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Machine Learning: HW1

Link to my GitHub repo: <https://github.com/coxas/CAPP30254>

***Problem 1:***

**Requests Over Time**

Graffiti Requests Over Time (for some reason there are “Creation Dates” marked as in the 1920s, don’t know what that’s about):



Pothole Requests Over Time:



Sanitation Requests Over Time:



When I tried to find the requests over time for the Abandoned Buildings Dataset, it said that some of the columns in the dataset had mixed types and wouldn’t print the graph.

There are a lot of subgroups for each group, and putting each requests-over-time graph here would be excessive. I’ve included a graph of one subgroup for each of the three large groups that have subgroups. They all seem to mirror the plots for their main groups, respectively.

Graffiti on Metal Requests Over Time:



Sanitation Requests About “Garbage in Yard” over time:

Again, there were no specific subtypes for potholes.

**Average Response time:**

|  |  |
| --- | --- |
| Graffiti | 8.05 days |
| Sanitation | 9.55 days |
| Potholes | 29.81 days |

There was only a creation date, but not a completion date, for Abandoned Buildings, so I wasn’t able to calculate response time.

Amazing to see how long it takes the city to answer pothole requests. Must be why there are still so many potholes in Hyde Park!

**Requests by Subtype:**

Graffiti:

|  |  |
| --- | --- |
| Metal - Unpainted | 15744 |
| Asphalt | 691 |
| Limestone | 3150 |
| Stucco | 2837 |
| Other/Unknown Surface | 6565 |
| Aluminum Siding | 42900 |
| Tree | 726 |
| Vinyl Siding | 14401 |
| Glass | 12146 |
| Metal - Painted | 142177 |
| Wood - Unpainted | 10799 |
| Wood - Painted | 48044 |
| Marble/Granite | 1056 |
| Other / Unknown Surface | 87059 |
| Metal | 47903 |
| Brick - Painted | 166052 |
| Cement (Sidewalk, Alley, Wall, Curb) | 50475 |
| Brick - Unpainted | 198701 |

Potholes: There weren’t any specific subtypes for potholes.

Sanitation:

|  |  |
| --- | --- |
| Graffiti Commercial Vehicle | 88 |
| Overflowing carts | 8944 |
| Dumpster not being emptied | 9223 |
| Construction Site Cleanliness/Fence | 4194 |
| Garbage in yard | 21564 |
| Dog feces in yard | 6361 |
| Standing water | 1158 |

Abandoned Buildings:

|  |  |
| --- | --- |
| Building is Boarded Up | 33 |
| Boarded | 6347 |
| Building is Open / Unsecure | 258 |
| Open | 44739 |

**Areas with Most Requests:**

|  |  |  |  |
| --- | --- | --- | --- |
| Type of Request | Neighborhood Name | Ward | Zip Code |
| Graffiti | South Lawndale | 14 | 60632 |
| Potholes | Austin | 41 | 60629 |
| Sanitation | Austin | 6 | 60620 |
| Abandoned Buildings | South Englewood | 17 | 60636 |

