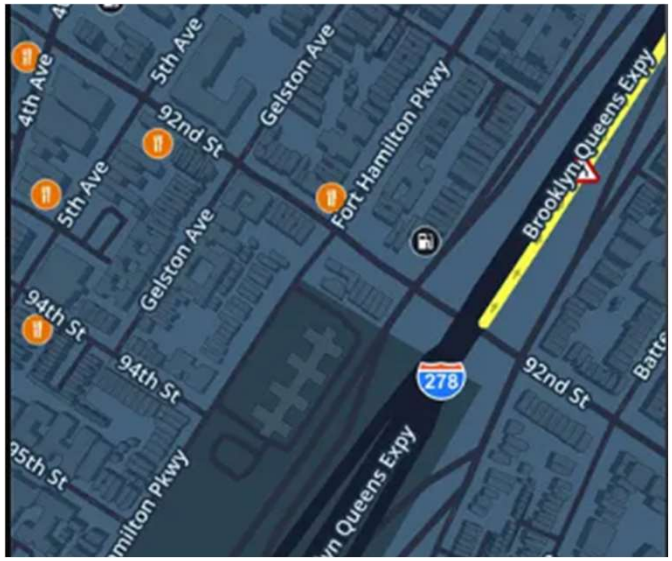
[1] J. M. D. L. says: C. W. D. says: K. M. says: R. Says: M. says: A. says: and L. S. says: “10 GPS apps for navigation [Android and IOS],” *GIS Geography*, 06-Mar-2022. [Online]. Available: https://gisgeography.com/gps-apps-navigation/. [Accessed: 30-Apr-2022].


Search Google Maps
Groceries
Restaurants
Takeout
Hotels
Gas
Pharmacies
Coffee
Satellite
Terrain
Traffic
Transit
Biking
More
Live traffic
Fast
Slow
Terrain
View topography and elevation
Map data ©2022 Google
Canada
Terms
Privacy
Send feedback
200 m


Woodbine Ave
Torrens Ave
Gamble Ave
Cosburn Ave
Gowan Ave
Logan Ave
Menu

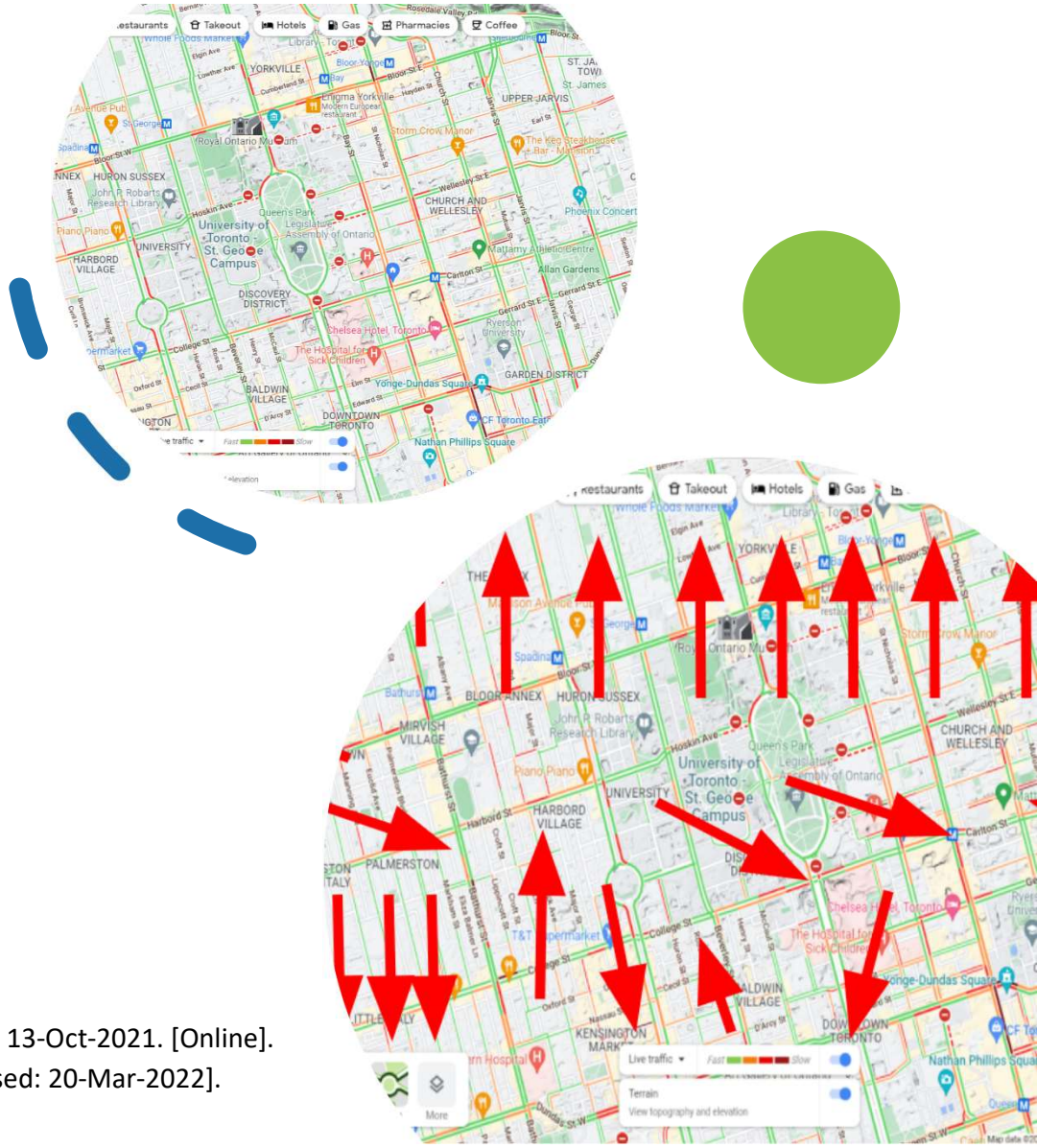

Search
Hoboken
Newport
Greenwich Village
SOHO
Nolita
Chinatown
New York
Dumbo
Downtown Brooklyn
Fort Jay
Cobble Hill
South Brooklyn
Carroll Gardens
Gowanus
Nearby


Paradiso Festival
Little Big To
on GMA
FEATURED
AAU Volleyball Champi...
Chapultepec Park
Cuba


4th Ave
5th Ave
92nd St
Gelston Ave
Fort Hamilton Pkwy
Brooklyn Queens Expy
94th St
278

ADHD user problems

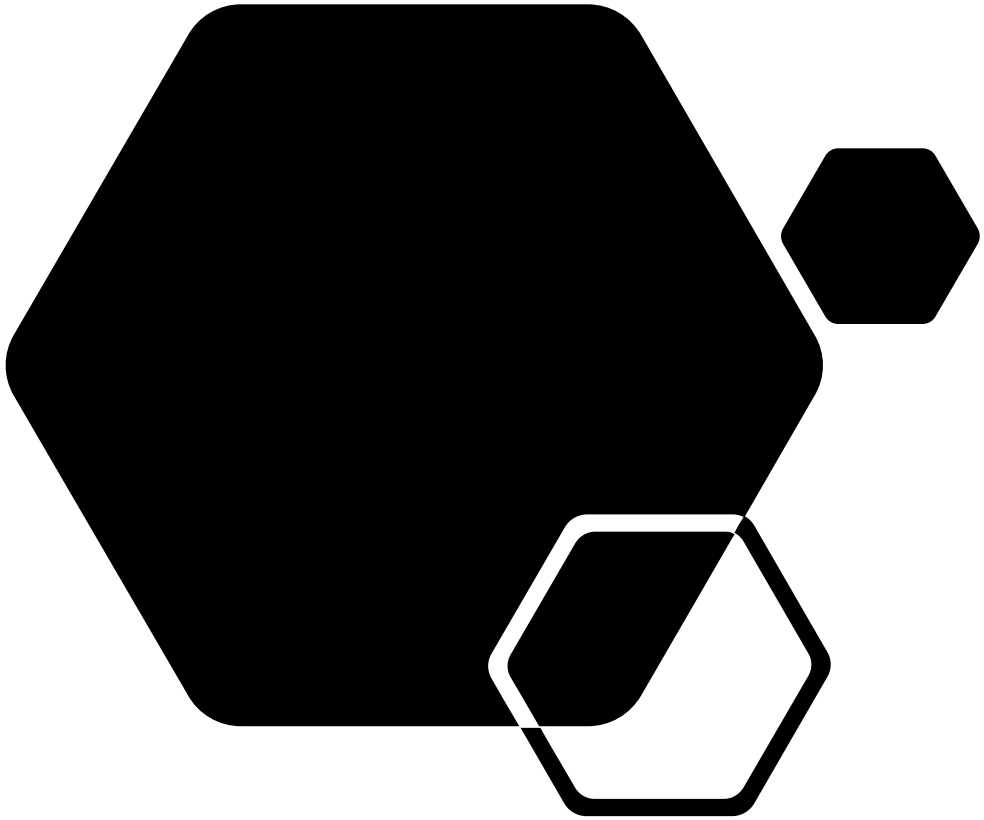
- Can't focus
- Distracted
- Difficulty in decision making [2]



