Your Project Title

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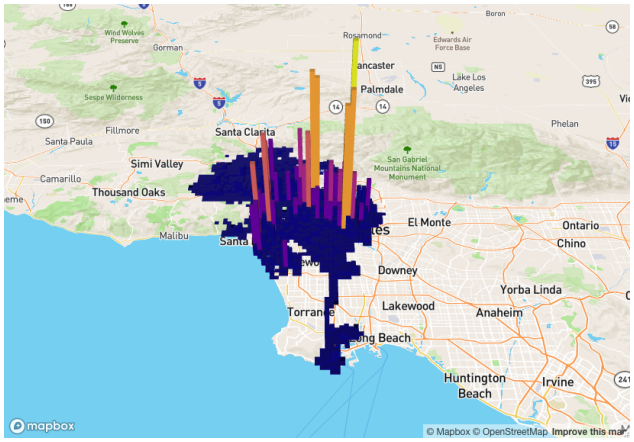
Introduction

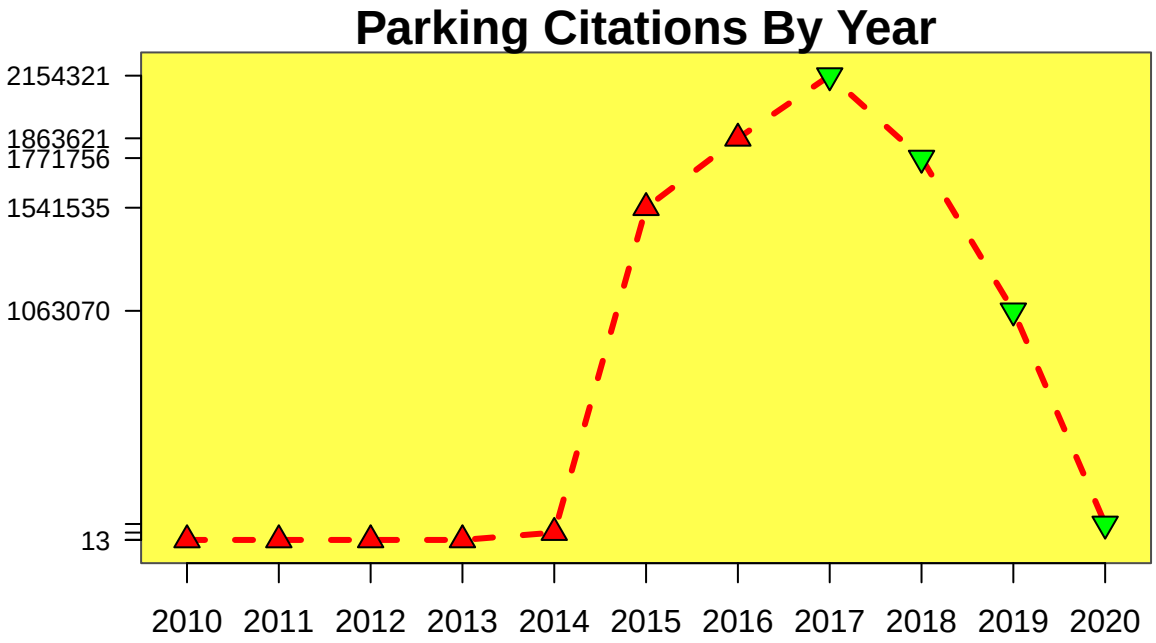
Alex, Anushi, Matt and Griffin all come from different backrounds and majors, so in disucssions for which dataset we wanted to analyze, we explored a wide range of topics from public health to the New York City subway We eventually decided to take on data from another large metropolis, but this time in sunny Los Angeles. In Los Angeles, the beautiful beaches, countless celebrities, and hollywood homes are magical for visitors. However, LA traffic is often very bad and parking in tourist areas can be a nightmare. As the second largest city in the United States, there are over 6.4 million vehicles in the Los Angeles urbanized area[1]. Our dataset, Parking_Citations, contains all the details of nearly 10 million parking violations in Los Angeles from 2010 to the present. That means we have access to the records that account for fines totalling close to $600 million. With so much money at stake and the huge volume of data, the city of Los Angeles keeps track of these records electronically. We intend to take this massive amount of data and transform it so that the intricacies of parking violations can be easily understood.



