

How can we stay safe in Chicago?

- An observational study about Chicago's traffic incidents

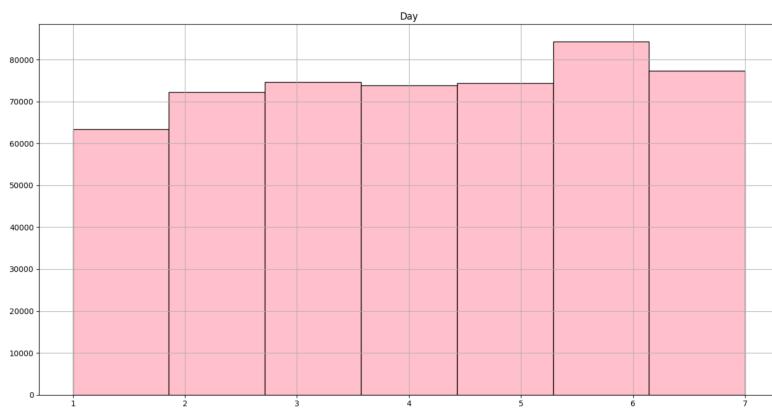
Considering the number of people living in Chicago (2.71 million (2019)), there are a lot of people driving daily in and out of the city. Traffic incidents and fatalities have not seen any downwards trends lately, it's important to do something about the massive amount of unnecessary deaths incidents. Doing an observational study about Chicago's traffic incidents could reveal possible factors that contribute to the high numbers of incidents, potentially allowing us to save more lives in traffic.

All data is pulled from "[Traffic Crashes - Crashes | City of Chicago | Data Portal](#)" Most data entries are from the 2017-present time (very few are from 2015-2016).

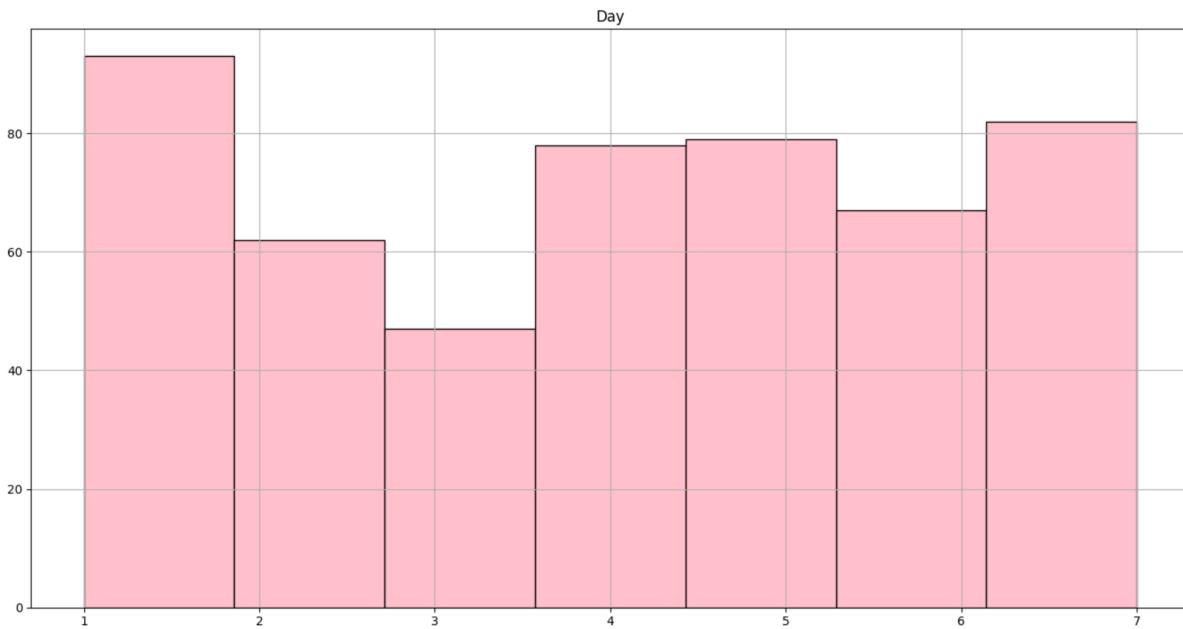
Due to the size of the dataset -including over 525k entries-, I focused on some key areas instead of doing a complete analysis, in hopes of some interesting findings. I filtered by several factors in different batches.

The first analysis looks at how all incidents and fatal incidents compare time-wise. Initial thoughts were that the more people are driving, the more incidents would occur.