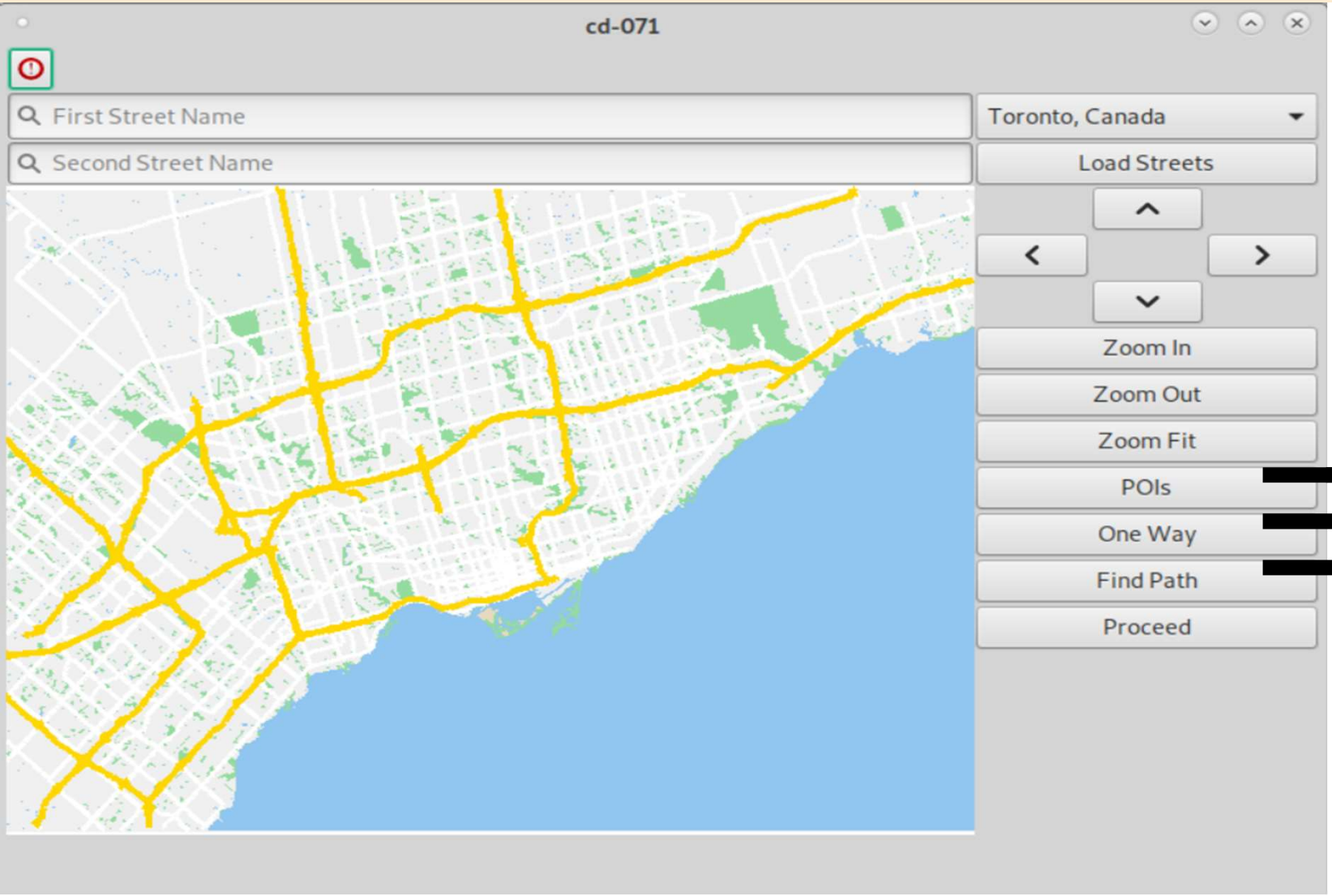
[2] T. Angel, “Everything you need to know about ADHD,” *Healthline*, 13-Oct-2021. [Online]. Available: https://www.healthline.com/health/adhd#causes. [Accessed: 20-Mar-2022].

TEAM’S PHILOSOPHY

"LESS INFORMATION IS BETTER INFORMATION"



