
MONTEGO

Ridership impacts of the introduction of a dockless bike-sharing scheme, a data-driven case study

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History

Bike-sharing timeline 1965 - now

1st generation (no locks)

1965 — Wittefietsenplan, Amsterdam

1970-1990 period with few innovation

2nd generation, (Coin deposit)

1991

experiment Farsø, Denmark

1995 — Bycyklen Copenhagen, Denmark

3rd generation, (card access)

1996 — Experiment with magnetic cards, University of Portsmouth, United Kingdom

1998 — First citywide introduction, Rennes, France

2003

OVFiets founded (PT-Bike), the Netherlands

2005 - 2010 — Introduction in multiple bigger cities in Europe and U.S.A.

4th generation (Smart locks)

2014

Ofo founded, China

2016 — Mobike founded, China

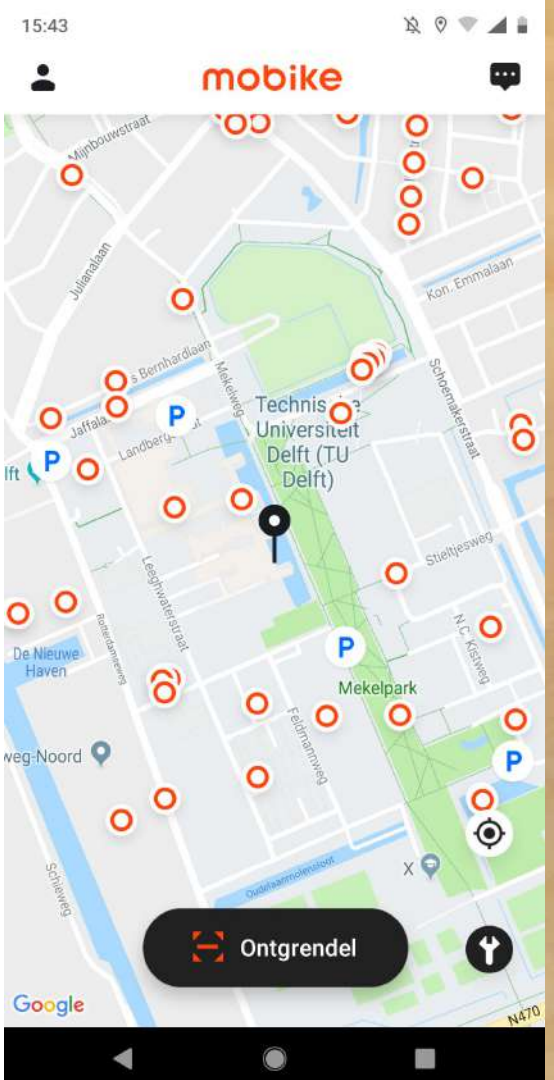
2017 — Introduction 4th generation Netherlands (Amsterdam, Rotterdam)

2018 — Start pilot Delft, the Netherlands

4th generation bikes

Properties:

- Smartphone
- Smart lock (GPRS + GPS)
- Data-driven operations
- Dockless
- Remarkable colours



Research question

How is bike-sharing used in Delft?

- General usage
- Origin/destination, especially the relation between railway stations and Science Park Zuid.
- Idle time

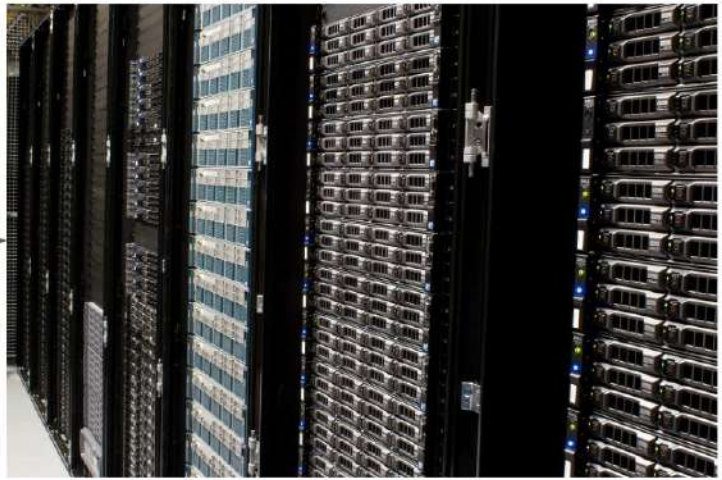
How can sharing data help to monitor bike-sharing systems by municipalities?