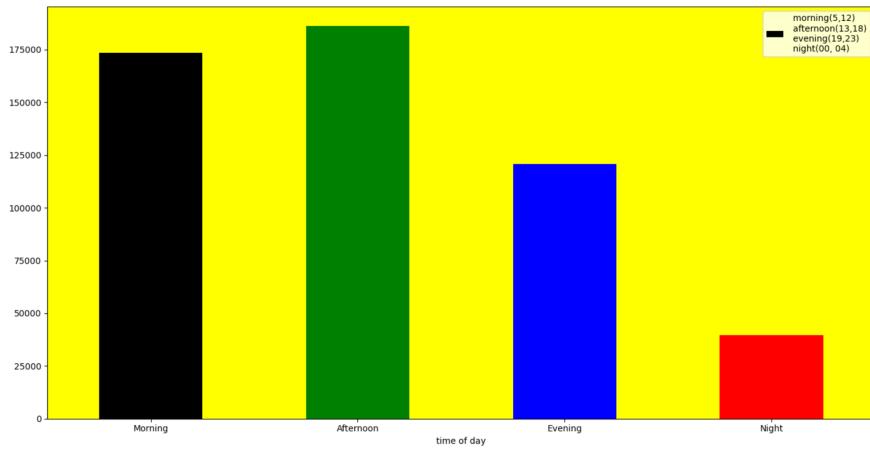
The graph under plots the number of incidents per day of the week. Saturday is a popular day to go out, considering most people are out of work and want to go out. The increase in people in traffic is a clear indication of the spike in incidents. One can also observe an average difference of about 5 thousand fewer incidents on Monday compared to the other days.



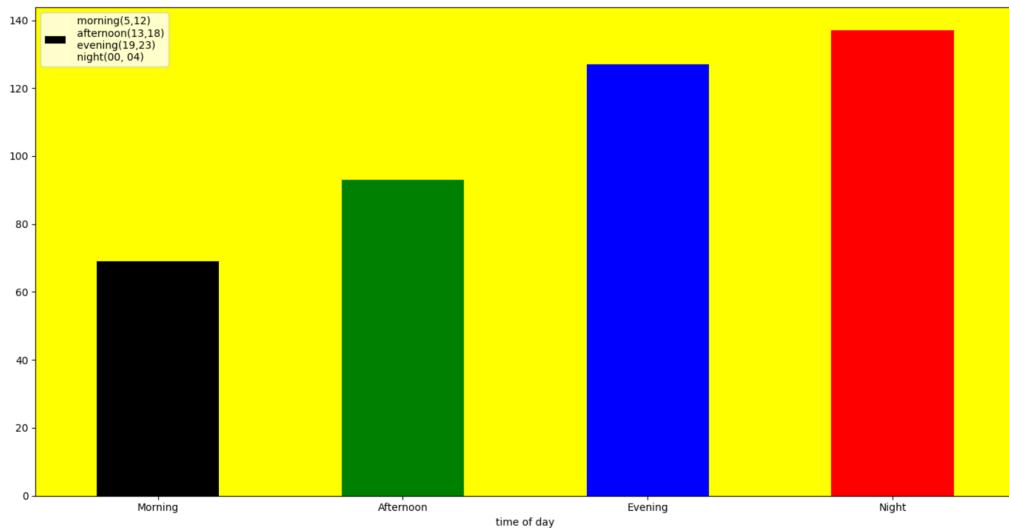
Using the same method of thinking -that an increase in people increases the number of traffic incidents- one would think that the number of fatal incidents would have some correlation with traffic incidents. The graph plotted below represents the number of fatal incidents which resulted in estimated damages of over \$1500. There were 426 such observations. Mondays averaged over 35% more incidents than the rest of the days. Considering Mondays had a lot fewer traffic incidents, one would assume the same for fatal incidents. In an attempt to gain further insight into the dangers of Mondays, the time of the incidents was analyzed.