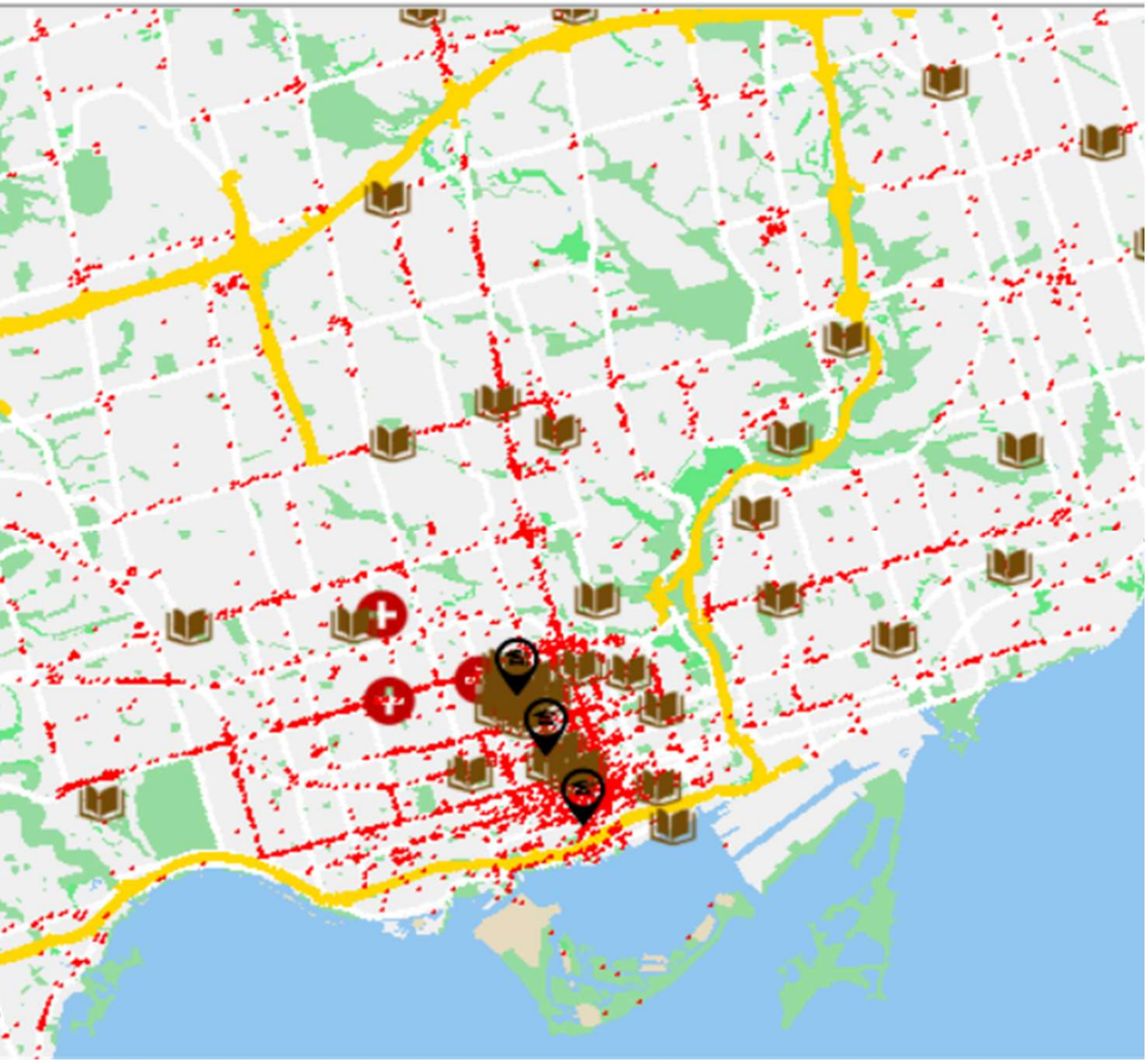
TOGGLE BUTTONS



POI Button

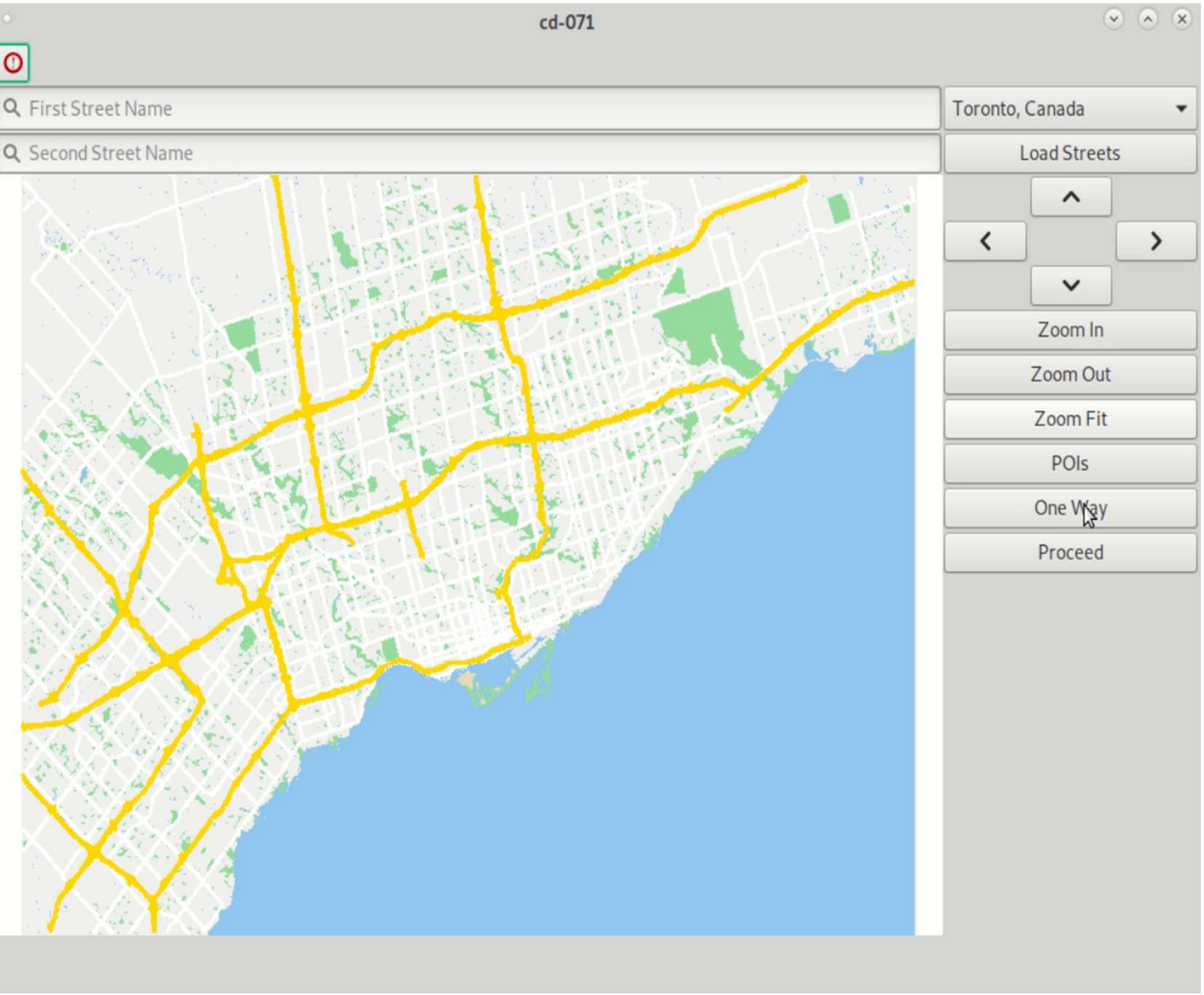
One way

Find Path



POINTS OF INTEREST
(without zoom level)

- **Cluttered Map**
- **Hard to view any other features**
- **Red dots scattered around the map with symbols**



POINTS OF INTEREST
(with zoom level)

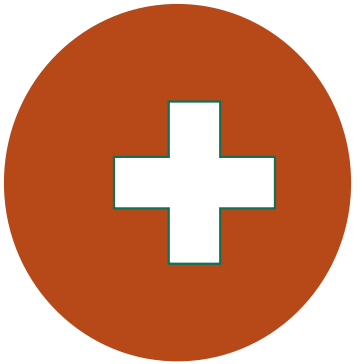
- **Displays the POIs(without text) when zoomed in 7 times**
- **Displays the POIs(with text) when zoomed in 9 times**

STATISTICS FOR POPULAR PLACES OF INTEREST

170 million Americans dine out everyday

90% people search for restaurants online [3]

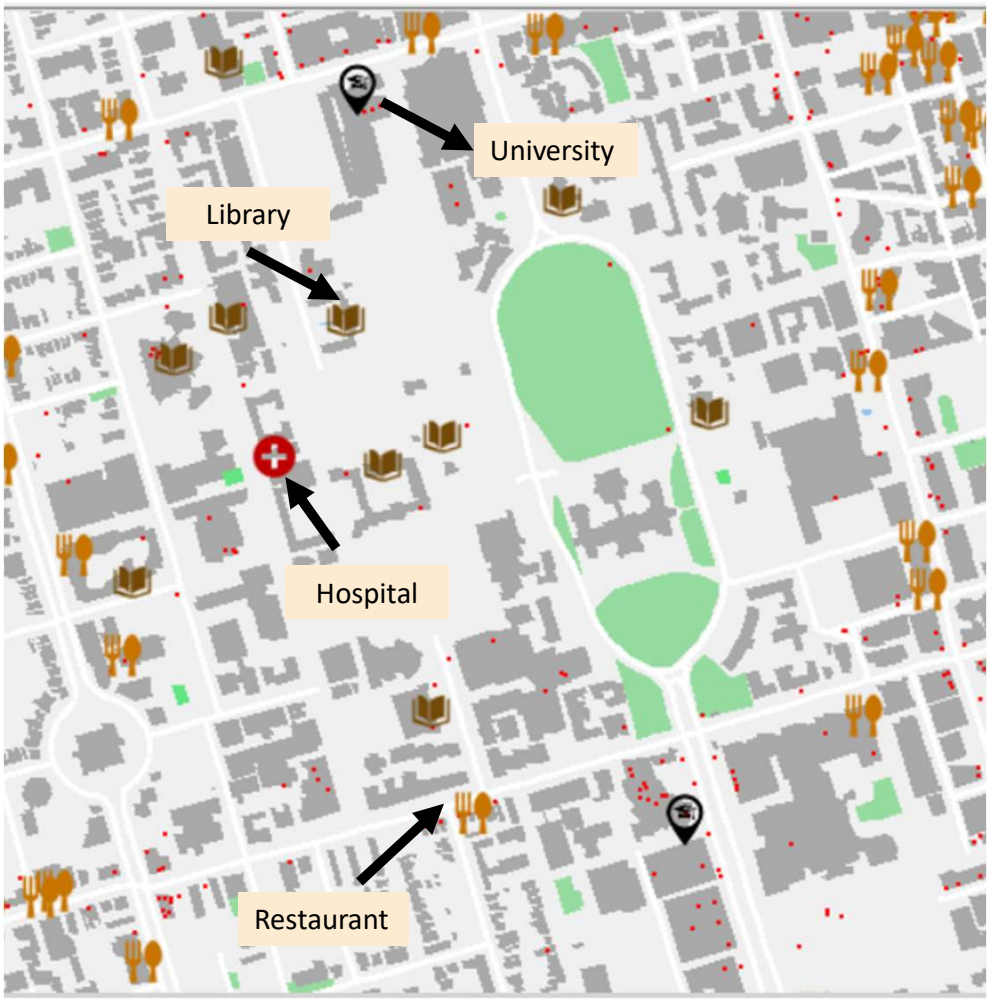
[3] "60+ delicious restaurant industry statistics - 2022 edition," *SmallBizGenius*. [Online]. Available: https://www.smallbizgenius.net/by-the-numbers/restaurant-industry-statistics/#gref. [Accessed: 30-Apr-2022].