Big Data

The raw data was accessed directly from the City of Los Angeles Department of Transportation (LADOT) through the city's Open Data website[2]. The original data set contained 9.97 million rows, each containing details on one parking violation. We identified the fine amount and location data as the most important variables and therefore removed all rows containing empty or NA values in those two columns. This narrowed the amount of rows to about 8.5 million. LADOT uses US Feet coordinates according to the NAD_1983_StatePlane_California projection, which is not easily comparable to standard latitude and longitude values, so our next step was to use **sp** package for R to transform our location data. Our final cleaned data set condained data on 8,502,692 tickets, including information of the time, date, location, vehicle information, parking offense, and more. Although well over the 1 milion row minimum requirement, this large amount of data will allow us to explore the trends in parking violations in LA over a relatively large time frame.

Overview graphs



When we began our analysis, we had to get some idea of what we were dealing with. With no instructions, We first boiled down the data into a more understandble form. The data gave us a good amount of information, and it also gave us a good starting point. The data showed a skewed distrubution over 11 year span. From 2010 to 2014 there were less than 40 parking citations recorded. In 2014 that number increased to 34,000. After that, we saw a drastic 44 percent change into 2015, when 1,541,535 parking citations were recorded. The count peaked at 2,154,321 citations in 2017. This peak accentuated both the steep rise leading up to 2017 and also the suprisingly steep decline afterwards. While this graph gave us a good handle on the numbers, there were questions unanswered about the data collection.The drastic increase from 2014-2015 may be explained by an attempt by the City of Los Angeles to digitize their citations. But that explanation is contradicted by the equally sharp decline after 2017. This left the question of how many citations did they actually collect? The graph didn't tell us exactly, but it gives us a range of values that captures the true value or something close. Even without the actual answer, this graph highlighted the magnitude of the citaitons in LA.

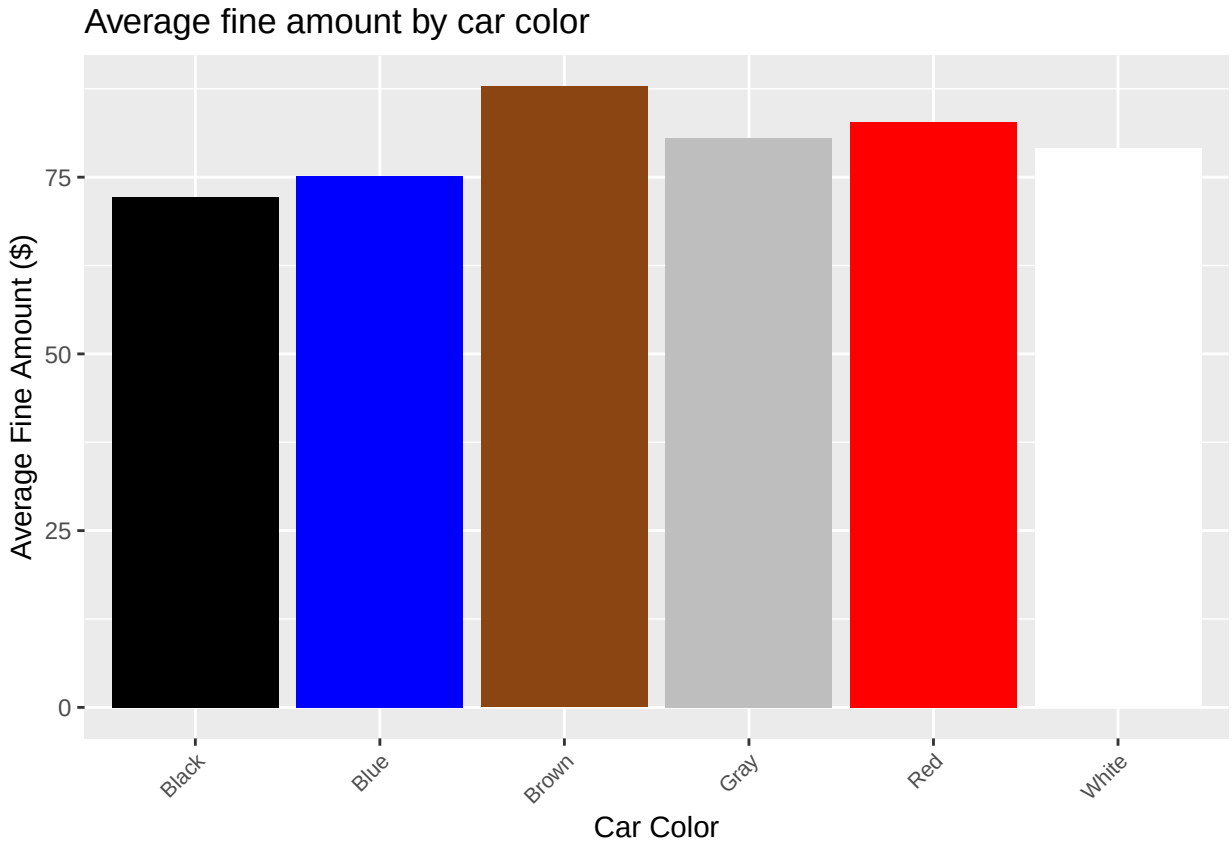
Year	Dollars_Collected
2010	730
2011	630
2012	2276
2013	3062
2014	2371400
2015	107172874
2016	130124585
2017	151608139
2018	124738695
2019	75291586
2020	2275
Total	591316252

