EXPLORING THE SERVICES AVAILABLE AND THE QUALITY OF PLAYGROUNDS IN GERMANY

IBM Applied Data Science Capstone Final Project

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Description of the problem/background

- Because of coronavirus lockdowns, my children are often home from school, and I sometimes need to take them with me while running errands

- It is useful to combine shopping with trips to our village playgrounds

- It is also useful to know which playgrounds will be good for different lengths of visits.
  - Based on the type and quantity of equipment available

- It is also useful to have lists of playgrounds near certain types of venues such as ice cream shops

Data Sources

- Web scraping to retrieve a list of playgrounds and their characteristics
  - From the crowd-source based website 'spielplatznet' (https://spielplatznet.de/spielplaetze).
  - This site allows a user to search for a city in Germany which then returns a list of playgrounds in the vicinity.
  - Based on playground user inputs

- Foursquare API
  - Retrieve information on venues near each playground.
  - Use the data in k-means clustering
  - Also, to search through for types of venues (ice cream shops, etc.)

- I use the village of Wedel in Schleswig-Holstein (near Hamburg)
  - Pretty good data.
  - I know many of the locations well and so can confirm when the data is complete or missing.
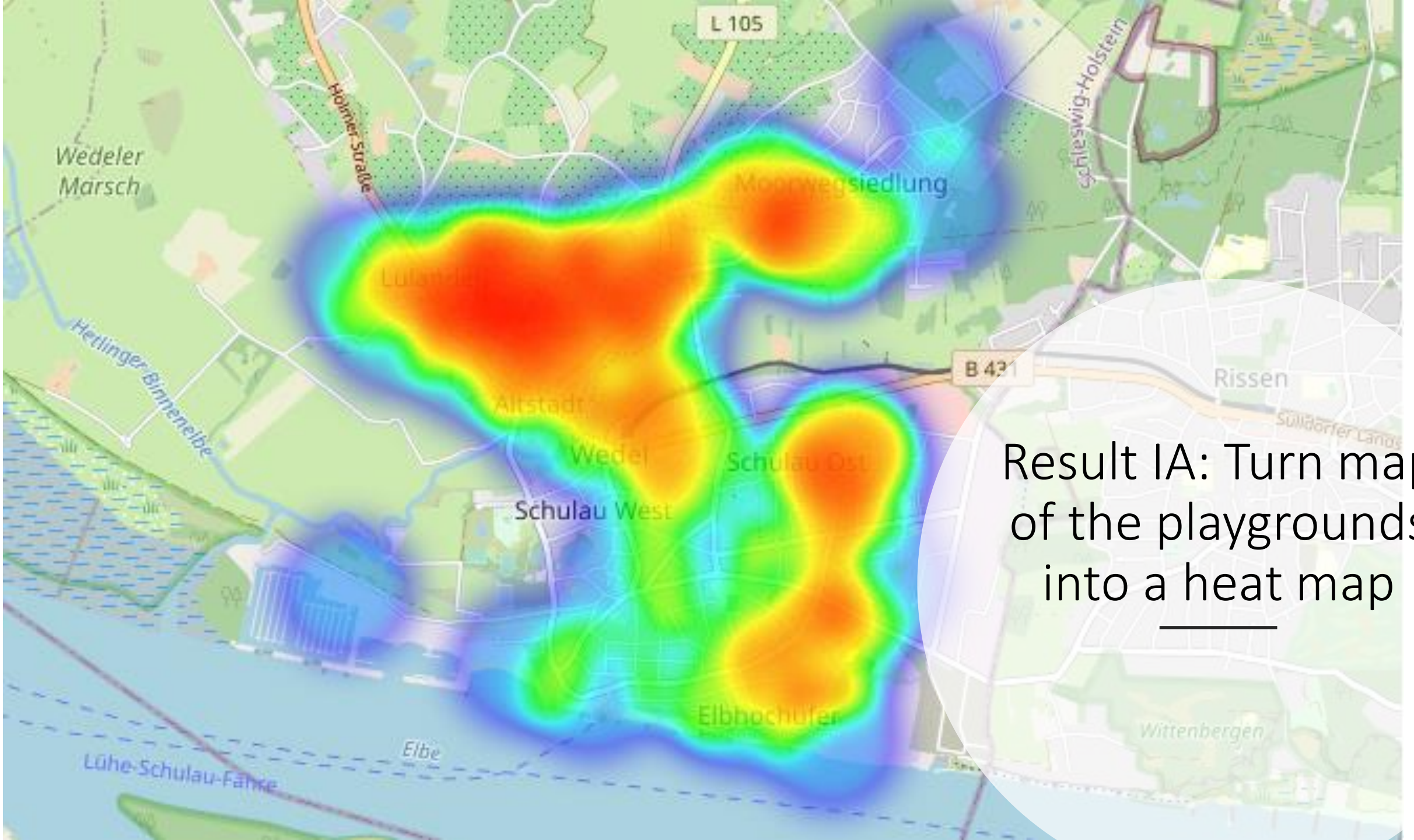
Analysis Process

- Retrieve a list of the playgrounds in the vicinity of a German city.