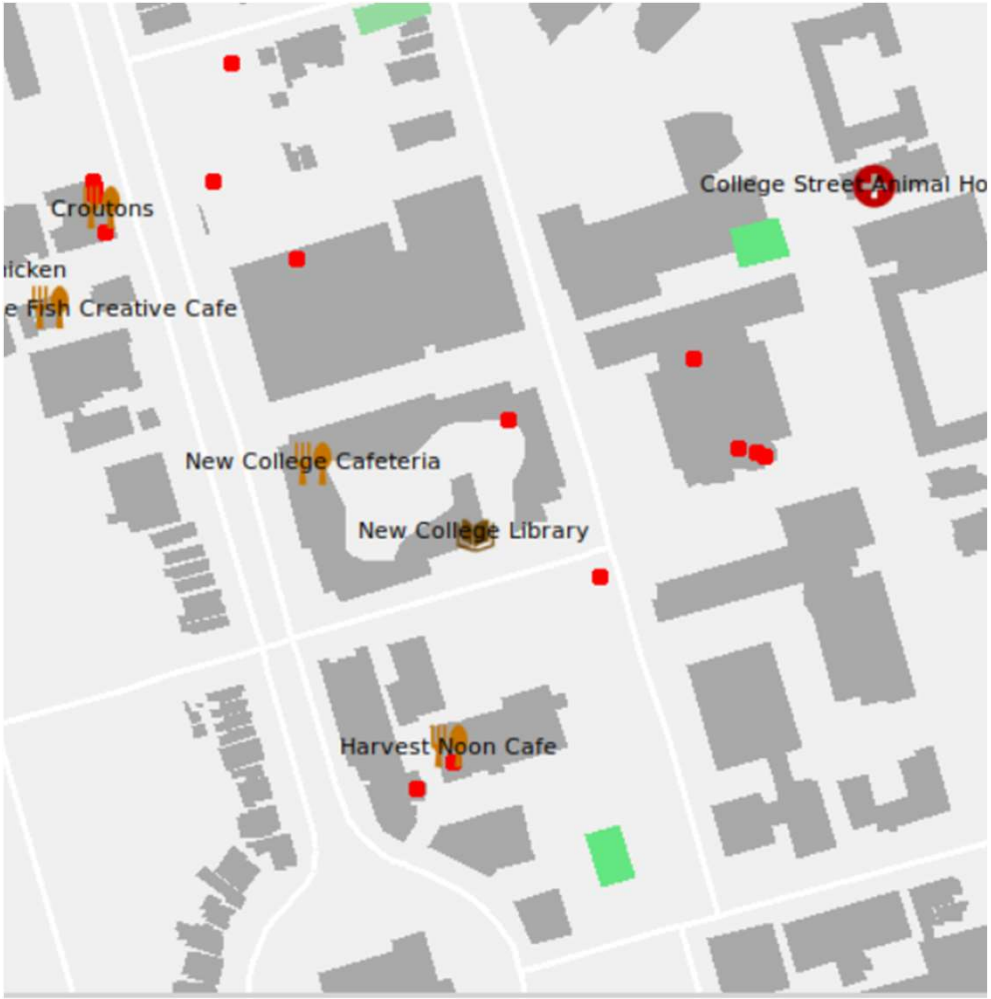


January 2020 – September 2021: 103,370 hospital stays and 255,410 ER visits [4]

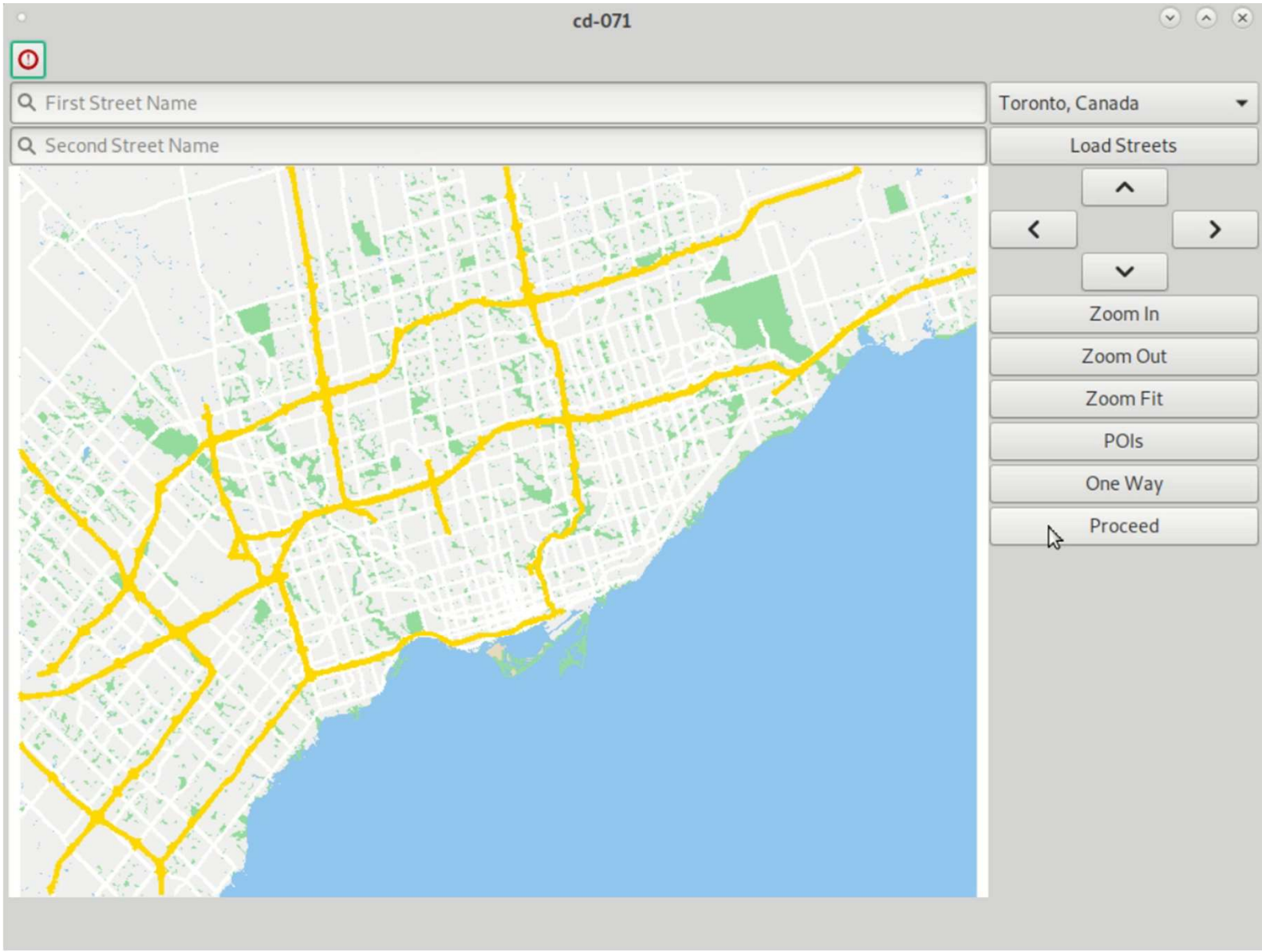
[4] "Covid-19 hospitalization and emergency department statistics," *CIHI*. [Online]. Available: https://www.cihi.ca/en/covid-19-hospitalization-and-emergency-department-statistics. [Accessed: 28-Apr-2022].