Challenge: How to obtain Data?

Mobike app

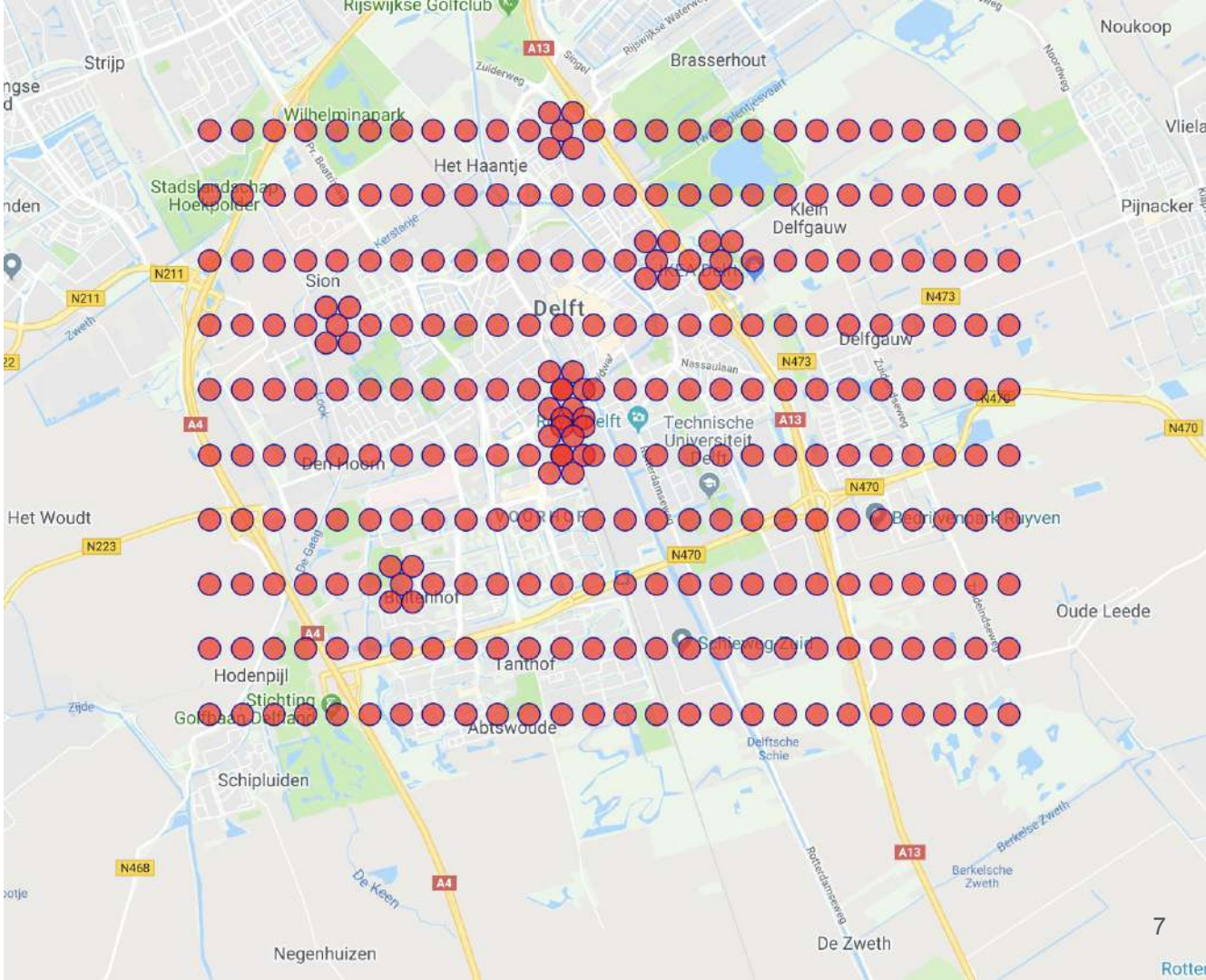
mitmproxy

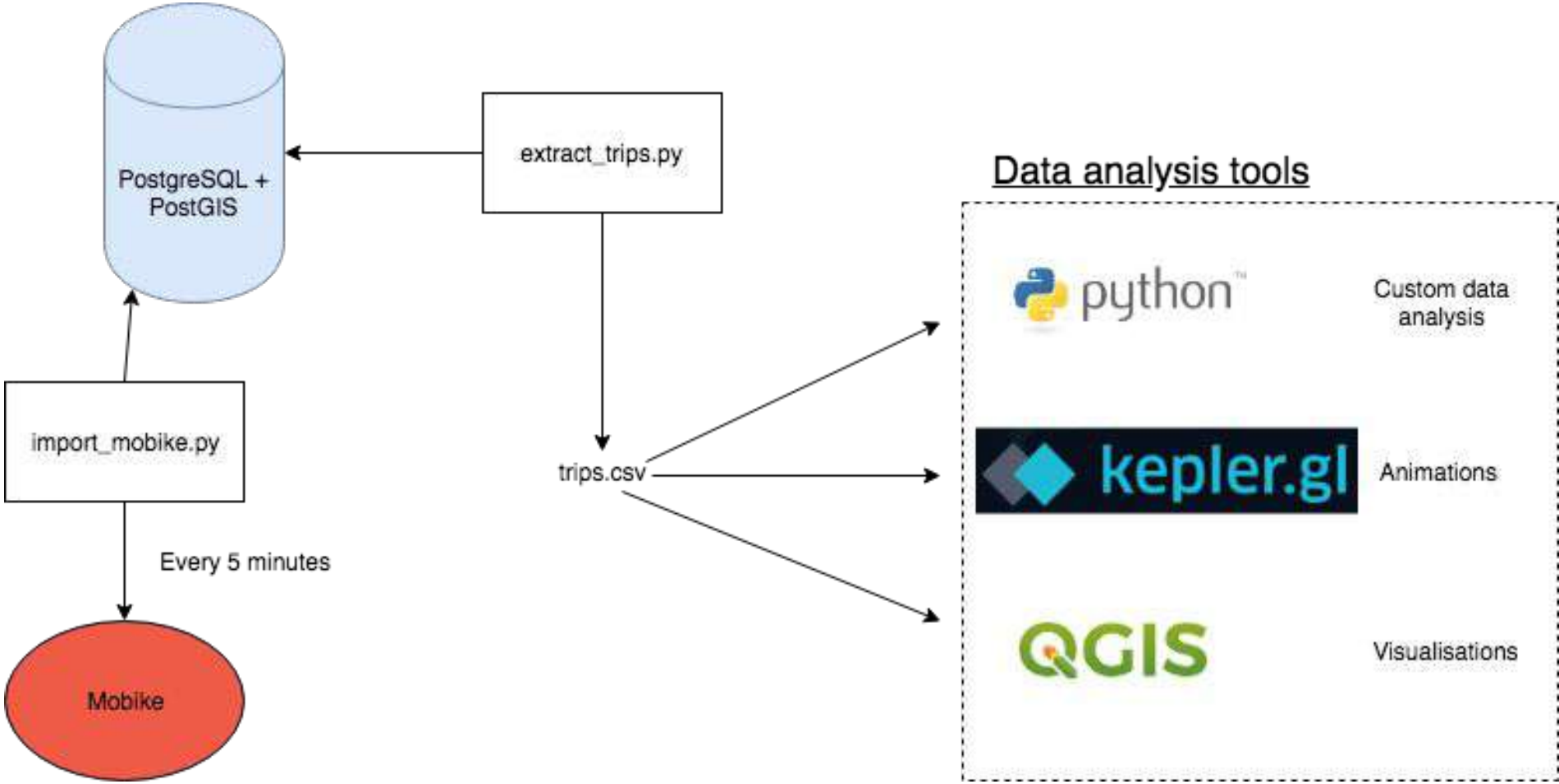
=



Mobike api

```
{
"code":0,
"message":"",
"bike":[
    {
        "distId":"A676013702",
        "distX":4.361303,
        "distY":52.000314,
        "distNum":1,
        "distance":"217",
        "bikeIds":"A676013702#",
        "biketype":2,
        "type":0,
        "boundary":null,
        "operateType":2
    },
    {
        "distId":"A676001117",
        "distX":4.362311,
        "distY":52.000392,
        "distNum":1,
        "distance":"247",
        "bikeIds":"A676001117#",
        "biketype":2,
        "type":0,
        "boundary":null,
        "operateType":2
    },
    ...,
    ...
```