- Use that list to then look up each playground's detailed information.

- Use Foursquare's api to then find which venues are nearby and add to the dataset.

- Find the commercial characteristics of each playground's neighborhood.

- Cluster the playgrounds based on their commercial surroundings.

- Also cluster the playgrounds based on the equipment available.

- Finally, make a few lists of playgrounds with kid-friendly food and icecream nearby and certain playground features.

Contents of the Jupyter Notebook

1. Introduction

2. Part I: Data preparation
   1. Part IA: Get a list of playgrounds in a city of interest
   2. Part IB: Get detailed playground information for each location
   3. Part IC: Visualizing the playground dataset
   4. Part ID: Adding Foursquare data

3. Part II: Methodology and results
   1. Part IIA: Exploring the top five venue types for each playground
   2. Part IIB: Clustering and mapping based on venues
   3. Part IIC: Clustering and mapping based on playground equipment
   4. Part IID: Finding the playgrounds that are near fast food restaurants, icecream shops, etc.

4. Discussion and concluding remarks

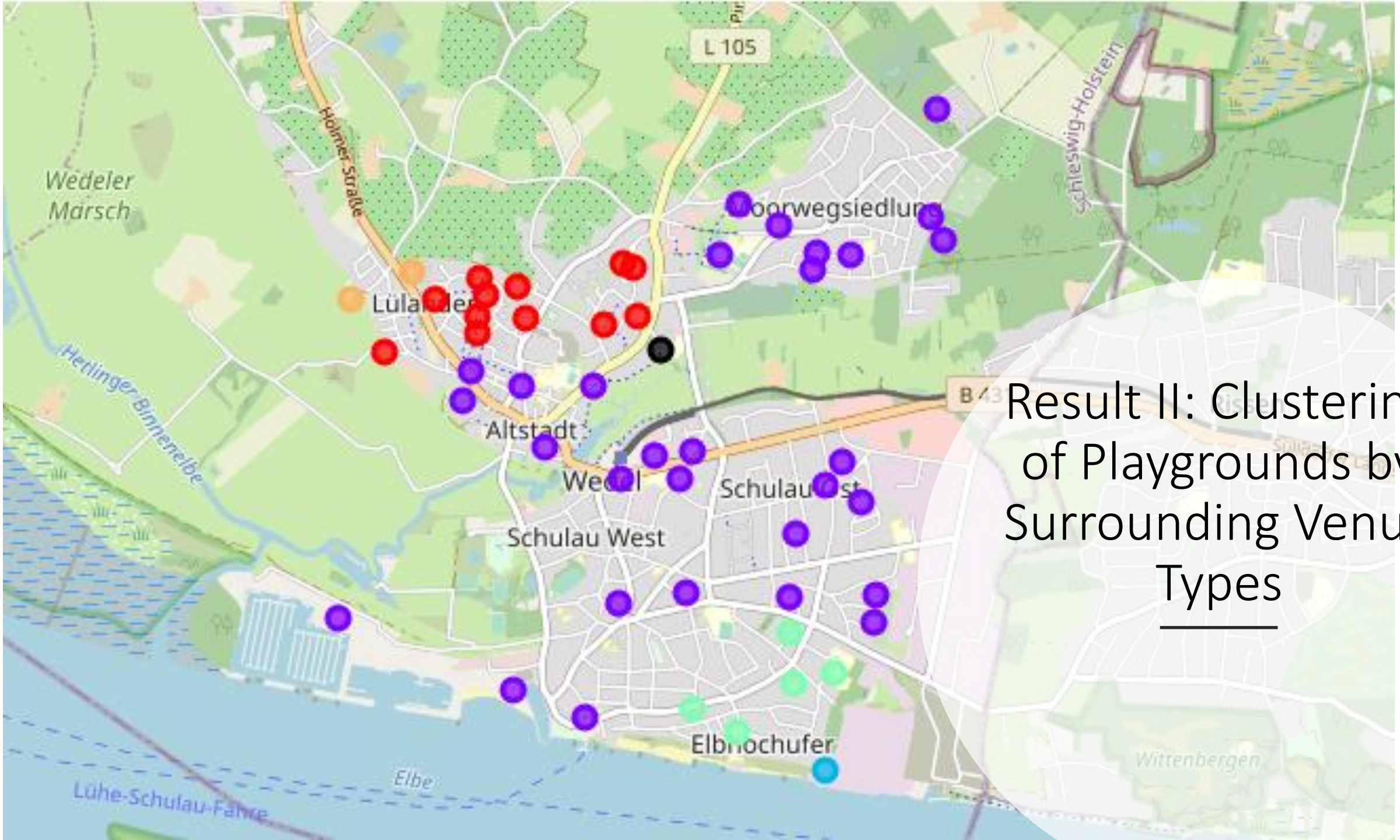Result I: Map of Wedel with Playgrounds Plotted
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Result IA: Turn map
of the playgrounds
into a heat map

