DATA SCIENCE FOR DESIGN

CYCLING EDINBURGH

Project Report by **Hafsa Olcay & Sophia Thuru**
University of Edinburgh, 2017

ABOUT OUR DATA

- **Dataset:** The data was gathered from **33 counters** across the city. The datasets we used are in **xsl** format and are arranged into a seven days timeframe ranging from 29/01/2017 to 04/02/2017. Each day includes hourly distributions of bike count, bike speed and pedestrian count. However, there are some inconsistencies from dataset to dataset (e.g separate tables for each day vs. merged tables, pedestrian counts vs. no pedestrian counts and different labels for variables). We also used **SQL Bike Counter Database** to extract the exact location of counters which we traced on Google Maps for our data visualisation.

- **Additional Resources**: We have conducted additional qualitative research using published material from SPOKES, the city councils (http://www.edinburgh.gov.uk/info/20135/cycling_projects/) and looked at local cycling blogs for further information on how people cycle/ their opinion about certain routes (http://citycyclingedinburgh.info/bbpress/) which helped us contextualize the quantitative information we gathered.

OUR OBJECTIVE

→ The objective of our analyses is to **provide insights on the ways in which cycling infrastructures encourage and/or discourage cycling habits**. Once we established some patterns within our datasets we begun to contextualise the data through qualitative research. The starting point of our enquiry was questioning why don't people cycle more in certain areas which lead us to hypothesise that this could be due to safety concerns related to the site properties and urban infrastructure. This project targets experts in Urban Big Data Centre who work on the improvement of urban infrastructure for cycling.

PROCESS & ANALYSES

→ Initially, we analysed the cycling patterns around 33 counters[1] by tracing the daily distribution of bike numbers counted for each day. On average, we have found that people cycle more on weekdays with the **highest rates located on Wednesday** and the **lowest on Saturday**. There were cases in which a location was popular in one direction but not in the other. Since the reason for the high difference between rates in different directions remains obscure, we decided to exclude such differences.

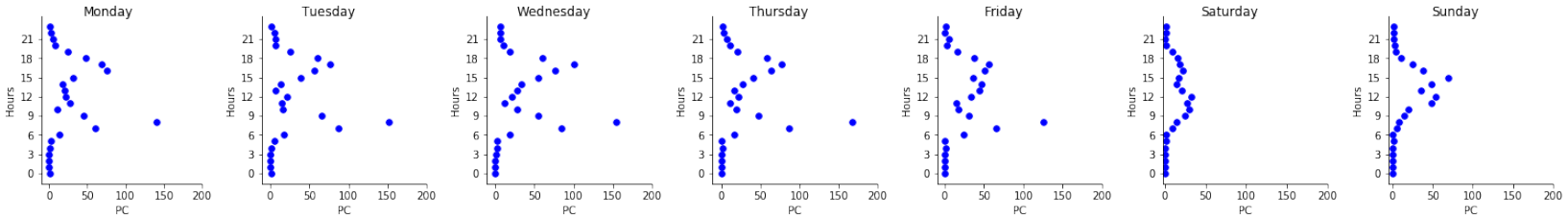
→ Upon gaining initial insights on the cycling habits per location we then compared the popularity of bike use in each site based on their weekly averages. In order to contextualise our data and further explore the correlation between sites and bike use we traced the roads and counters on a map of Edinburgh. The **most popular locations were Melville Drive and Wester Coates**. We also detected that **Morrison Street, despite being situated in between popular locations, had one of the lowest cycling rates**.

→ We made further analysis for **Wester Coates** and **Morrison Street** to see if popularity for these two sites is relevant to bike counts.

[1] There have been 48 counters of which we could receive fragmented information about, but for the 2017 dataset, 33 of them were available.