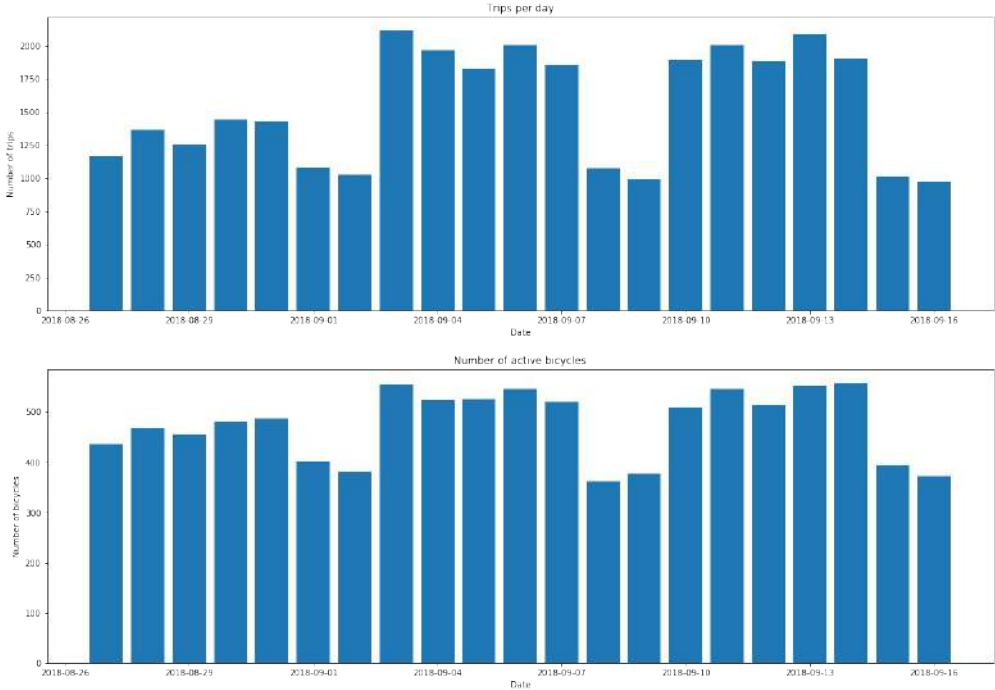

PostgreSQL + PostGIS
extract_trips.py
import_mobike.py
Every 5 minutes
Mobike
trips.csv
Data analysis tools
python
Custom data analysis
kepler.gl
Animations
QGIS
Visualisations