	Playground	Playground Latitude	Playground Longitude	Venue	Venue Latitude	Venue Longitude
0	Spielplatz Waldspielplatz Moorwegsiedlung Wedel	53.592631	9.731698	Waldspielplatz	53.592623	9.731623
1	Spielplatz Waldspielplatz Moorwegsiedlung Wedel	53.592631	9.731698	Hackradt Bäcker	53.590744	9.725168
2	Spielplatz Haselweg Wedel	53.591291	9.706469	ALDI NORD	53.592820	9.710503
3	Spielplatz Meisenweg Wedel	53.594306	9.715068	ALDI NORD	53.592820	9.710503
4	Spielplatz Meisenweg Wedel	53.594306	9.715068	Spielplatz	53.592523	9.710625
5	Spielplatz Meisenweg Wedel	53.594306	9.715068	Schokoengel		
6	Spielplatz Meisenweg Wedel	53.594306	9.715068	elBistro Wedel		
7	Spielplatz Meisenweg Wedel	53.594306	9.715068	Spielplatz		
8	Spielplatz Wasserspielplatz Haus am See Wedel	53.591441	9.705530	ALDI NORD	53.592820	9.710503
9	Spielplatz Wasserspielplatz Haus am See Wedel	53.591441	9.705530	Steinberghalle Wedel	53.589295	9.699597

Use Foursquare to find all venues near each playground

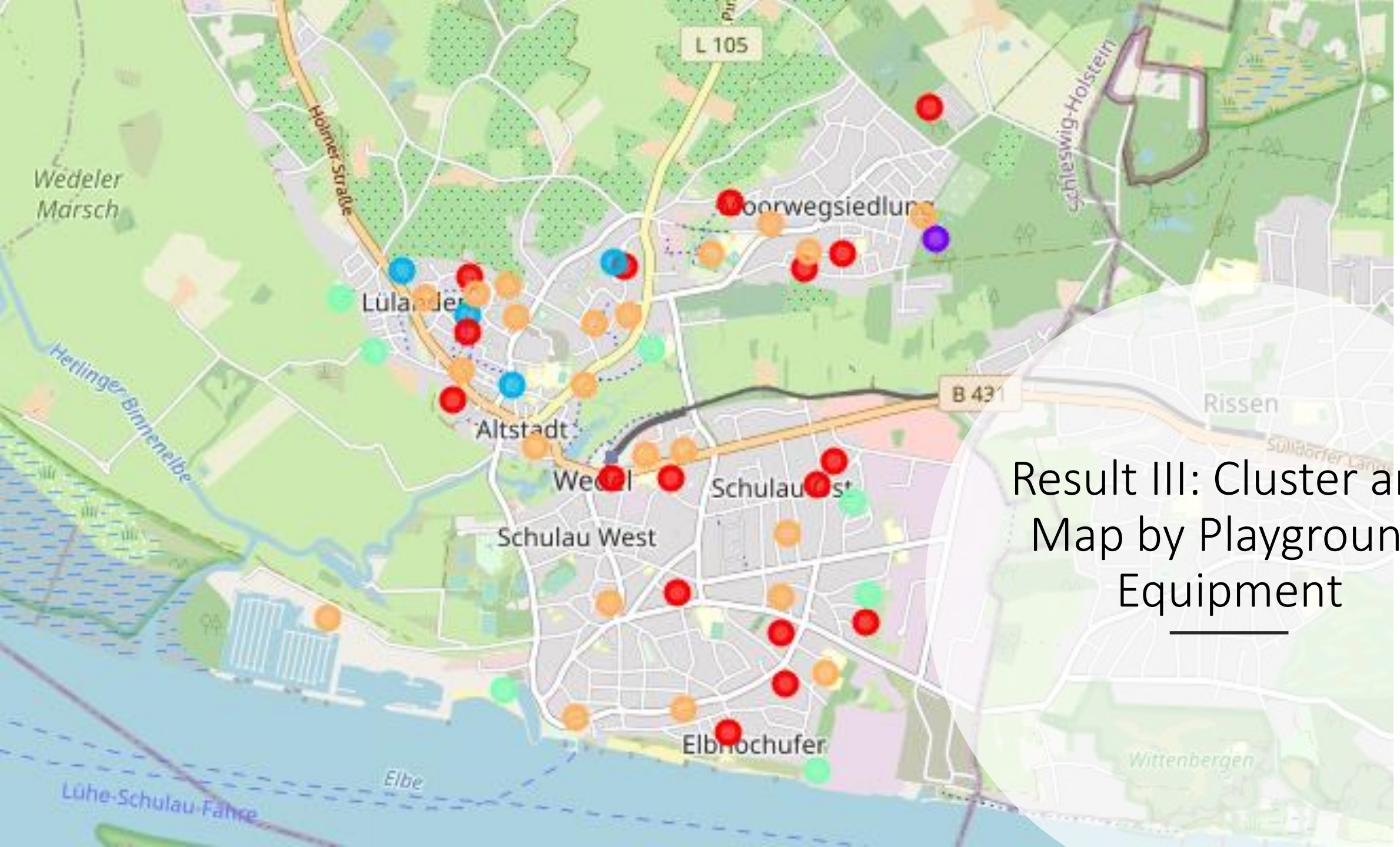| Playground	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue
Spielplatz Albert-Schweizer Schule Wedel	Arts & Crafts Store	Garden	Supermarket	Photography Studio	Bus Stop	Electro... S...
Spielplatz Alter Zirkusplatz Wedel	Supermarket	Shopping Mall	Turkish Restaurant	Café	Bakery	B...
Spielplatz Altstadtschule Wedel	Italian Restaurant	Hotel	Sculpture Garden	Trattoria/Osteria	Museum	Fast F... Restau...
Spielplatz Anne-Frank-Weg Wedel	Garden Center	Supermarket	College Gym	Insurance Office	Turkish Restaurant	Electro... S...
Spielplatz Ansgariusweg Wedel	Bakery	Tea Room	Supermarket	Garden Center	Turkish Restaurant	Drugs...