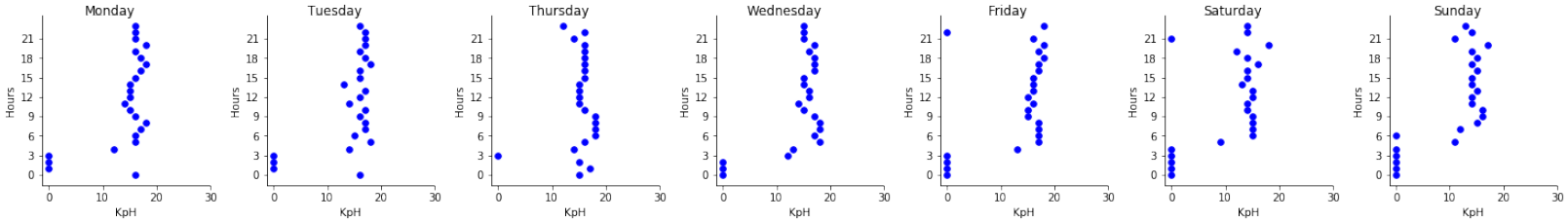
SITE 7: WESTER COATES

Hourly distribution of bike counts



PC: Bike counts

Hourly distribution of bike speed

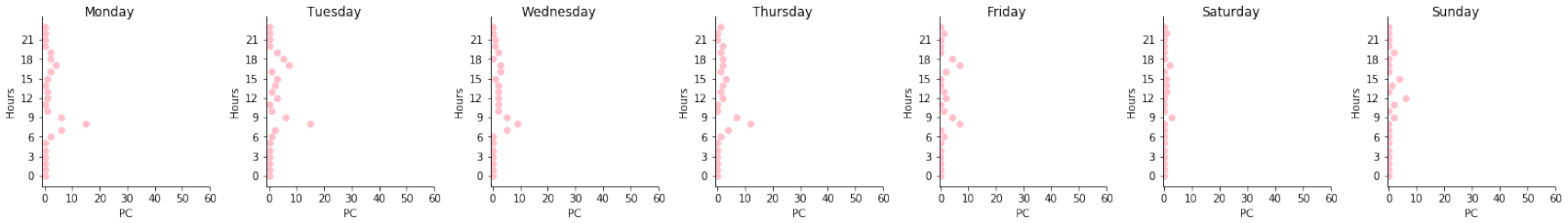


KpH: Bike speed

These figures show that people cycle the most during the morning rush hour (7-9 am) on Wester Coates which is much higher than the evening rush hour (6-8 pm) that has the second highest rates of bike counts. Despite the hourly and daily changes in bike counts, the range of speed is between 10 – 20 KpH and does not show significant differences during the week. Therefore, it can be argued that there is not much interruption to flow of cycling which might be a factor that makes the location popular.

