Coursera Capstone Project

IBM Applied Data Science Capstone

Finding the Optimal Location to Establish a New Hospital in London

Project by
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Introduction (Background):

London, the capital of England, is an extremely diverse metropolitan city. Healthcare in the UK is largely covered by the NHS (National Health Services) that aims to provide free and universal medical services to the residents of the UK. The city of London consumes as estimate one fifth of the NHS budget in England [1]. The NHS provides all kinds of medical services like check-ups, surgeries and mental health care. Supposing the NHS approaches me with a proposal to build a new hospital within the city limits of London, I aim to be able to tell them which location in London would be best suited for this establishment. Using data science and machine learning, I will predict the borough that will benefit the most from these services, in terms of number of people who will be benefitted, security and accessibility.

Motivation

Hospitals are essential establishments that need to be present in each and every locality. The need for easily accessible, safe and reliable hospitals is evident and access to healthcare is a human right. Though there are already a large number of hospitals functioning to provide services to the people of London, I aim to find the most optimal location for the construction of a new hospital based on certain pre-defined criteria.

Problem Statement

To use data science approaches to analyse and select the most optimal location in the capital city of London to establish a new hospital that aims to serve and provide medical assistance

to citizens from all walks of life and of various age groups. Further, I will adopt clustering techniques to help find the most suitable borough in London to establish a new hospital.

Stakeholders

The stakeholders in my project are: the hospital management, the citizens of the borough and the doctors working in the new hospital.

1. **The hospital management:** In order to be useful to citizens, the hospital must be located in a locality that is safe, easily accessible and has a large number of elderly people and patients.
2. **The citizens of the borough:** The residents of the borough that the hospital is going to be built in will be directly benefited from the establishment of the same.
3. **The doctors working in the new hospital:** The doctors will prefer the location if it is safe to work in. It will be better if the hospital is located in a borough where it will benefit more patients.

Data Required

To solve the problem, I will be using the following data:

- **Foursquare location data API**
  - Used to find the lists boroughs in London.
  - This API provides location specific details like nearby venues, close neighbourhoods and is easily integrated into geospatial data analysis projects.
  - I will be using the

- **Latitude and longitude data:**
  - To obtain the coordinates of the boroughs of interest to my project.
  - This is required to plot the map and also to get the venue data.
  - This API is also available as a csv file that can be joined with the Foursquare location data to provide a way to plot the locations on a folium map.

- **Demographic Data of the population of London**
  - Age distribution data of the population of London, available at https://www.ageuk.org.uk/london/about-us/media-centre/facts-and-figures/ .
  - This data will be scraped using a web-scraping tool like Beautiful Soup that can help decide which parts of London have higher proportions of elderly people and will benefit from the construction of a hospital there.
  - This can be viewed as density clusters on a folium map.

- **Crime rate data in London:**
  - Available at : https://en.wikipedia.org/wiki/Crime_in_London.

- Since we also aim to consider the crime rate details of the location of our hospital, I will be using Wikipedia's crime in London data to determine the safest area to establish a hospital.

Reference:

[1] https://en.wikipedia.org/wiki/Healthcare_in_London