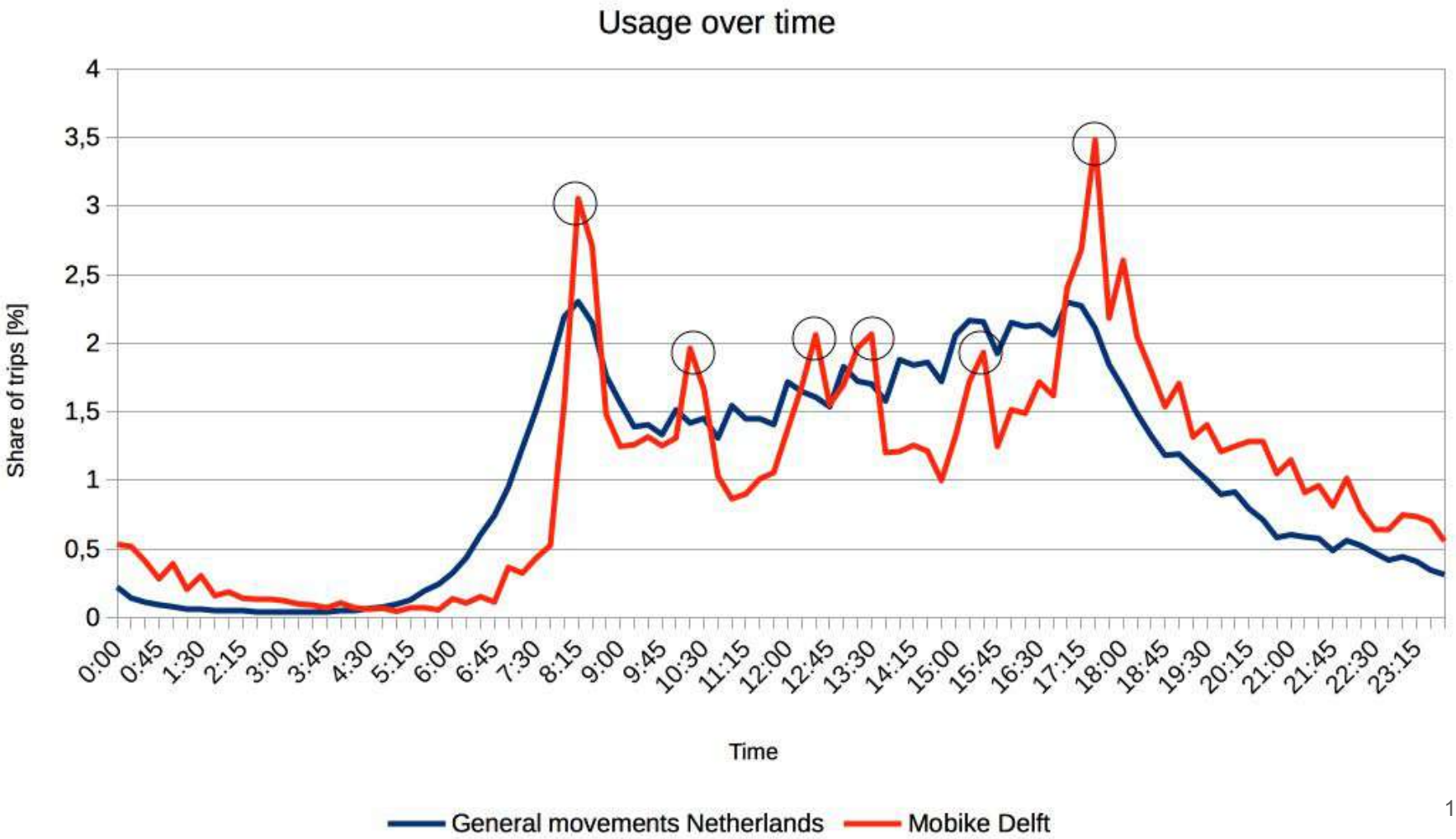
How Mobike is used in Delft?

