Crowdsourcing for Situational Awareness Following an Earthquake

Goal: After a devastating earthquake in St. Himark, we aim to analyze data on earthquake intensity and aftermath to identify which areas of the city are in greatest need of recovery efforts. The data, which was collected through an app, includes indicators of earthquake damage such as availability of power and condition of infrastructure. We will visualize and interpret this data to pinpoint which parts of the city emergency responders should prioritize.
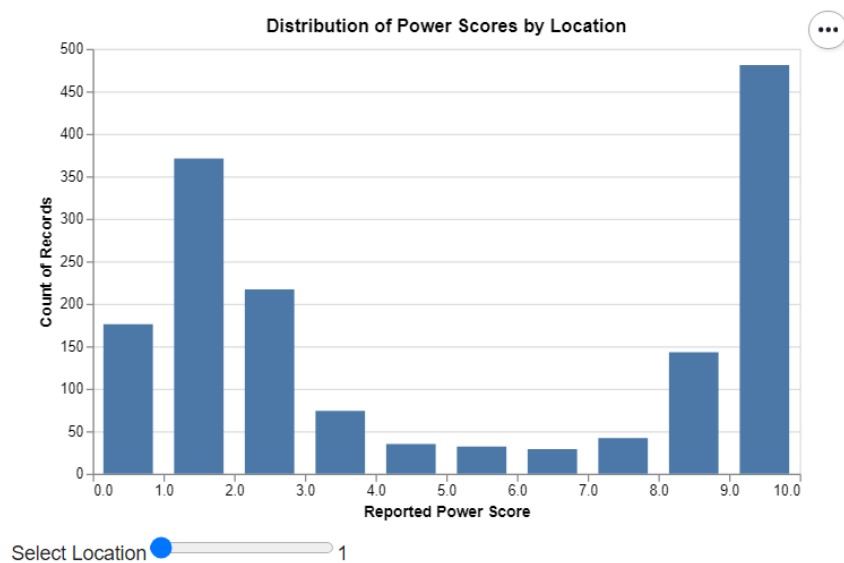
Visualizations

Figure 1: Distribution of Power Score by Location

Based on the distribution of power scores by location, locations 1, 3, and 9, 10, and 11 experienced the most severe damage to power lines. In these three locations, 10 was the most frequent score for the "power" category, indicating extensive damage.
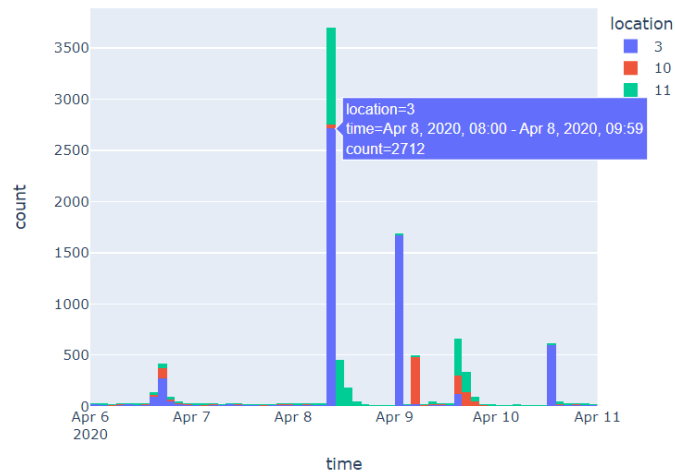
Figure 2: Distribution of Reports Received for Locations 3, 10, and 11

Of locations 3, 10, and 11, people in location 3 produced the greatest number of responses. This indicates that this area is more densely populated than the rest, further highlighting the need for emergency response efforts to prioritize location 3.
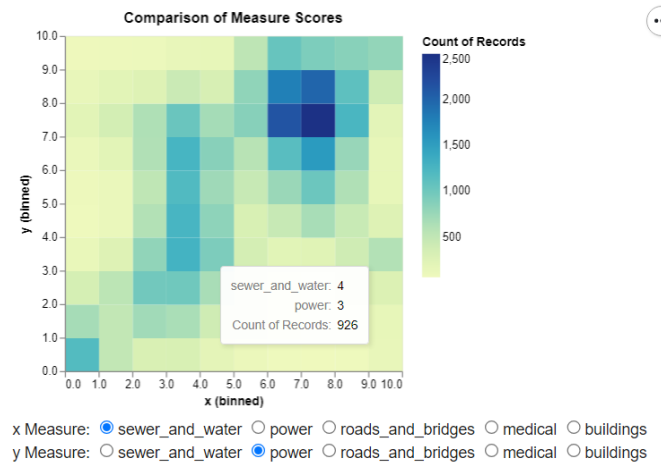

