

Target Audience:

The target audience for our dash app are the TFL senior management and staff, allowing them to get an idea of how they can improve their cycle hire pricing through analysis of our data. We want TFL to ensure that the cycle hire scheme is growing and improving, while ensuring that the scheme holds its value for money through price variations. We hope to make the dash app available to the public, however this would only be once the app, along with our pricing recommendations are approved for use by the TFL senior management and staff.

Questions to be Answered:

The following questions have been posed to help frame the problem and create conclusions from the data sets:

- In which areas of London is the air quality better/worse? How should a new pricing strategy then be formulated based upon this disparity in air quality to improve areas in which the air pollution is worse? What are the best ways for the target audience to visualise these trends?
- What is the range between the cleanest and most polluted areas in London? How does this range affect the pricing strategy range between these same areas? How can the target audience justify this pricing strategy based upon presented data?
- Are there any specific areas in which the pollution level is significantly impacting people's health? How could the pricing strategy be adapted for these highly polluted areas to encourage more cycle hire use?
- What are positive/negative correlations in cycle hire use throughout the hours in a day in London? How could the pricing strategy be adapted throughout a day to account for busier times? Would the target audience think the pricing system throughout the day is reasonable?
- What are positive/negative correlations in cycle hire use throughout a year in London? How could the pricing strategy be adapted throughout a year to account for differences in seasonal demand?

These questions give a clear direction for the analysis of the data sets to ensure the information extracted is relevant and related to the specific questions. Moreover, all the questions are directly related to the problem of having a fixed pricing strategy and ways in which to improve this problem. Finally, the questions are also related to the target audience persona and how the project may impact and benefit them.

Overall Dashboard Design:

The Coding Cyclists have tackled TFL's cycle hire pricing, masterminding an algorithm to adjust the price of the cycle hire dependent on hourly and monthly cycle hire data, alongside PM 2.5 pollution levels across the boroughs of London. The aim is to create a price map that increases TFL revenue by promoting cycle hire and taking advantage of rush hour prices, as well as, promoting cycle hire in highly polluted boroughs with hopes to reduce pollution across greater London. The price map displays pricing based on pollution levels in each borough, whereby boroughs with higher levels of PM 2.5 pollution, see lower prices for cycle hire, while the opposite is true for boroughs with low levels of PM 2.5 pollution. There are selectors on the right panel of the map, that allow the user to select a time of day as well as a month of the year, applying multipliers to the price based on the selected time and month chosen. This means that we can adjust the price, increasing it in rush hours and popular months, while decreasing it in off-peak hours and less popular months. This works to increase total TFL revenue and promote cycle usage in times when there observed drops in cycle hire.

This main dashboard map can be broken down into all other visualisation pieces that are explained below, showing how each piece of pricing data was calculated from the hourly, monthly and pollution data provided. These can be selected on a side bar that leads to tabs on the dashboard that then open each graph as specifically selected by the user.

Question the visualisation is designed to address:

Visualisation 1:

- Are there positive/negative correlations in cycle hire use throughout the hours in a day in London? How could the pricing strategy be adapted throughout a day to account for busier times? Would the target audience think the pricing system throughout the day is reasonable?

The visualisation for this question should be a bar chart as it can show the number of cycle hires per each hour clearly. As the target audience is a manager from TFL, the chart should be professional, the axes and title should explain the data represented clearly and the colours used should be professional and not distracting.

The bar chart should indicate the busier times, when the number of cycle hires per hour are higher than the average, hence those are the hours for which pricing should be increased. Similarly, the chart should show the hours when the number of cycling hires is lower than the average and for those the pricing should be decreased. There should also be a selector to change the day, hence changing the data in the chart, allowing the user to see trends over multiple days in an entire month. The target audience should find the changes in the pricing reasonable if the new price for the busier hours is not much higher than the previous price. The charts could also be published to the public to help the target audience understand the reason behind changing the prices.

Visualisation 2:

- In which areas of London is the air quality better/worse? How should a new pricing strategy then be formulated based upon this disparity in air quality to improve areas in which the air pollution is worse? What are the best ways for the target audience to visualise these trends?
- What is the range between the cleanest and most polluted areas in London? How does this range affect the pricing strategy range between these same areas? How can the target audience justify this pricing strategy based upon presented data?
- Are there any specific areas in which the pollution level is significantly impacting people's health? How could the pricing strategy be adapted for these highly polluted areas to encourage more cycle hire use?

The visualisation for these questions should be a choropleth and/or bar chart as it can show the London borough versus the pollution levels of each borough, giving an indication of which boroughs produce the most pollution according to our data. As the target audience is a manager from TFL, the chart should be easy to read, professional and be visually appealing, as to express data clearly.

The choropleth should show the levels of pollution for all the boroughs in London next to one another, with a shading of the total PM 2.5 level in each borough to give an indication of which boroughs would fall into different pollution and hence, pricing zones. The bar chart should show the levels of pollution for all the boroughs in London against one another, to give an indication of which boroughs have much greater or lower pollution levels than the average. These graphs mean that the manager can see which boroughs should be given cheaper prices due to high amounts of pollution as to increase TFL cycle usage and hopefully decrease pollution levels. This data should allow easy implementation of strategic price changes for bettering the environment through decreasing pollution levels. The chart could also be published to the public to help the further audience understand the aims of the pricing changes and the impact TFL are trying to make.

Visualisation 3:

- Is there a positive correlation between cycle hire use and X month of year in London? How could the pricing strategy be adapted throughout a year to account for differences in seasonal demand?

The data used for the visualisation is monthly data, and so the chart will be in the design of a bar chart. Since the visualisation is for TFL staff it must be a professional. Therefore, the axis labels should be clear and in easily readable (in both font and size). The colour should also be professional and appealing by including a variety of colours while avoiding colours which are too bright. As the bar chart is a plot of cycle usage against month there will be no units for either axis. Also, to make the information easier to digest the inclusion of white space between each bar could be helpful.

The bar chart should indicate the busier months of the year, when the number of cycle hires per month are higher than the average, hence those are the months for which pricing should be increased. Similarly, the chart should show the months when the number of cycling hires is lower than the average and for those the pricing should be decreased. The target audience should find the changes in the pricing reasonable if the new price for the busier months is not much higher than the previous price. The charts could also be published to the public to help the target audience understand the reason behind changing the prices.