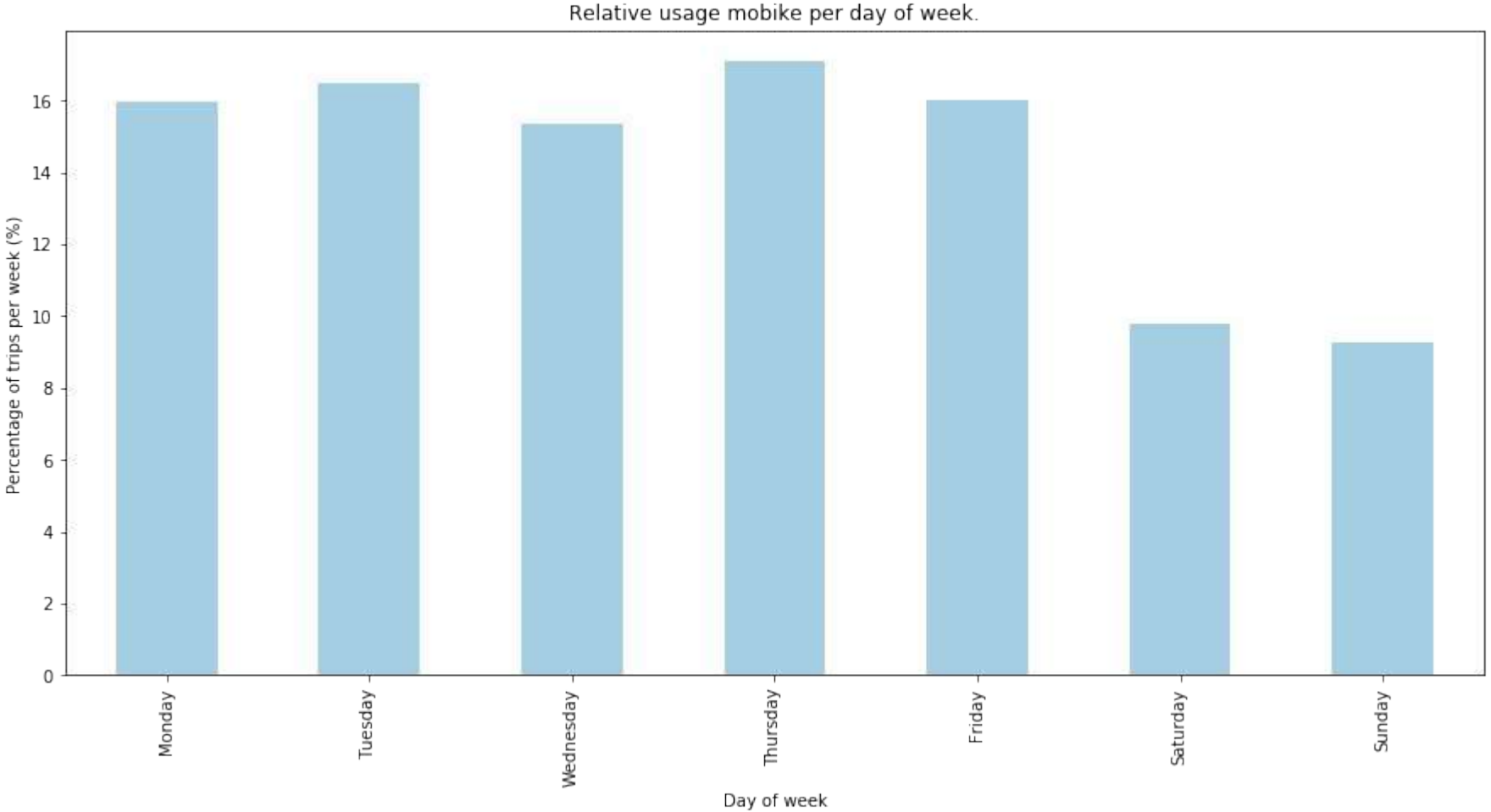
https://www.youtube.com/watch?v=MVqJtJA6_wg

General

- Between 1000 and 2100 daily trips
- 1.6 daily trips per bike
  - When only active bikes considered between 2.5 and 3.8




Usage over time
Share of trips [%]
4
3,5
3
2,5
2
1,5
1
0,5
0
0:00
0:45
1:30
2:15
3:00
3:45
4:30
5:15
6:00
6:45
7:30
8:15
9:00
9:45
10:30
11:15
12:00
12:45
13:30
14:15
15:00
15:45
16:30
17:15
18:00
18:45
19:30
20:15
21:00
21:45
22:30
23:15
Time
General movements Netherlands
Mobike Delft


Relative usage mobike per day of week.
Percentage of trips per week (%)
0
2
4
6
8
10
12
14
16
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday
Day of week