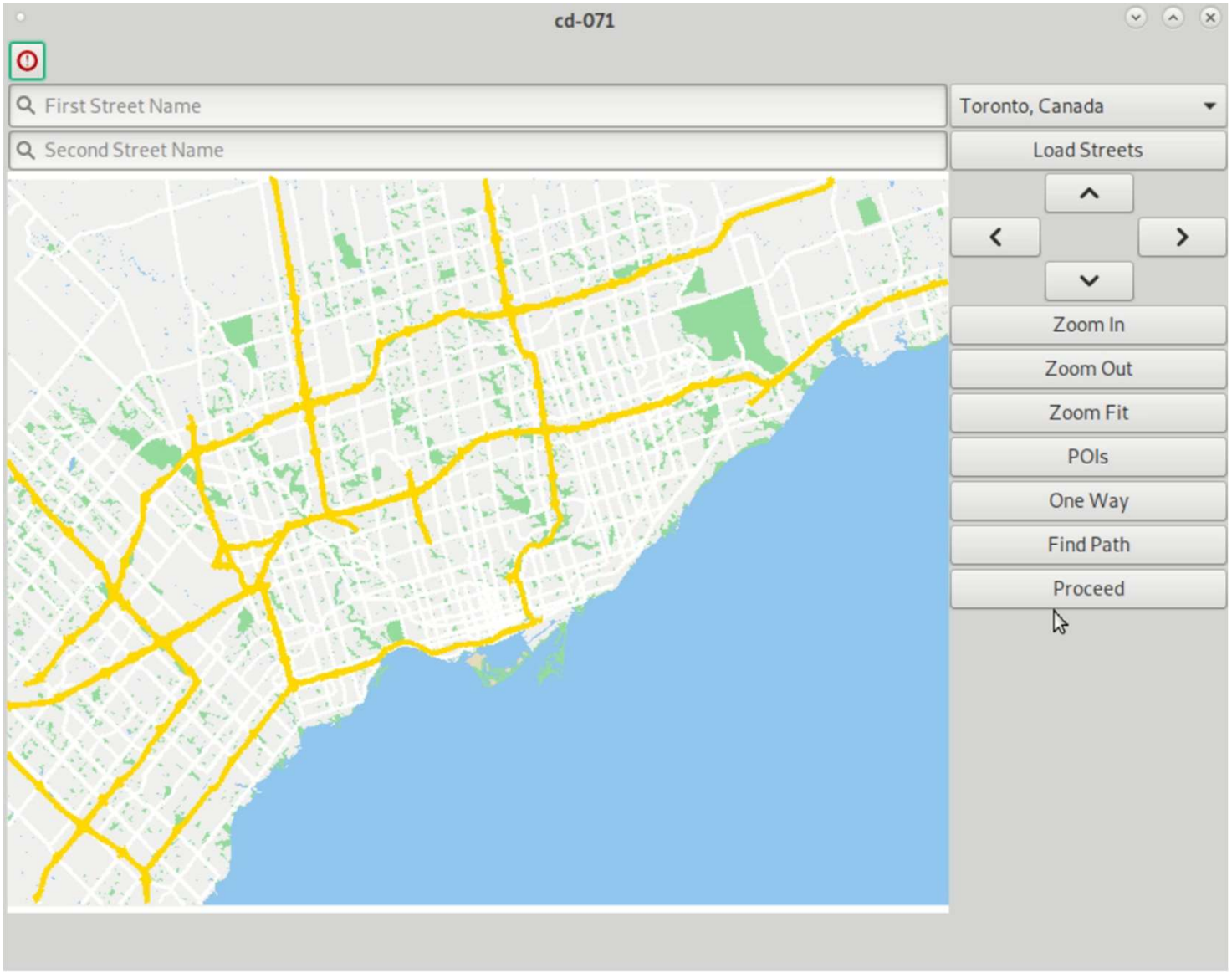
COLOUR COORDINATED MAP BADGES





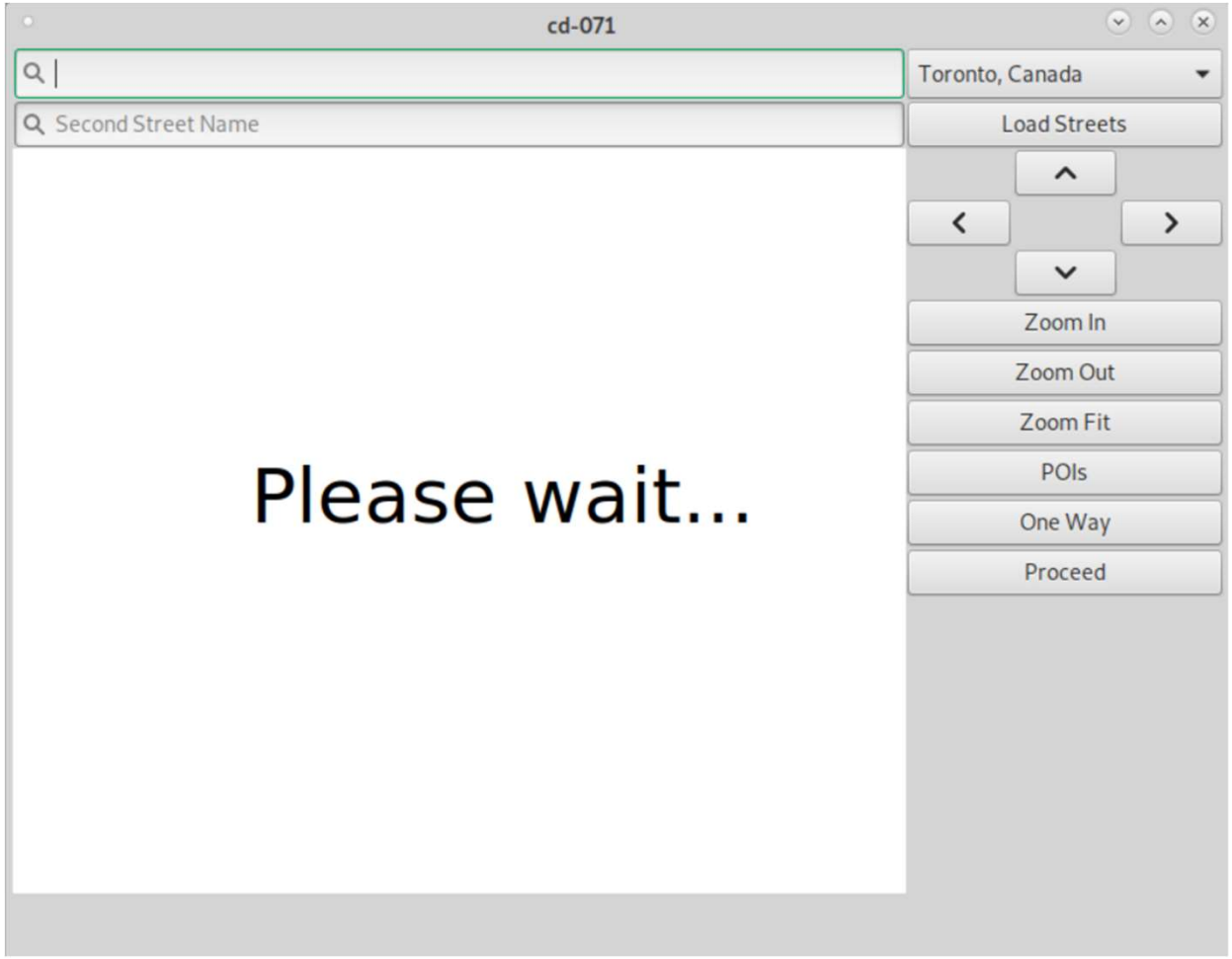
One Way


cd-071
First Street Name
Second Street Name
Toronto, Canada
Load Streets
Zoom In
Zoom Out
Zoom Fit
POIs
One Way
Proceed


cd-071
First Street Name
Second Street Name
Toronto, Canada
Load Streets
Zoom In
Zoom Out
Zoom Fit
POIs
One Way
Find Path
Proceed

