

Trends in Fire Accidents in Toronto*

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January 24, 2024

I have examined the data on reported fire incidents from 2011 to 2022 in the city of Toronto that the Ontario Fire Marshal made available in this analysis. After analysing the trend of incidents from 2011 to 2022, I discovered an unanticipated increase in incidents between 2017 and 2018. Additionally, we have examined the pattern of incidents over the course of several months from 2011 to 2022.

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1 Introduction

In many nations, fire events have long been a major factor in resource loss and fatalities. Canada (“Fire Incidents Increased During Pandemic,” n.d.) recorded 39000 fire incidents in 2021. I used the fire incident data from Toronto Open Data (*Opendatatoronto: Access the City of Toronto Open Data Portal* 2022) in this study to understand the trend of fire incidents in Toronto. I looked into the Toronto fire occurrences that occurred between 2011 and 2022 in this paper. I have examined the trends in the occurrences over the course of several years and months. I have additionally documented the quantity of fatalities resulting from fire incidents across the various years. Additionally, I have looked at the most frequent reason for the fires.

*Code and data are available at: https://github.com/MeerSisodia1707/Fire_Incidents_Data.git

2 Data

As previously mentioned, Toronto Open Data was the source from which I obtained the data used here. I have analysed the data (R Core Team 2022) using the tidyverse package in the programming language R (R Core Team 2022) (Wickham et al. 2019). Numerous columns were present in the data, spanning from the incidents' locations to their causes of ignition. A sample of the data used is shown below; I have just displayed the columns that I used for this project. (The data itself contains 29425 rows and 43 columns). Here each row represents a reported incident.

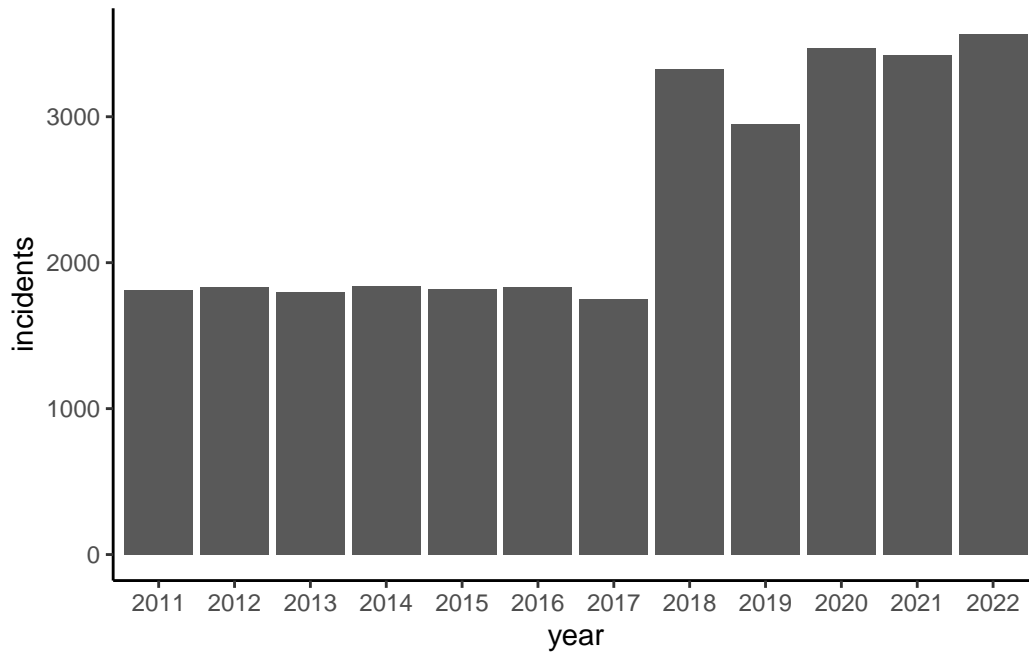
TFS_Alarm_Time	Civilian_Casualties	Ignition_Source
2018-02-24T21:04:29Z	0	999 - Undetermined
2018-02-24T21:24:43Z	0	999 - Undetermined
2018-02-25T13:29:59Z	0	NA
2018-02-25T14:13:39Z	0	999 - Undetermined
2018-02-25T18:20:43Z	0	NA

After cleaning and preparing, the data looked like this.

