Perfecting Tartu smart bike user experience

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Introduction

Many smart bike users (including us) have encountered the problem that at specific times Tartu bikes are in specific locations. This means user might not get a bike from the desired location or from any nearby docks in a 5 min walk radius. Our goal was to make it easier for bike users to plan their everyday commuting.

Facts

- The most rides per day were cycled on 10 June 2019 **(15465)**
- The least rides per day were cycled on 12 April 2020 **(169)**
- During summer* **5207** rides were made per day on average
- During winter** **560** rides were made per day on average
- The most popular check-out station is **Uueturu**
- The least popular check-out station is **Kvissentali**
- The most rides per month were made in June 2019 **(164743)**
- The least rides per month were made in February 2020 **(13687)**
- On average one ride was **2.9 km**
- The longest ride was **67.5 km**

* June, July, August 2019
** December, January, February 2019/20

GitHub: https://github.com/3linameier/IDS2020

Figure 1 & 2. Relative number of bikes in Pirogovi plats dock in every 20 min during workdays in September 2019 and October 2019

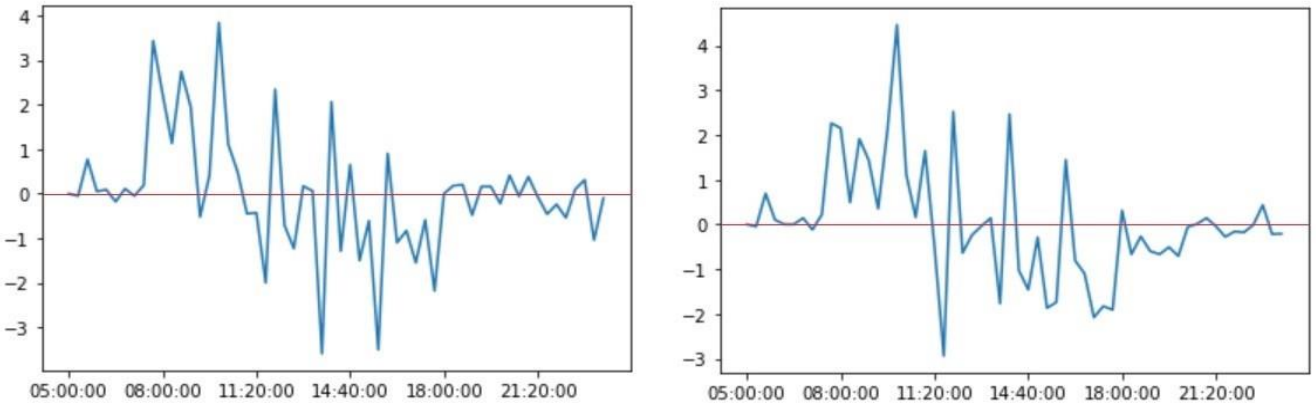
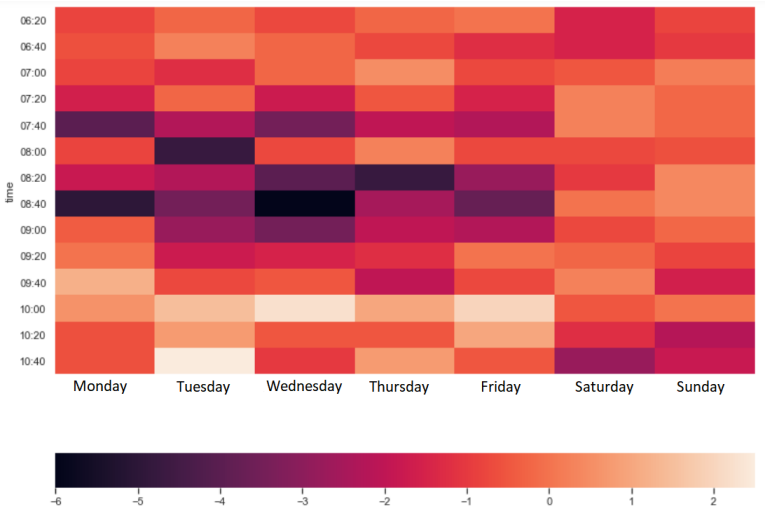


Figure 3. Heatmap showing average bike usages if Uueturu dock grouped by weekdays.



Data and methods

Our data was provided by Tartu Smart Bike. For training the model we used subsets of one dock and one month to predict relative numbers of bikes in the same dock in similar month (Sept & Oct, July & August).
For training we used k-nearest neighbors and random forest algorithms.

Results

We managed to make predictions about the amount of bikes in a certain dock at a certain time mostly with the accuracy of over 75% (depends on the dock). Also we made statistics about the monthly averages on weekdays.
We can check the relative number of bikes in a desired dock on a desired period of time.