Path Finder

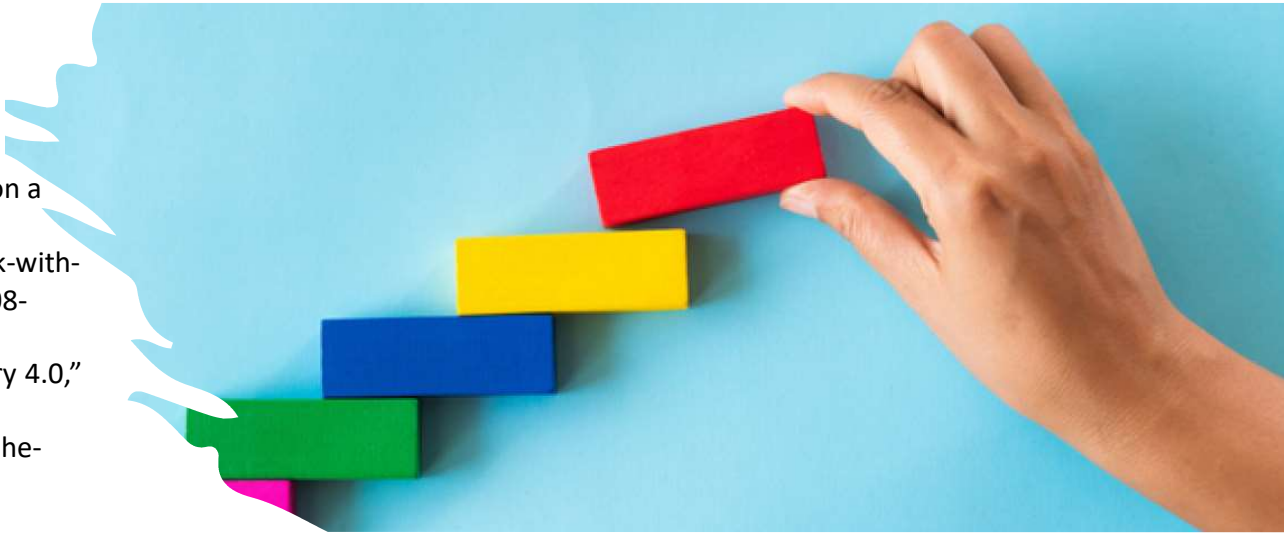
CONTINOUS FEEDBACK



[5] World Leaders in Research-Based User Experience, “Response time limits: Article by Jakob Nielsen,” Nielsen Norman Group. [Online]. Available: https://www.nngroup.com/articles/response-times-3-important-limits/. [Accessed: 30-Apr-2022].

Iterative loading

- Loads what is necessary
- Load when it is necessary



[6] N. Shabasheva, “Minimalist white wall clock with light metal on a yellow background....,” *iStock*. [Online]. Available: https://www.istockphoto.com/photo/minimalist-white-wall-clock-with-light-metal-on-a-yellow-background-time-concept-gm1199400708-343137221. [Accessed: 30-Apr-2022].
[7] 5th A. 2019, “Industrial IOT and the building blocks for Industry 4.0,” *IoT World Today*. [Online]. Available: https://www.iotworldtoday.com/2019/08/05/industrial-iot-and-the-building-blocks-for-industry-4-0/. [Accessed: 30-Apr-2022].

LOADING DATA STRUCTURES

```
void loading_features() {

    double feature_area;

    for (int features = 0; features < getNumFeatures(); ++features) {
        std::vector<ezgl::point2d> tempVec;
        for (int numPoints = 0; numPoints < getNumFeaturePoints(features); ++numPoints) {
            int x_start = x_from_lon(getFeaturePoint(numPoints, features).longitude());
            int y_start = y_from_lat(getFeaturePoint(numPoints, features).latitude());
            ezgl::point2d points(x_start, y_start);
            tempVec.push_back(points);
        }
        tempVec.shrink_to_fit();
        struct Feature_data tempFS;
        tempFS.fill_points = tempVec;
        tempFS.typeName = getFeatureType(features);
        feature_area = findFeatureArea(features);
        optimizedFeatures.insert(std::make_pair(feature_area, tempFS));
    }
    std::cout << "loading features" << std::endl;
    optimizedFeatures.erase(0);

}
```

```
void loadPOI() {
    if (foodPOI.size() == 0) {
        //creating structs for POI types
        for (int points = 0; points < getNumPointsOfInterest(); ++points) {
            if (getPOIType(points) == "restaurant") {
                foodPOI.push_back(points);
            } else if (getPOIType(points) == "hospital") {
                medicPOI.push_back(points);
            } else if (getPOIType(points) == "library") {
                libraryPOI.push_back(points);
            } else if (getPOIType(points) == "university") {
                universityPOI.push_back(points);
            } else
                otherPOI.push_back(points);
        }
        foodPOI.shrink_to_fit();
        medicPOI.shrink_to_fit();
        libraryPOI.shrink_to_fit();
        universityPOI.shrink_to_fit();
        otherPOI.shrink_to_fit();
    }
}
```

Travelling salesman

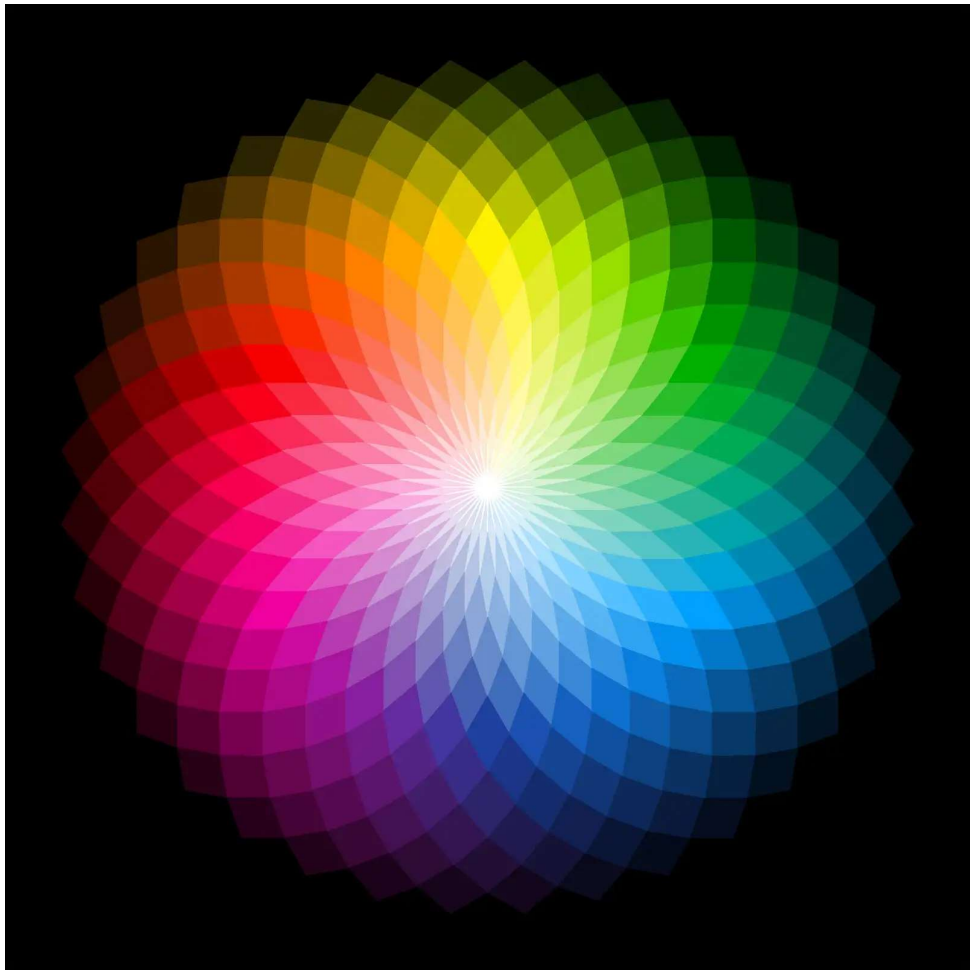
- Dijkstra with conditions
- Heuristics check
- Added weightage to multiple pick-up points

```
for(int i=0; i<dropOffId.size(); ++i){
    if((currID == dropOffId[i].dropIDx) && (dropOffId[i].visited == false)){
        if(!heuristic_check){//add code for if all drop offs not donre
              dropOffId[i].visited = true;
              return currID;
            if(dropOffId[i].canVisit == true){
                dropPoints++;
            }
            else{
                dropPoints = 0;
                break;
            }

        }
        else{
            temp_struct.bestTime = nodes_chahit[currID].bestTime;
            temp_struct.deliveryId = i;
            temp_struct.deliveryPtId = currID;
            temp_struct.isPick = false;
            multiDijsktra.push_back(temp_struct);
            multiDijsktra.shrink_to_fit();
        }
    }
}
```

```
for(int i=0; i<pickUpId.size(); ++i){
    if((currID == pickUpId[i].pickIDx) && (pickUpId[i].visited ==false)){
        if(!heuristic_check)        {
            pickUpId[i].visited = true;
            dropOffId[i].canVisit = true;
          for(int j=0; j<dropOffId.size(); ++j){
              if((currID == dropOffId[j].dropIDx) && (dropOffId[j].canVisit == true) && (dropOffId[j].visited == false)){
                dropOffId[i].visited = true;
                --deliveryPts;
                break;
              }
        }
            return currID;
        }
        else{
            //std::cout<<currID<<std::endl;
            temp_struct.bestTime = nodes_chahit[currID].bestTime;
            temp_struct.deliveryId = i;
            temp_struct.deliveryPtId = currID;
            temp_struct.isPick = true;
            multiDijsktra.push_back(temp_struct);
            multiDijsktra.shrink_to_fit();
        }

    }
}
```