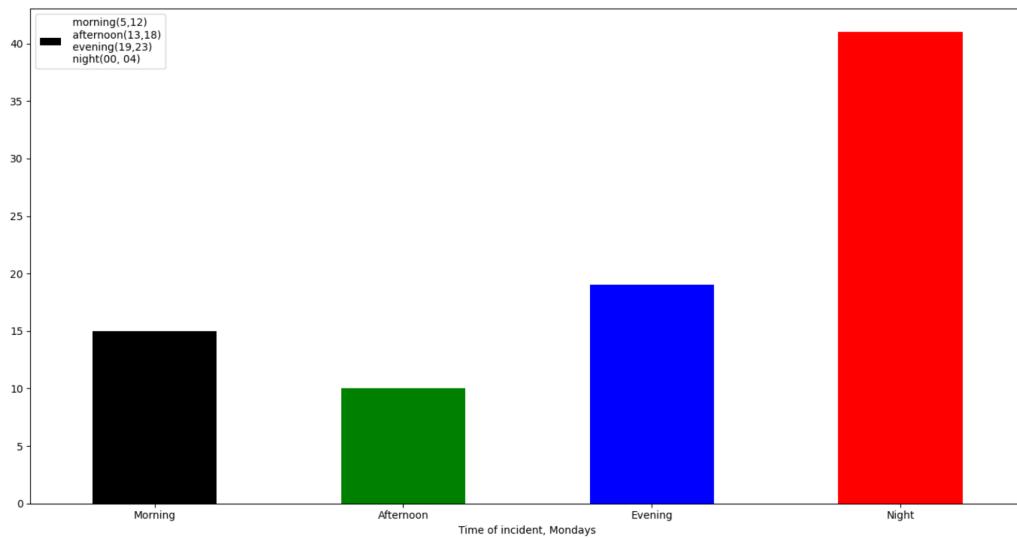
The graph below plots the time of day the traffic incidents happened. Primarily grouping them into four different groups: morning, afternoon, evening, and night. Going off the assumption that more people in traffic causes more incidents, one should expect an increase in incidents in the morning and afternoon. Considering that's when people come and go to work. The data is as expected, supporting the current assumptions. -Night is only defined for 4 hours, which is partly why the number of incidents is insignificant compared to the others.



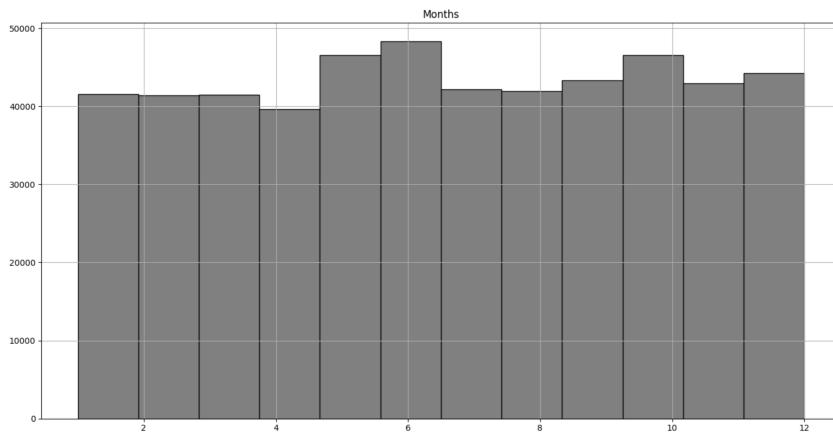
So far it seems like the data between all traffic incidents compared to the fatal incidents bear no meaning. Although they don't follow the same patterns, it could be useful to continue the comparison, to see if they have an inverse pattern, meaning they are opposites of each other. The graph below plots the time of day the fatal incidents happened; showing the same pattern as all the others -the opposite of the traffic incident graphs. Nights, followed by evenings have almost double the number of fatal incidents compared to the mornings and afternoons



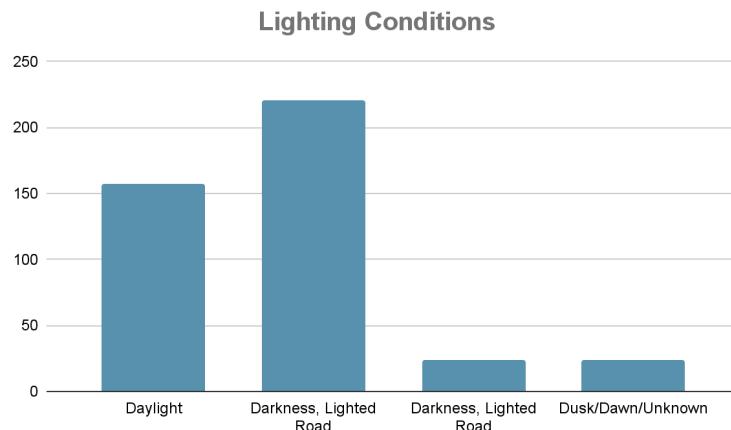
Taking a deeper dive into the surge of fatal incidents on Mondays, we can observe that night incidents are dominating. Night of Monday can be considered as late Sundays (since Monday night starts after 11.59 pm Sunday), which can explain some of the increase, but if the weekend factor is detrimental, we can assume Fridays, and Saturdays would have followed the same pattern. The only thing to be derived from this as of now is to stay off the roads Monday nights.