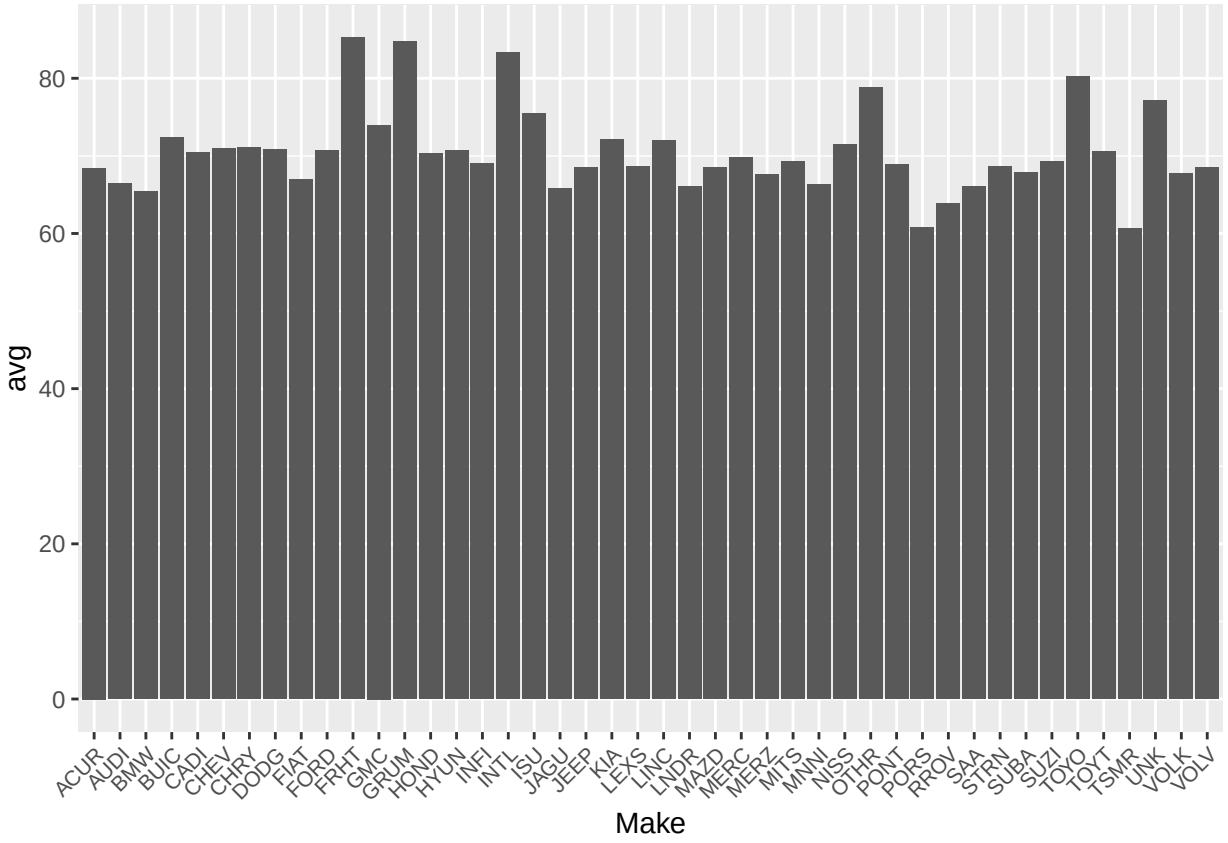
Top_Violations	Count	fine_amount
NO PARK/STREET CLEAN	2389114	73
METER EXP	1634877	63
RED ZONE	635504	93

```
##    Violation.Description Fine.amount
## 1                2251157A        1100
## 2     DP- RO NOT PRESENT         1100
## 3     DP- RO NOT PRESENT         1100
## 4     DP- RO NOT PRESENT         1100
## 5     DP- RO NOT PRESENT         1100
## 6     DP- RO NOT PRESENT         1100
## 7     DP- RO NOT PRESENT         1100
## 8     DP- RO NOT PRESENT         1100
## 9     DP- RO NOT PRESENT         1100
## 10    DP- RO NOT PRESENT         1100
## 11    DP- RO NOT PRESENT         1100
## 12    DP- RO NOT PRESENT         1100
## 13                               1100
## 14                               1100
## 15               2251157B        1100
## 16               2251157A        1100
## 17               2251157A        1100
## 18               2251157B        1100
## 19               2251157A        1100
## 20               2251157A        1100
## 21               2251157A        1100
## 22               2251157B        1100
## 23               2251157A        1100
## 24               2251157B        1100
## 25               2251157A        1100
## 26               2251157B        1100
## 27               2251157A        1100
## 28             DP-ALTERED        1100
## 29    DP- RO NOT PRESENT         1100
```