More than meets the eye-Kevin

- Individuals with ADHD have very strong responses to **colors**.
- Colors are deceivingly important when it comes to map design… How do we get it right?
- And what color designs choices has our team made?



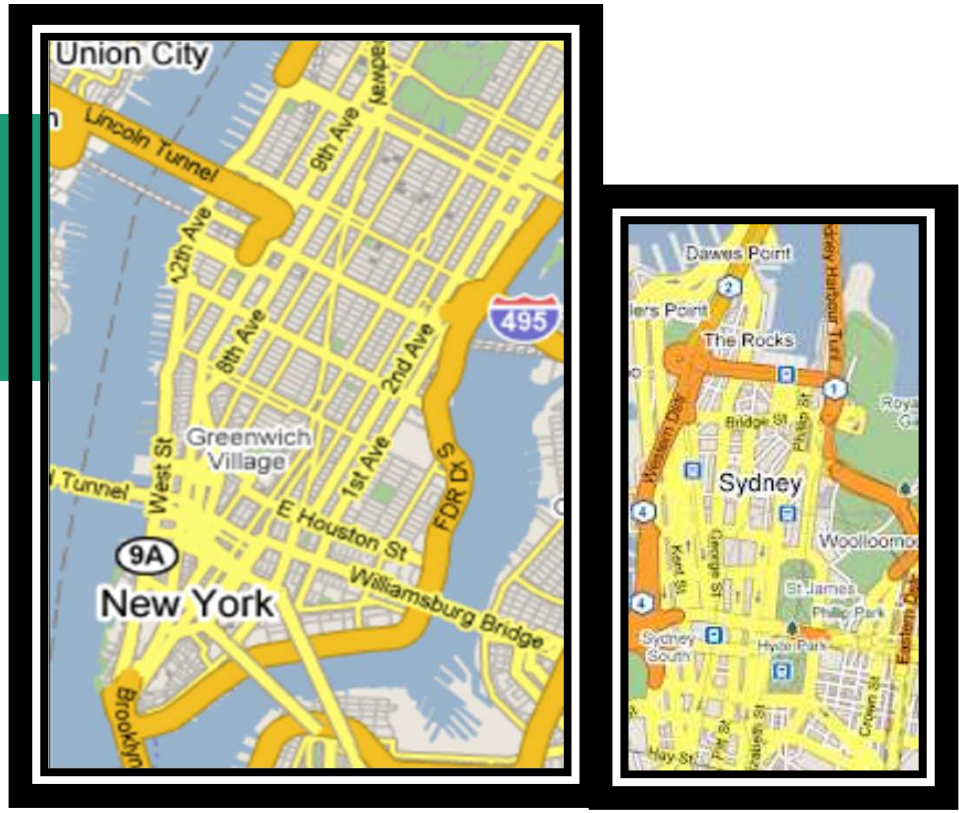
The Palette:

- ADHD causes symptoms of inattentiveness and hyperactivity
- Colors chosen would have to both be distinct, but not distracting
- Research suggests that lightly muted tones of green and blue help keep attention in those who have ADHD [1]

[1]https://www.sherwin-williams.com/architects-specifiers-designers/education/project-profiles/sw-art-stir-colors-matter

The Problem with Google Maps

- Google Maps has been generally criticized for a long time for their poor color design
- Many users agree that the colors are too washed out
- Primarily employ many non-ADHD friendly colors like shades of orange[4], which research indicates to be detrimental to ADHD focus



justin marples Original Poster May 20, 2019

Google Maps background colours are washed out; I cannot identify the roads etc. How to resolve this?

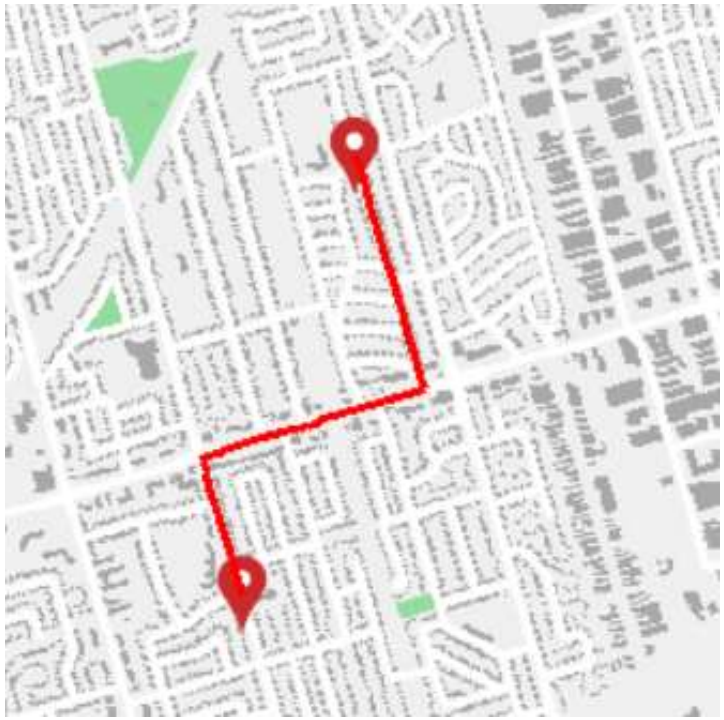
[4]https://www.disabledliving.co.uk/blog/colours-vs-people-with-special-needs/

Our Approach

- However, from our map, we have primarily used colors that are slightly muted, yet non-washed out and clearly identifiable shades of green and blue.

Highlighting:

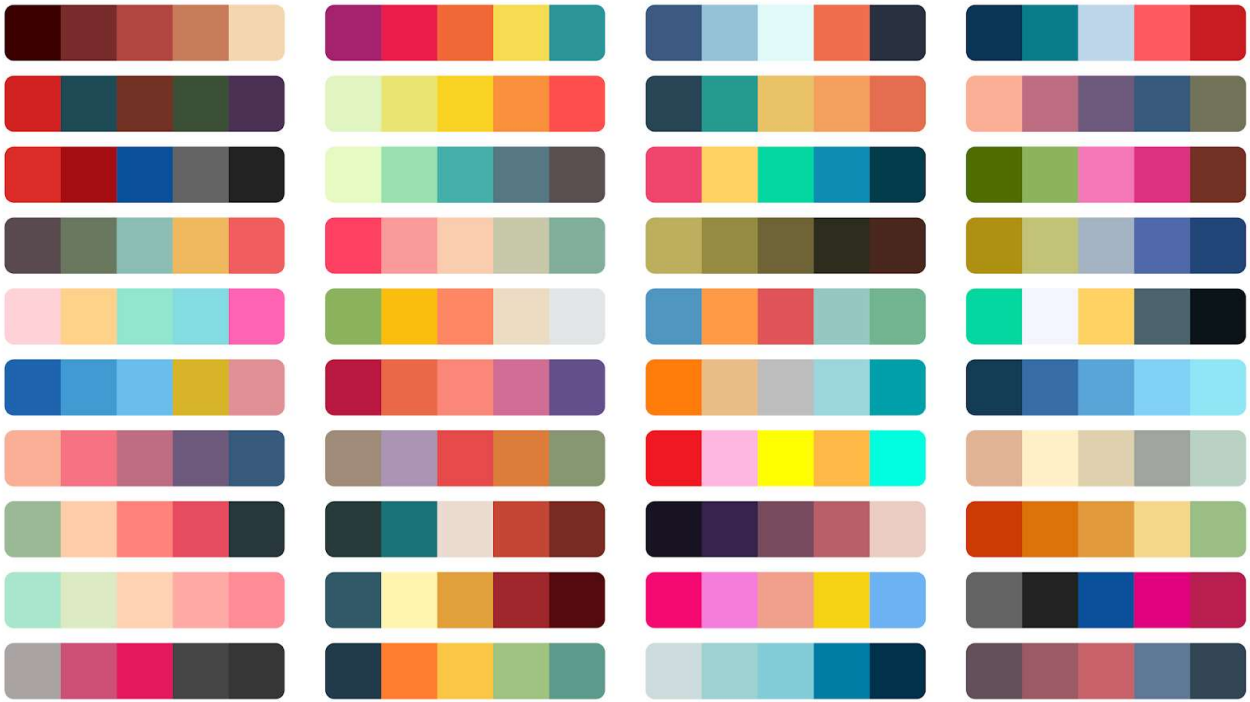
- Function that highlights a path from point A to point B
- As discussed earlier, primary symptom of ADHD is lack of attention, so...
- Make the path as distinct as possible.
- Red immediately grabs attention[5][6] (Example of our code's highlight shown)