**Requests by Neighborhood (Ward):**

Ward, Potholes Ward, Graffiti Ward, Sanitation Ward, Buildings

|  |
| --- |
| 0.0 1311 |
| 1.0 8626 |
| 2.0 11718 |
| 3.0 6500 |
| 4.0 5691 |
| 5.0 8426 |
| 6.0 9619 |
| 7.0 6697 |
| 8.0 12495 |
| 9.0 8420 |
| 10.0 9872 |
| 11.0 8360 |
| 12.0 7891 |
| 13.0 12746 |
| 14.0 9824 |
| 15.0 6278 |
| 16.0 6379 |
| 17.0 7441 |
| 18.0 11036 |
| 19.0 13534 |
| 20.0 6239 |
| 21.0 11883 |
| 22.0 5503 |
| 23.0 14129 |
| 24.0 7663 |
| 25.0 8296 |
| 26.0 6868 |
| 27.0 10433 |
| 28.0 8692 |
| 29.0 9679 |
| 30.0 6928 |
| 31.0 7503 |
| 32.0 14169 |
| 33.0 6478 |
| 34.0 11303 |
| 35.0 8653 |
| 36.0 11654 |
| 37.0 7581 |
| 38.0 10239 |
| 39.0 11853 |
| 40.0 9700 |
| 41.0 16623 |
| 42.0 11738 |
| 43.0 6859 |
| 44.0 5392 |
| 45.0 13212 |
| 46.0 3482 |
| 47.0 7655 |
| 48.0 5747 |
| 49.0 8452 |
| 50.0 10855 |
| 0.0 271 |
| 1.0 49078 |
| 2.0 14492 |
| 3.0 4016 |
| 4.0 2339 |
| 5.0 2073 |
| 6.0 1099 |
| 7.0 2187 |
| 8.0 1625 |
| 9.0 1910 |
| 10.0 18804 |
| 11.0 34359 |
| 12.0 47890 |
| 13.0 18465 |
| 14.0 64920 |
| 15.0 14014 |
| 16.0 15957 |
| 17.0 2907 |
| 18.0 8952 |
| 19.0 1436 |
| 20.0 5693 |
| 21.0 1054 |
| 22.0 35734 |
| 23.0 30808 |
| 24.0 6880 |
| 25.0 48708 |
| 26.0 21462 |
| 27.0 20223 |
| 28.0 11972 |
| 29.0 8253 |
| 30.0 27715 |
| 31.0 29628 |
| 32.0 28526 |
| 33.0 36700 |
| 34.0 1171 |
| 35.0 38698 |
| 36.0 9546 |
| 37.0 7304 |
| 38.0 14638 |
| 39.0 15068 |
| 40.0 16532 |
| 41.0 1856 |
| 42.0 17213 |
| 43.0 12148 |
| 44.0 13875 |
| 45.0 12760 |
| 46.0 8779 |
| 47.0 32000 |
| 48.0 9456 |
| 49.0 11171 |
| 50.0 13299 |
| 0.0 3 |
| 1.0 2638 |
| 2.0 1962 |
| 3.0 1883 |
| 4.0 1048 |
| 5.0 1606 |
| 6.0 4843 |
| 7.0 3937 |
| 8.0 3015 |
| 9.0 3139 |
| 10.0 1642 |
| 11.0 2563 |
| 12.0 1353 |
| 13.0 1629 |
| 14.0 2683 |
| 15.0 2716 |
| 16.0 2533 |
| 17.0 3972 |
| 18.0 3653 |
| 19.0 1357 |
| 20.0 2682 |
| 21.0 4688 |
| 22.0 1457 |
| 23.0 1885 |
| 24.0 3021 |
| 25.0 1888 |
| 26.0 2797 |
| 27.0 3147 |
| 28.0 3648 |
| 29.0 2018 |
| 30.0 1983 |
| 31.0 2099 |
| 32.0 4448 |
| 33.0 2206 |
| 34.0 3237 |
| 35.0 2930 |
| 36.0 1810 |
| 37.0 2722 |
| 38.0 1786 |
| 39.0 2041 |
| 40.0 1782 |
| 41.0 1474 |
| 42.0 1079 |
| 43.0 3148 |
| 44.0 1554 |
| 45.0 1981 |
| 46.0 1519 |
| 47.0 1610 |
| 48.0 837 |
| 49.0 1256 |
| 50.0 2041 |
| 0.0 10 |
| 1.0 386 |
| 2.0 689 |
| 3.0 1409 |
| 4.0 417 |
| 5.0 880 |
| 6.0 3124 |
| 7.0 2927 |
| 8.0 2349 |
| 9.0 2739 |
| 10.0 1615 |
| 11.0 575 |
| 12.0 517 |
| 13.0 454 |
| 14.0 903 |
| 15.0 3486 |
| 16.0 4046 |
| 17.0 4863 |
| 18.0 1115 |
| 19.0 491 |
| 20.0 2590 |
| 21.0 2397 |
| 22.0 538 |
| 23.0 379 |
| 24.0 2763 |
| 25.0 455 |
| 26.0 664 |
| 27.0 1696 |
| 28.0 3226 |
| 29.0 931 |
| 30.0 527 |
| 31.0 437 |
| 32.0 374 |
| 33.0 264 |
| 34.0 4053 |
| 35.0 489 |
| 36.0 454 |
| 37.0 1615 |
| 38.0 252 |
| 39.0 189 |
| 40.0 172 |
| 41.0 161 |
| 42.0 51 |
| 43.0 117 |
| 44.0 87 |
| 45.0 239 |
| 46.0 89 |
| 47.0 192 |
| 48.0 84 |
| 49.0 80 |
| 50.0 155 |

Five interesting things I learned about 311 requests:

* There are a lot of different ways that people identify with their community. There are the 77 recognized “community areas”, which is what I usually understand as the “neighborhood”. For example, I live in Hyde Park, but my favorite community area is Andersonville. Actually, that’s not even a Community Area, it’s a neighborhood withing the Community Area of Edgewater! However, citizens also identify with their wards, because each ward is tied together politically, via the Aldermen who help run the city. There are also zip codes, which generally identify an area for mail delivery.
* The community area with the most graffiti calls was South Lawndale. For the most abandoned/vacant buildings reported it was West Englewood. For both potholes and sanitation, it was Austin.
* These neighborhoods are all on the South or West side are some of the poorest and most dangerous neighborhoods in Chicago.
* On average, there are longer completion times for community areas on the South and West sides of the City.
* There wasn’t much use of the 311 line until around the year 2000, when calls dramatically spiked for all four types of calls.

***Problem 2:***

You will notice I don’t really have much for this section. I ran out of time. I had to present my BA thesis last week and spent all of my time working on that instead of this homework. I also don’t know where Professor Rayid got the idea that we worked with APIs in 121-122. I haven’t worked with an API before and I simply did not have time to figure it out. I’m not a bad or slacker student; my transcript will attest to that. I just simply did not have adequate time to dedicate to learning something from scratch.

Ideally, though, in theory, I would use the Census data to create a new dataframe using pandas and join it on the ones that I already created in part 1, by using latitude/longitude as a join condition or by using the latitude and longitude to determine census tract, and then categorize each address as belonging to a certain census tract. I would then use the functions I created in problem 1 to pull out characteristics related to demographics for, say, the ten zip codes with the most requests.

***Problem 3:***

A: There were six total calls from 7500 S Wolcott Ave. Five were about potholes and one was about sanitation. The probability of an incoming call being about potholes is .8333, and the probability of it being about sanitation is 0.1667. Therefore, it is most likely that an incoming call from 7500 S Wolcott Ave will concern potholes.

B: Lawndale is in Community Area 29. 4584 requests about Graffiti Removal came from Lawndale. There were 11914 requests about Graffiti Removal from Uptown, which is Community Area 3. There were

C: There were 260 total calls about Graffiti Removal. 100 came from Englewood, giving a probability of (100 / 260) = 0.3846. 160 came from Uptown, giving a probability of 0.6154. Therefore, it is about 23% more likely that the call about Graffiti Removal came from Uptown.