Location	count
1301 ELECTRIC AVE	11363
101 LARCHMONT BL N	7815
1600 IRVING TABOR CT	7346
2377 MIDVALE AVE	6113
5901 98TH ST W	5790
4301 TUJUNGA AV	5687
7000 HAWTHORN AVE	5606
2800 E OBSERVATORY	5378
4300 TUJUNGA AV	5279
100 LARCHMONT BL N	5236

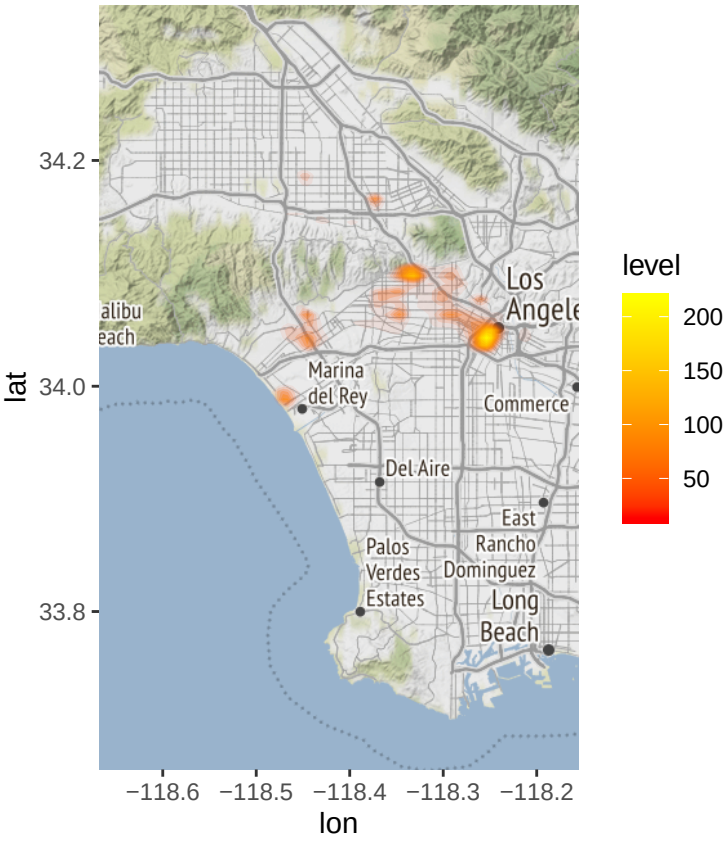
Who receives parking citations?