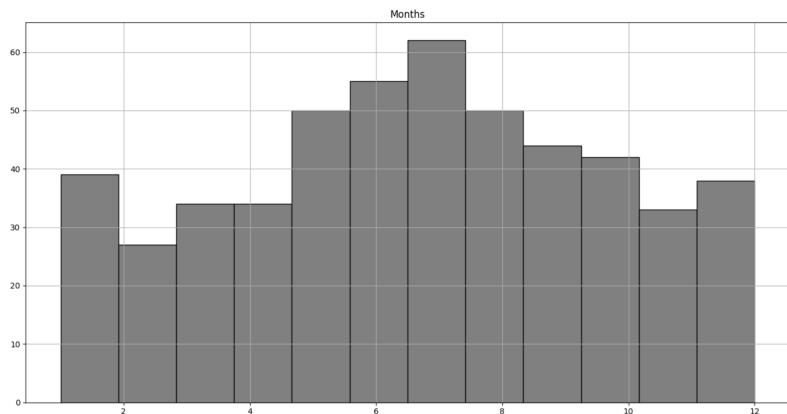
Traffic incidents per month stay on a consistent level, as shown on the graph below. The peak in the summer months most likely follows the aforementioned assumption on more people -> more accidents. The same can be explained for the peak in October, more people are likely returning home for thanksgiving, increasing the number of people in traffic. Otherwise, there are no unexpected findings.



So far we have gathered that fatal incidents happen mostly at night and in the evenings. As shown below approximately 60% of the incidents take place at dimmed lighting conditions. Given this data, it would be reasonable to predict that dark months such as November and December would have an impact on the number of fatal incidents.

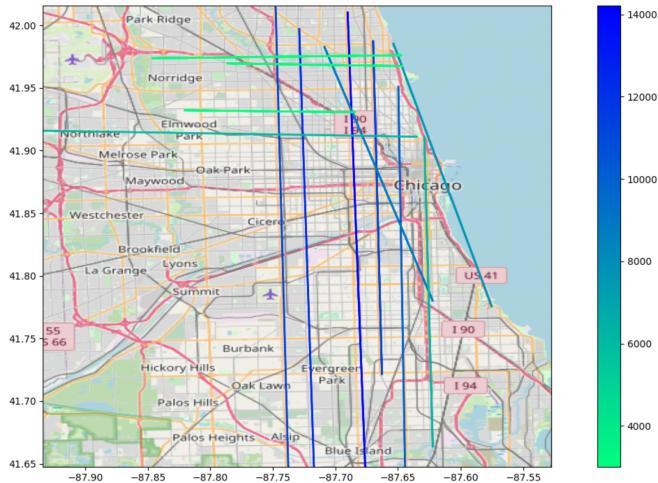


“Shockingly enough”, the trends are the complete opposite of expected. Although the summer months have more people driving, there isn’t sufficient data supporting that more drivers -> more fatal incidents. Incredibly enough the “dark months” can be considered as the safer ones. Speculations that fewer people drive in the winter can momentarily be disregarded since the monthly plot bar showed no inconsistencies with the number of incidents.



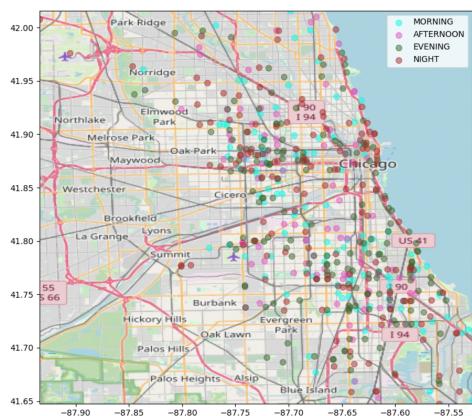
Visualizing the fatal incidents

To get a look at how the traffic incidents are spread, the most dangerous streets were grouped by the number of incidents. All streets with more than 3000 recorded incidents were separated, and some are plotted below, on a gradient line map. Out of the 525k+ incidents, 42 streets represented over half of the said incidents. 40 out of the 42 streets had more than one fatal incident as well. Making these 40 streets Chicago's most dangerous streets. Note that some of the streets cover highways, meaning more drivers.



Visualizing the fatal incidents (over \$1500 in damages)

Each circle represents one fatal incident. Lighter colors represent afternoon and earlier. Darker colors represent the evening and later on. An interesting observation is the distribution of light and dark colors. It seems like the northside of Chicago has more fatal incidents later in the day, whilst the southside has more fatal incidents earlier in the day. Some clusters can be observed as well, which will be addressed further below.



Cross analyzing traffic incidents with the fatal incidents

When comparing traffic incidents with fatal incidents, an interesting pattern occurs. Multiple groups of clusters are close or on the aforementioned fatal roads. It may indicate that some areas of the fatal roads have hotspots where more fatal incidents happen. As people tend to work near or in downtown Chicago, there will be a certain amount of shared roads between a huge amount of workers. These roads will mainly be used before and after work, which is around the morning and the afternoon. This may correlate with the increase of the early incidents in the south/mid side of Chicago. The northwest has a great occurrence of late incidents on the popular roads.