[5]https://untappedbrilliance.com/colors-adhd/
[6]https://www.verywellmind.com/the-color-psychology-of-red-2795821

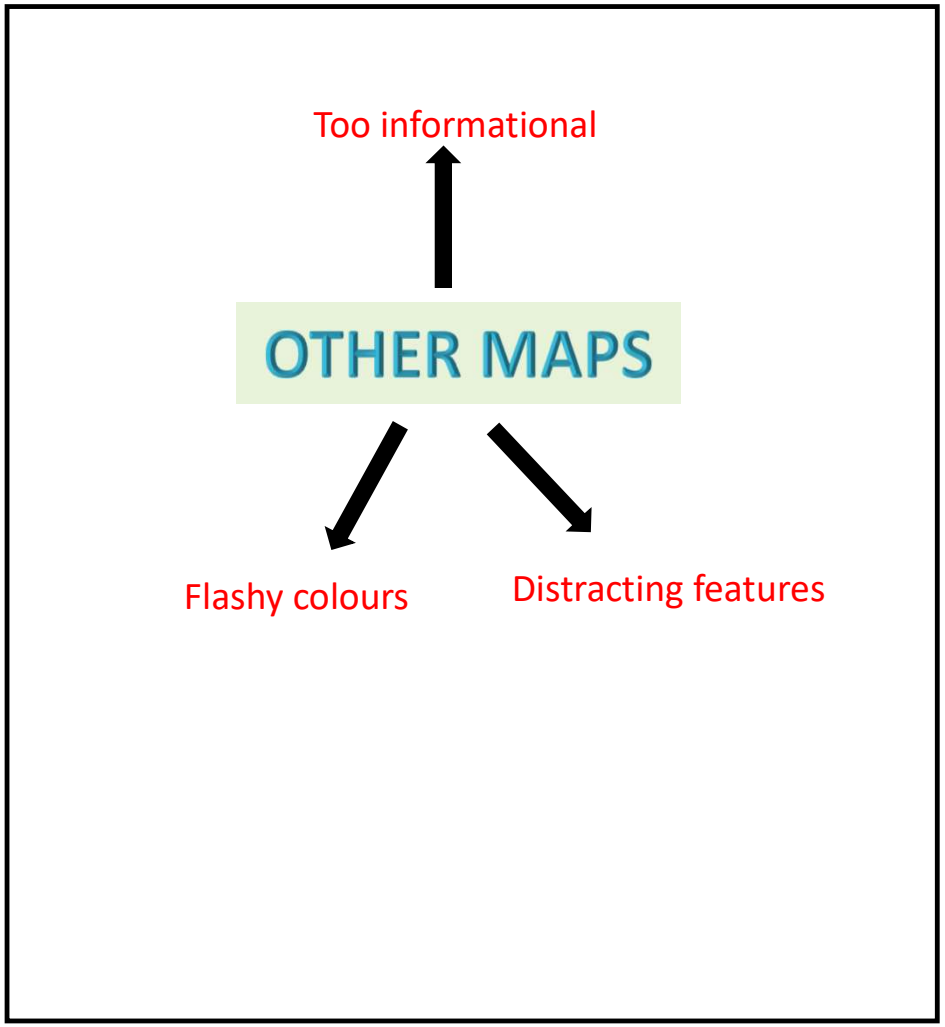
But… Can we make it even better?

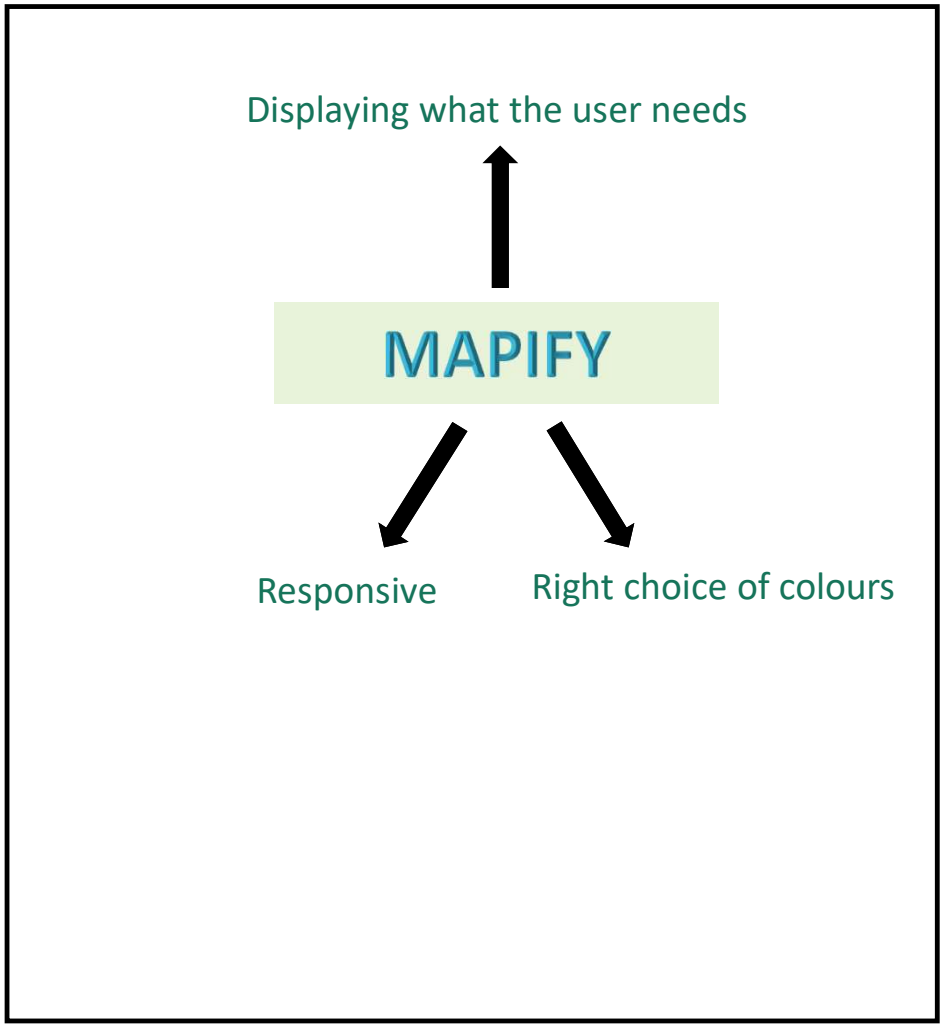
- The ability to allow custom color customization
- Gives more control to the user without compromising inherent useability
- Which is incredibly important
- Less information is good information!



Additionally, provide extra accommodation for visually impaired people, like those with color blindness

CONCLUSION


Too informational
OTHER MAPS
Flashy colours
Distracting features


Displaying what the user needs
MAPIFY
Responsive
Right choice of colours