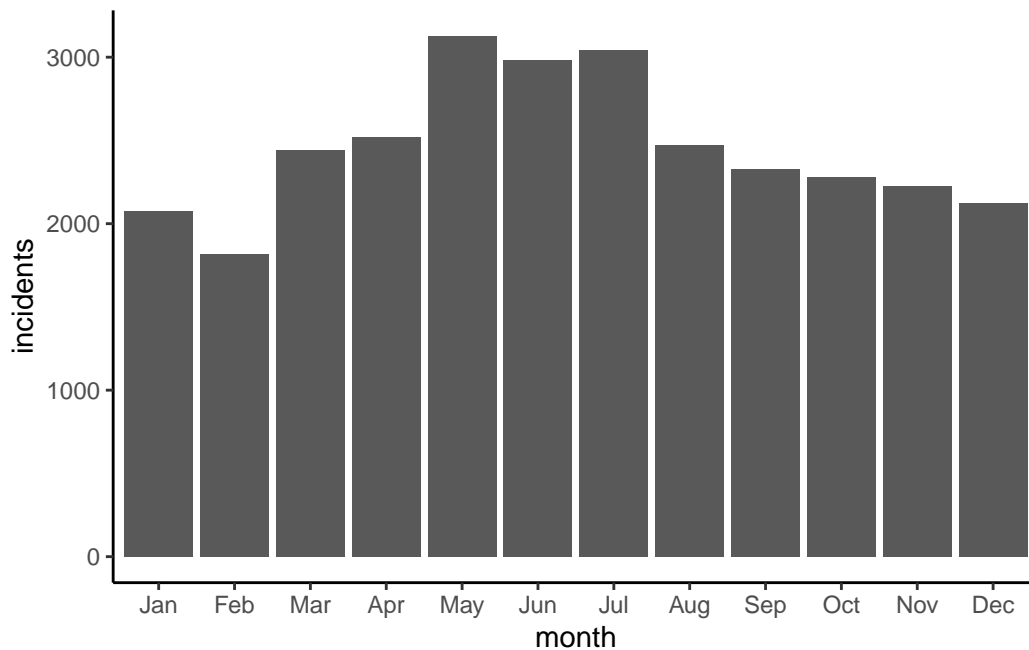
The column TFS_Arrival_Time, which represents the time at which the fire fighters reached the place of incident, was the one that was crucial to this project. I calculated the years and months of the incidents and made a separate column for them in the data using that column and the library lubridate. The column civilian casualties represents, as the name suggests, the number of fatalities of an incident.

3 Discussion

My analysis revealed that the number of incidents unexpectedly increased after 2018 (One explanation might be that this data wasn't efficiently collected prior to 2017).



Additionally, I discovered a pattern in the way the incidents were distributed across the different months from 2011 to 2018. June, July, and May have the most incidents. In general, the number of incidents increases beginning in April and peaks in May. They begin to decline in August and keep going down until December. All things considered, this indicates that summertime is when there are more fire incidents.



Reference

- “Fire Incidents Increased During Pandemic.” n.d. <https://www.firefightingincanada.com/fire-incidents-increased-during-pandemic-statscan/>.
- Opendatatoronto: Access the City of Toronto Open Data Portal*. 2022. <https://open.toronto.ca/dataset/fire-incidents/>.
- R Core Team. 2022. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. <https://www.R-project.org/>.
- Wickham, Hadley, Mara Averick, Jennifer Bryan, Winston Chang, Lucy D’Agostino McGowan, Romain François, Garrett Golemund, et al. 2019. “Welcome to the tidyverse.” *Journal of Open Source Software* 4 (43): 1686. <https://doi.org/10.21105/joss.01686>.