Aim

The map aims to visualize the number of crimes (which is the total of all crime types) at two different geographic levels of London (borough and ward) in each year between 2011 and 2018[1]. Additionally, the specific crime number of major categories will also be displayed when the user puts its cursor over an area.

Data Collection And Manipulation

It uses the data combined from four datasets in two websites, two are crime data of borough level and ward level from 'Recorded Crime: Geographic Breakdown' provided by Metropolitan Police Service, the other two datasets are SHP files from 'Statistical GIS Boundary Files for London' of ward boundary in 2014 and Borough boundary in 2011 to be consistent with the region division of crime data. SHP file for Borough is transformed into a data frame to get its polygon coordinates and then join it with the borough crime data. Similar step for the ward. Next, the joined ward data frames is appended to the joined borough data and a column is added to identify whether it's a borough[2]. Afterwards, this new data frame will be export to a geojson format[3]. The geojson file will be upload to Mapbox through Mapbox Datasets API[4] and then export it to a vector tile. For Background Map Style, we choose Monochrome light.

The Design And Technical Approach

the Mapbox GL JS library is used to render interactive maps from vector tiles and Mapbox styles. We first utilized the tile to create two layers. One layer contains a choropleth visualization for the number of borough level crimes, and one layer contains a choropleth visualization for ward-level crime numbers. After that, a zoom level is defined at which each layer and its respective legend should appear or disappear using the 'minzoom' and 'maxzoom' layer properties. Next, an interactive time-slider is added. When the user moves the time-slider, an 'event listener' is triggered and then it triggers a function which decides which year's value are displaying. After that, the tile set is used again to add a line highlight layer so that we can filter it to show the outline of a borough (or a ward). Finally, use 'queryRenderedFeatures' to show the outline and the specific crime number of major categories of certain hovered-over map area.

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1. Due to changes to ward code boundaries, crime data for both borough and ward is from 2011 to 2018 to be consistent.
2. If a row is for borough, it will show 'TRUE'。
3 The above steps are performed in python. Following is the GitHub link of the python code and datasets: https://github.com/Dora-fxh/casa0003.git
4. Use this API because it exceed the file size limits when uploading to dataset and directly upload as a tileset cannot rendered at all zoom level (the minimum zoom is 10)