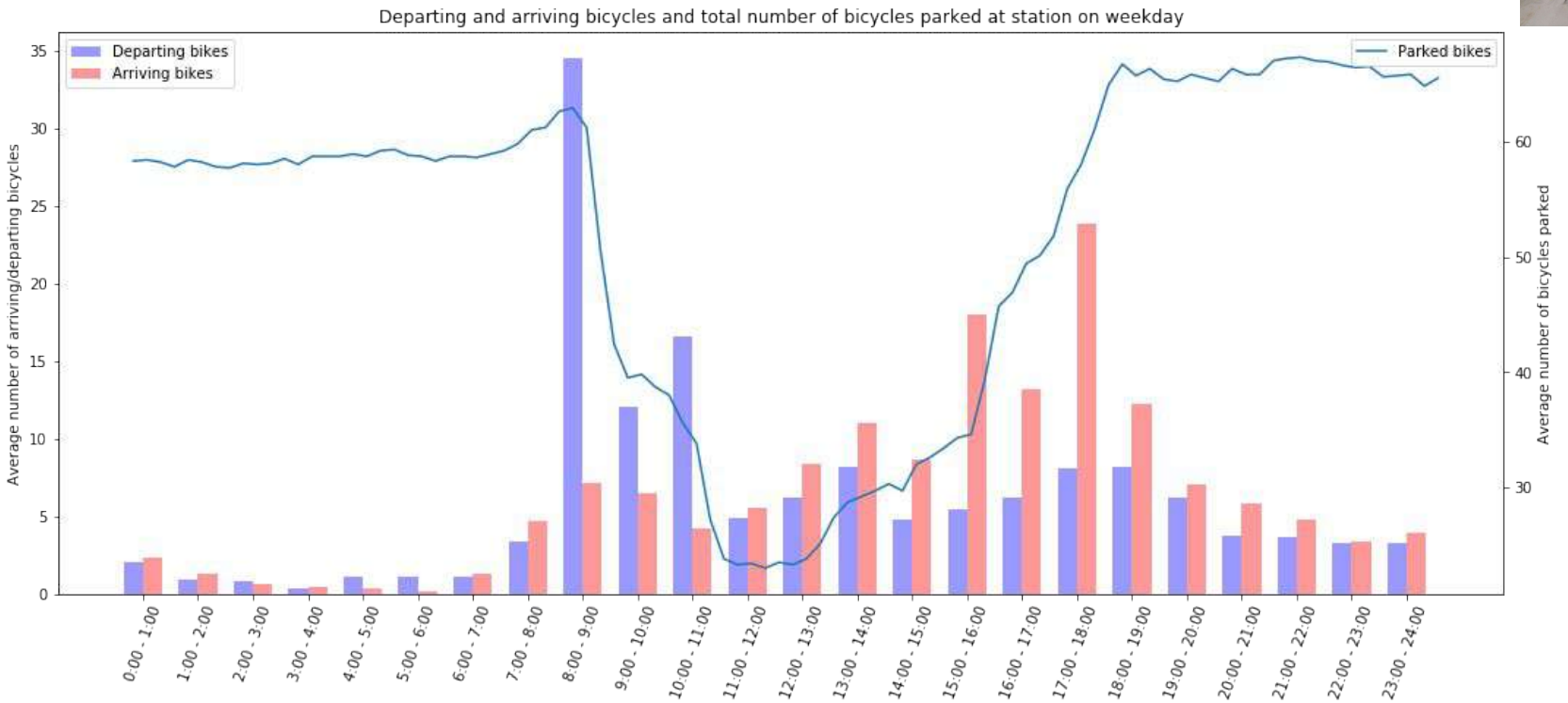
Average euclidian trip length 1.6 km (1.7 km - 2.3 km over road)

18.7% of trips related to railway station

50 trips per day Delft Zuid

Trips 3 - 7 september

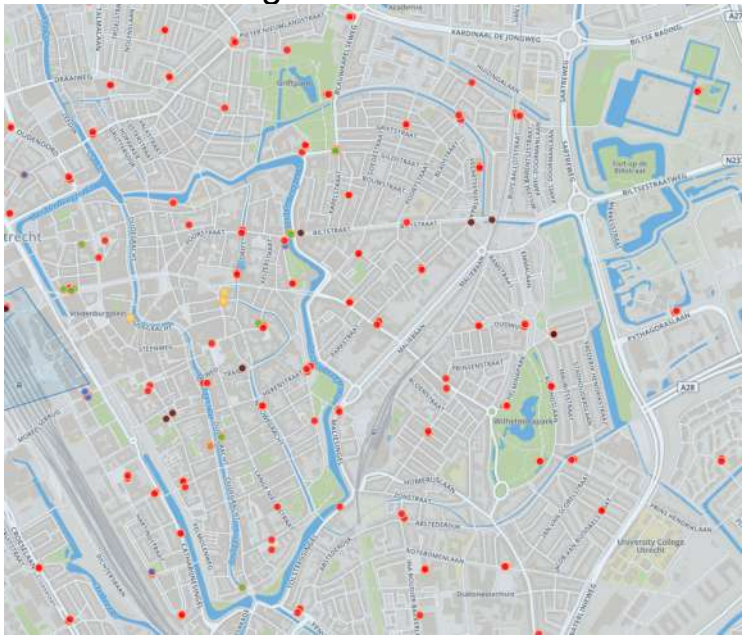
Bike-sharing as solution for overfull bicycle-parking facilities?