Rank most common venues by playground

Result II: Clustering of Playgrounds by Surrounding Venue Types

Playgrounds Clustered by Surrounding Venues

- Cluster 0 (red): A residential neighborhood of the village. There are less cafes here and a more residential/homeowner services

- Cluster 1 (purple): The bulk of observations. In the more urban area of the village with access to several small shops and services. A better choice for an extended outing that includes playgrounds and socializing

- Cluster 2 (blue): A beach playground isolated from most shops.

- Cluster 3 (light-green): 1960's-70's area of city with smaller home businesses and second-hand stores.

- Cluster 4 (orange): Playgrounds on the road into the village which share the same shops.

- Cluster 5 (black): This playground didn't return commercial venues nearby. Foursquare is not entirely consistent for this area as this playground isn't that isolated.

Result III: Cluster and Map by Playground Equipment

Playground Equipment-Based Cluster

- Cluster 0 (red): These are mostly some pretty good playgrounds, good for hour-long trips

- Cluster 1 (purple): This is an exceptional forest playground, the kind that parents send pictures of to other people. There's probably even some equipment that's not listed here

- Cluster 2 (blue): All the playgrounds with water features (pumps, troughs, water wheels, etc.). These tend to have less standard playground equipment, and are more just focused on water play

- Cluster 3 (light-green): These playgrounds all include football/soccer fields and good equipment

- Cluster 4 (orange): Some have less going on –more neighborhood playgrounds than those worth driving to. Also, the playgrounds without ratings and poorly listed equipment. It may be that these do not have much data provided to the webpage.

Result IV: Lists of Playgrounds Near Important Resources

- Fast food restaurants

- Venues serving icecream

- Playgrounds with water features

- With a supermarket nearby

- Ex. the ice cream playgrounds:

	Playground	Playground Latitude	Playground Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
39	Spielplatz Alter Zirkusplatz Wedel	53.575596	9.710723	Eiscafé Venezia	53.577454	9.70535	Café
154	Spielplatz Rosengarten Wedel	53.581053	9.705455	Eiscafé Venezia	53.577454	9.70535	Café
182	Spielplatz Vogt-Körner Straße Wedel	53.575123	9.705176	Eiscafé Venezia	53.577454	9.70535	Café

Discussion and concluding remarks

- Clustering based on nearby venues captures differences in the services available well
  - Also Captures neighborhoods differences/characteristics

- Patterns also emerge on the playground equipment clusters.
  - Many of the playgrounds in the village are good and have been grouped together.
  - Playgrounds with football/soccer fields are also grouped well, as are those with water features.

- Sometimes its more important to have specific businesses or business categories nearby.
  - Lists of the playgrounds near fast food, ice cream, supermarkets, and playgrounds with certain equipment are now readily available.

- Thoughts on expansion/improvement:
  - Calculate the distance between each playground and the venues since walking with children is difficult sometimes
  - Could also use the coordinates to retrieve satellite imagery, then a computer vision approach to check how much afternoon shade is available.
  - Identify parking options nearby