

Visualization of NYC Restaurant Inspection Data using Augmented Reality (AR)

Abstract

- Visualizations for the most recently inspected and graded restaurants located in the 5 Boroughs of New York City.
- More than 90% of the violations cited are health/hygiene related
- Provide an insight on the hygienic scenario of eateries in NYC
- Helps user make decisions on eating out by assessing the options their area provides
- Allow user to select restaurants in their Borough region based on:
 - Inspection Results trend
 - Cuisine popularity
 - Most Hygienic Cuisines
 - Restaurant Scores
 - Criticality of the violation cited [if any]

Data Description

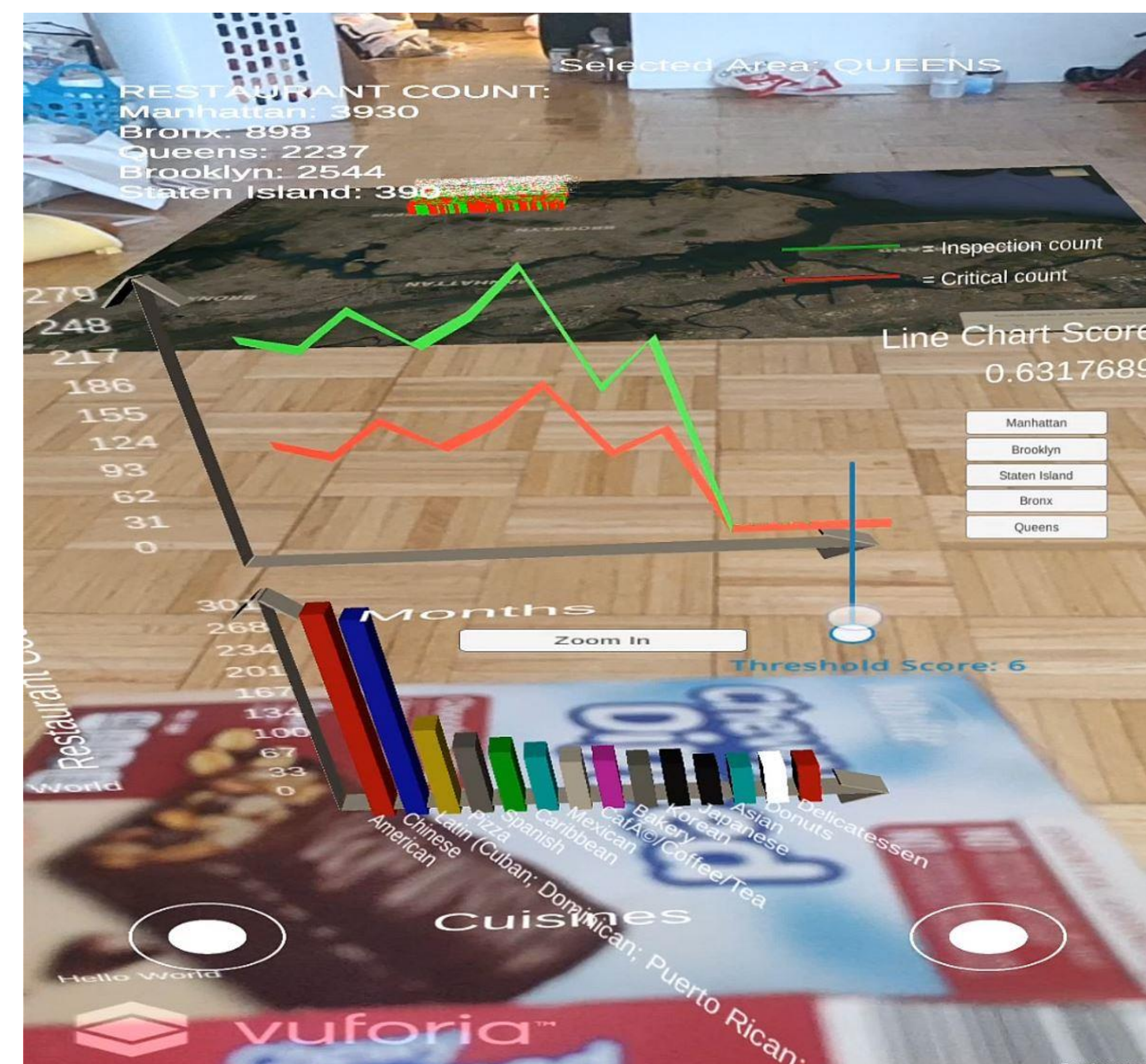
- Dataset used: Kaggle NYC Restaurant Inspections Data
- Inspection Data used only for the most recent year: 2017
- Older records not relevant for assessing restaurant hygiene conditions
- Metrics used to assess
 - Score (Slider) : Range [0-150]
 - Criticality (Restaurant Object Colour): Critical/Non-Critical
 - Grade (Visible once user selects restaurant): Range:[A-F], Z/P- Pending, N- Not Graded
- Important Features: Restaurant Names, Cuisine, Address, Date/Month of Inspection, Phone Number, Grade

WHY AR? AND HOW?

- AR allows:
 - Increased perception about the data as can be augmented with any real-life object as plane
 - Share detailed information about the data user wants to see, by spreading it out on a map and giving user multiple options which help them get the data that they actually want to see
 - Extended Interactivity with the User
 - Using Unity and Vuforia, it is possible to create Augmented Reality applications. Vuforia uses computer vision to detect a plane in physical space of the user, and objects can be placed in this detected plane. As a result, the orientation and positions of the objects change with user's physical movement, as if they are actual physical objects placed near the user.