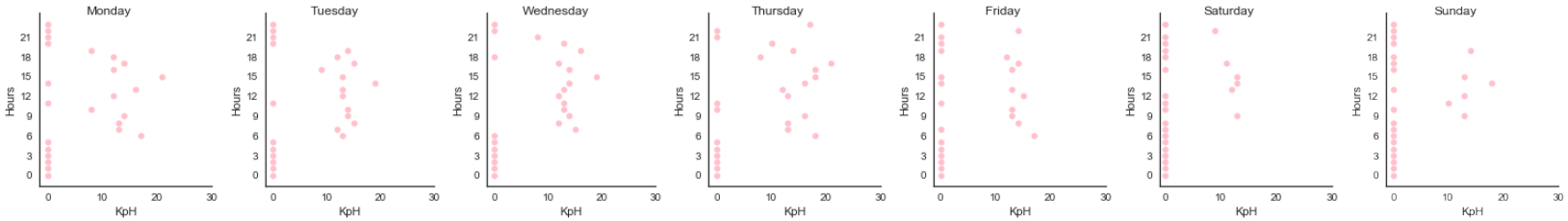
SITE 21: MORRISON STREET

Hourly distribution of bike counts



PC: Bike counts

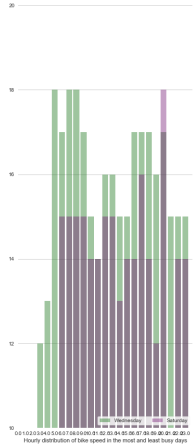
Hourly distribution of bike speed



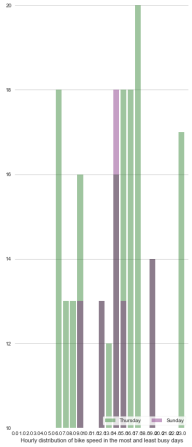
KpH: Bike speed

The figures for Morrison Street show the highest rates of cycling to be during the morning rush hour which are significantly lower compared to Wester Coates. The hourly distribution of bike speed shows a wider range and a more scattered distribution on both hourly and daily bases which might suggest that Morrison Street does not provide smooth cycling conditions for the cyclists, and therefore, is not very favourable.

Hourly distribution of bike speeds in most and least busy days (Wednesday - Saturday) for Wester Coates

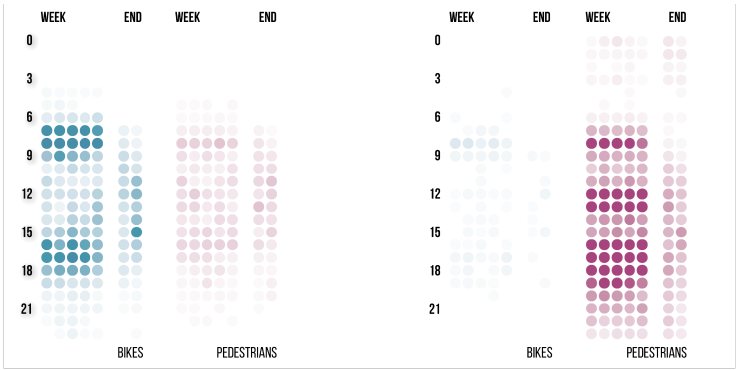


Hourly distribution of bike speeds in most and least busy days (Thursday - Sunday) for Morrison Street



The figures on the left demonstrate the distribution of speed on the least and most popular days in both sites. The highest bike speed was recorded on Morrison Street which indicates a possibility of speeding up on the site.

Bike and pedestrian counts for Wester Coates and Morrison Street



Morrison Street has a significantly lower bike count compared to Wester Coates (230 in total vs 4063 on Wester Coates). At the same time, the street has a relatively high incidence of pedestrian counts (9149 vs 1587). This suggests that Morrison Street is unpopular among cyclists and popular among pedestrians.

Through additional research we found that the junction between Haymarket Terrace and Morrison Street has been identified by SPOKES as problem areas for cyclists due to tramline and cluttered space. It appears that this has not been resolved with the Council suggesting adding 'Give Cyclists Space' signs to make cycling safer. Moreover, around early February 2017 Living Street Edinburgh published an article in which buildings work were said to have caused trouble among pedestrians mentioning unclear footpaths. We hypothesise the unpopularity of Morrison Street among bikers to be attributed to road cluttering coupled with high numbers of pedestrian and bus lanes leading to conflict over space. The uneven distribution of speed may suggest cyclists have more obstacles to overcome when biking. We think that the area around the junction in particular would benefit from clearer street signalling and, if possible, increased segregation.

SITE 33: LONDON ROAD

The dataset on London road contained some odd data regarding direction. We found that direction 'North' had a total of 1156 bike counts and consistently high bike counts throughout the week averaging at 165 whereas direction 'South' has a total of 818 counts 680 of which were recorded on 04/02/2017 on a special biking event and, therefore, is not representative of habitual bike counts which averaged at 23. We found on Google view that one side of London Road had street segregation implemented for cyclists. We hypothesised that this could explain the discrepancy in bike counts between directions.

CRITICAL REFLECTION

- → In conclusion, through our data analysis and contextualisation we suggest that the quality of infrastructures is an important factor in determining cycling habits. Areas that are unpopular due to road cluttering could benefit from clearer road signalling and, where possible, segregation of cycling routes.

Word count: 1017