Figure 3: Comparison of Score Across all Locations

Sewer and water and power damages have the strongest positive correlation among five categories of damage, with sewer and water score of 7 and power score of 7 having the highest count of records in the heatmap. Medical and buildings don't have a clear relationship with any other categories. This suggests most damages recorded are related to water and electricity, thus emergency responders should prioritize recovering them.
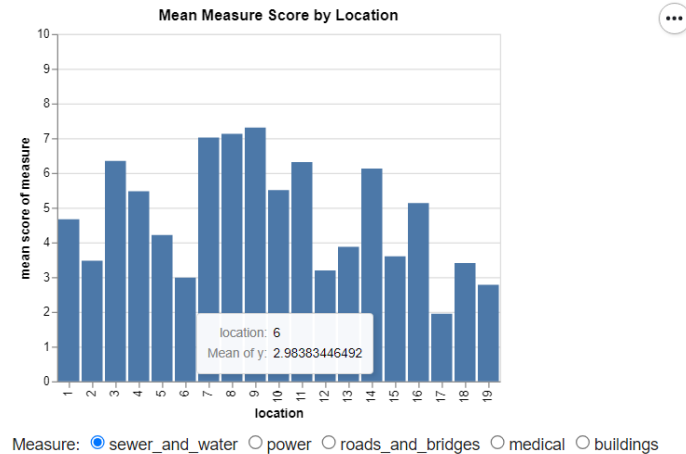
Figure 4: Mean Score by Location

Locations 17, 18, and 19 have low mean scores in most categories, so we could focus on other locations first. Location 12 has a mean of 5 or below in all categories except medical with a mean of 9. This is unusual and requires further investigation.
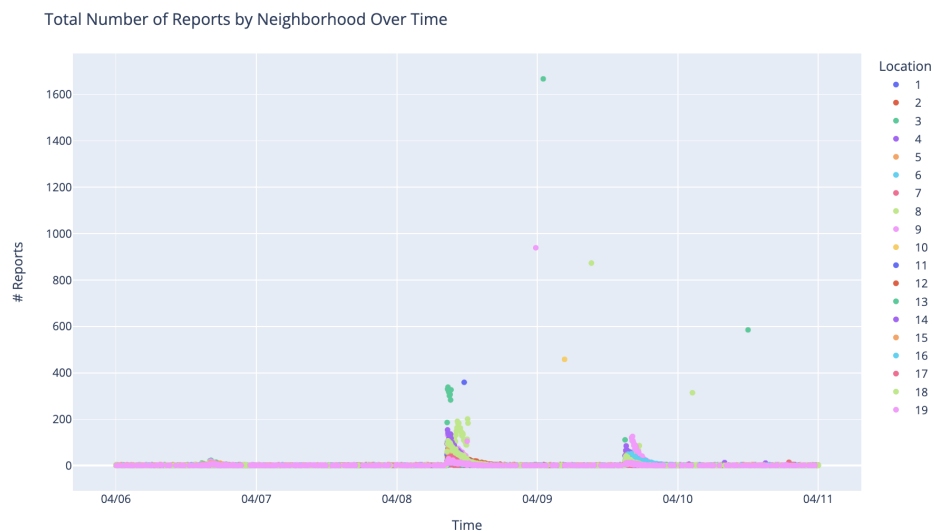

Figure 5: Total Report by Location Overtime

Figure 5 gives an overall picture of the incident, both between events and across neighborhoods. Reports during pre-quake, major quake, and aftershock are received. There is a spike on April 8, which reflects the major earthquake that hit St. Himark at the beginning of the work day. The shape of the curve resembles the gamma distribution. A slower decay shows how app reports start coming back in as the city recovers. There is an outlier on April 9, with 1667

reports received from location 3. Combining with other graphs, it can be seen that location 3 should be prioritized.