Average fine amount by car color
Average Fine Amount ($)
75
50
25
0
Black
Blue
Brown
Gray
Red
White
Car Color


avg
80
60
40
20
0
ACUR
AUDI
BMW
BUIC
CADI
CHEV
CHRY
DODG
FIAT
FORD
FRHT
GMC
GRUM
HOND
HYUN
INFI
INTL
ISU
JAGU
JEEP
KIA
LEXS
LINC
LNDR
MAZD
MERC
MERZ
MITS
MNNI
NISS
OTHR
PONT
PORS
RROV
SAA
STRN
SUBA
SUZI
TOYO
TOYT
TSMR
UNK
VOLK
VOLV
Make

```
## # A tibble: 44 x 2
##    Make    avg
##    <fct> <dbl>
##  1 ACUR   68.4
##  2 AUDI   66.5
##  3 BMW    65.4
##  4 BUIC   72.3
##  5 CADI   70.5
##  6 CHEV   71.0
##  7 CHRY   71.1
##  8 DODG   70.9
##  9 FIAT   66.9
## 10 FORD   70.7
## # ... with 34 more rows
```

Where do parking violations occur?




```
## [1] "LA_Weather"
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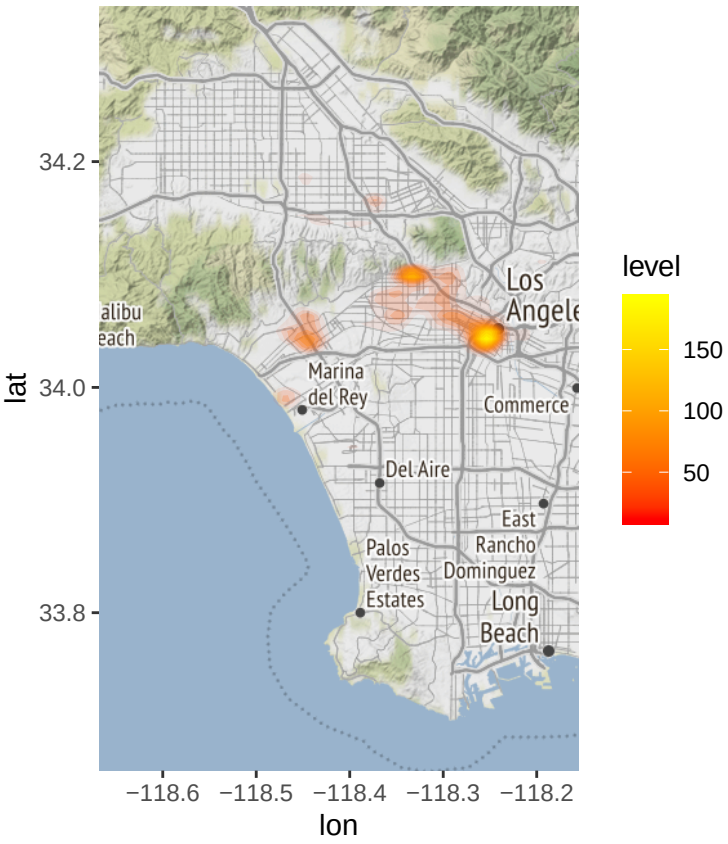
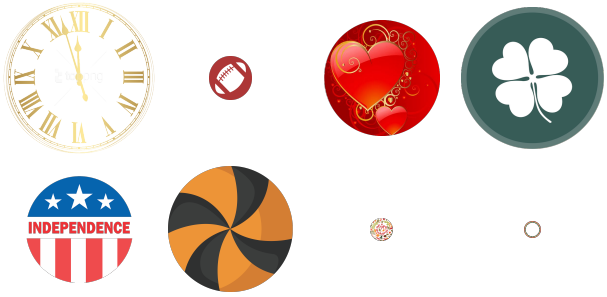


When do violations occur?



References:

1. https://la.streetsblog.org/2010/12/13/density-car-ownership-and-what-it-means-for-the-future-of-los-angeles/

2. https://data.lacity.org/A-Well-Run-City/Parking-Citations/wjz9-h9np

3.