Visualisations Presented

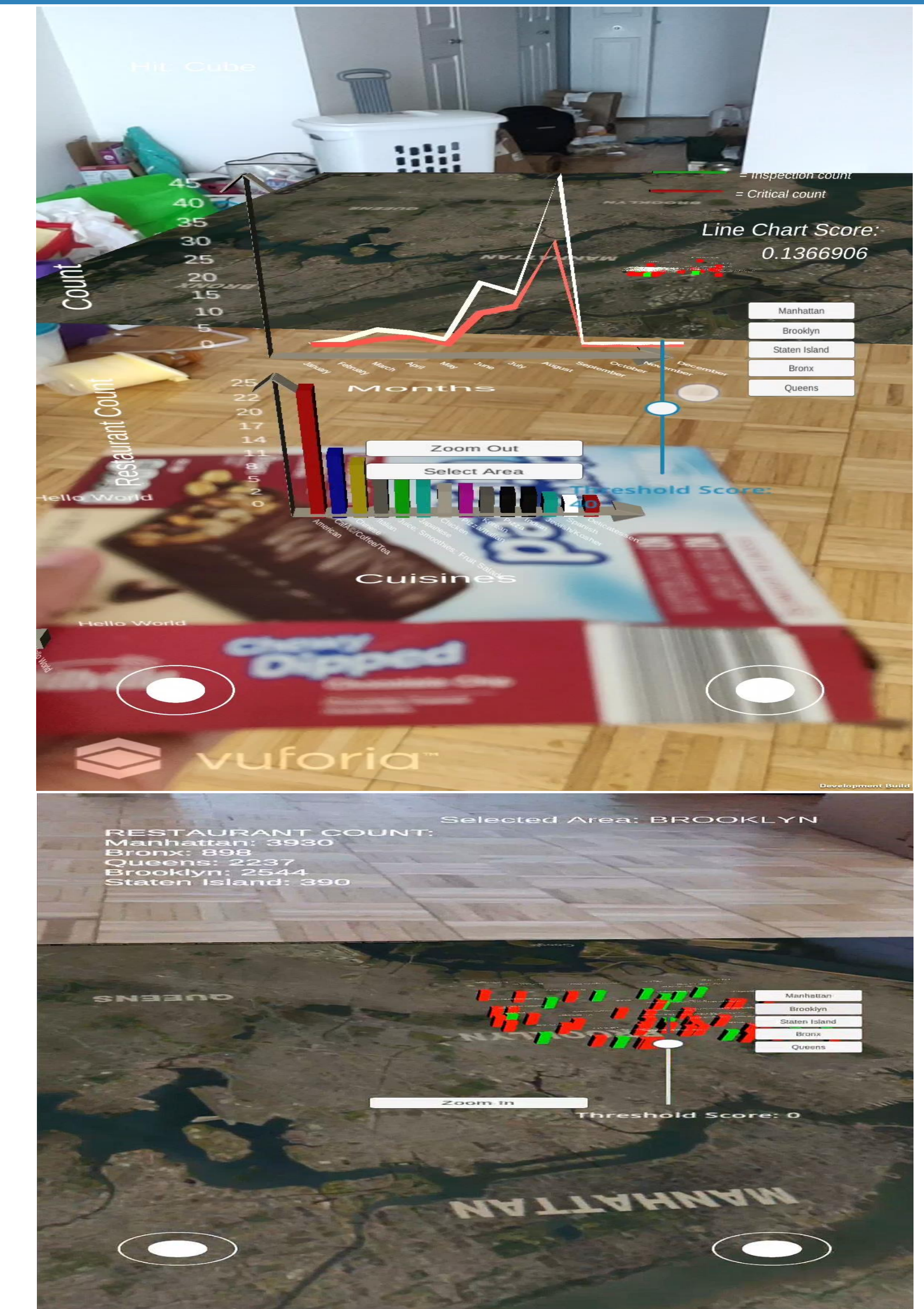
- 3D Map: For depicting individual datapoints
- Line Chart: For depicting the trend of total inspections conducted over the year and number of critical violations cited over the year
- Line Chart Score Calculation:
(Normalised Average of (inspection count – critical restaurant count) for each month)
- Bar Graph: Depiction of number of restaurants for top 15 cuisines in a borough
- Brushing and Linking technique is applied which filters restaurants according to the score threshold being set



Insights

- The restaurant dataset is very huge and consists of data that might be irrelevant from the user's perspective, like inspection code, grade date etc.
- This approach allows to extract only the information that is user relevant
- The score represents the latest all over score of a restaurant and is one of the most important assessing metrics, because of which we allow the user to set a score threshold
- Also the trends in the number of inspections give an idea about how many restaurants are recently getting inspected and how many out of these are violating the rules. This way the users get informed on the hygiene trends in their area, which would further help them in decision making in terms of eating out options.

Results



Conclusion and Future Work

- Right now the locations of the restaurants depicted are accurate to the Borough. Exact geolocation of the restaurant on the map can be depicted for a more real-time experience.
- This can be done by merging the current dataset with NY City dataset containing the location info accurate up to street level, or even better actual restaurant GPS locations.
- Due to time and computation limitations, we were only able to render some basic shapes for restaurants.
- This approach can be extended to a variety of more complex visualizations which are computationally expensive to render in AR
- Also, the map area is now limited to a single city. This can also be expanded, given an accurate dataset is found and cost of processing such huge data can be somehow minimized.