Bicycles parked for long time

80% bikes thar are not used for more then 5 days in residential areas

- Redistributing bikes



Recommendations

Data

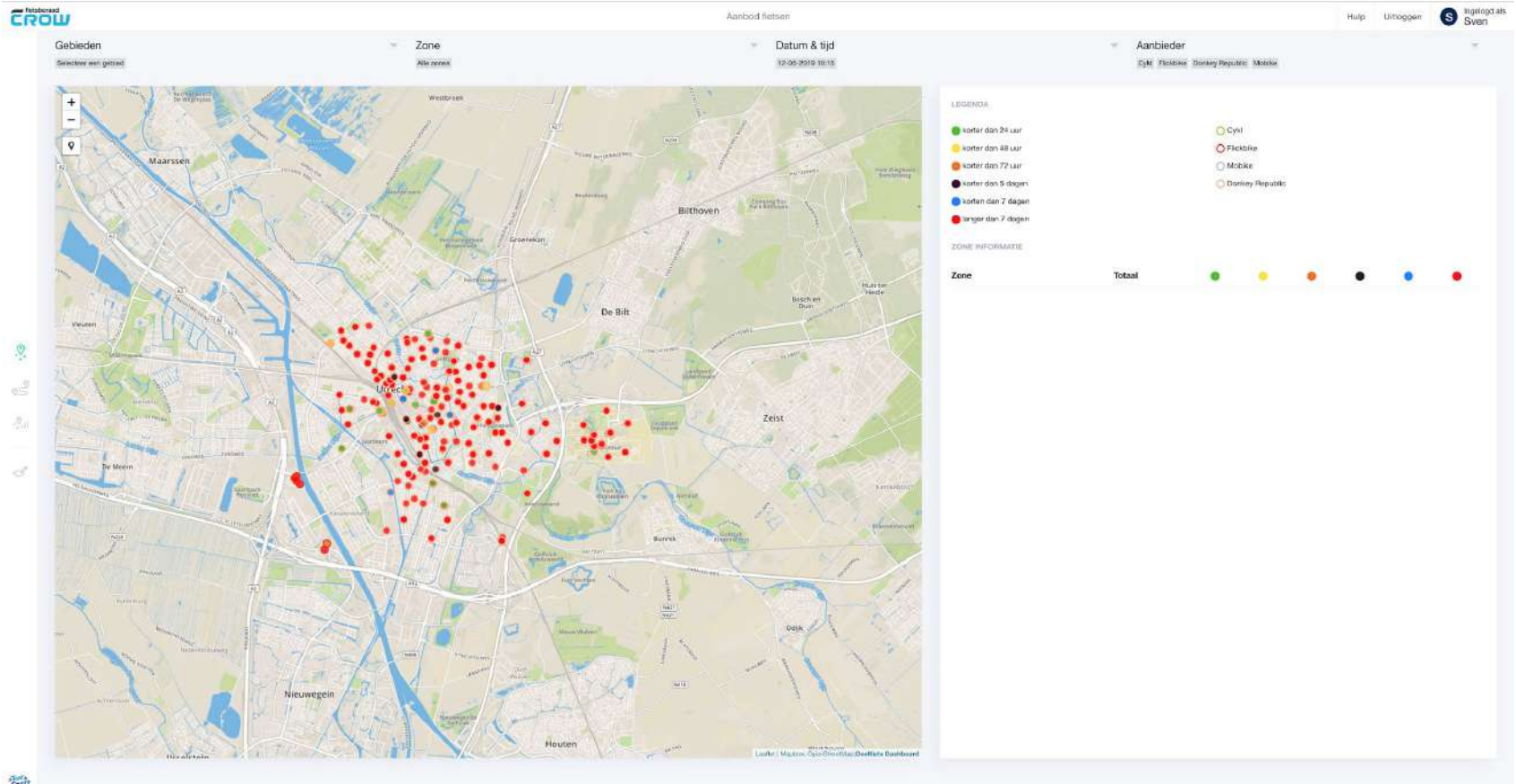
Enforce sharing of data via standards

- GBFS(+), open data
- MDS

Goals:

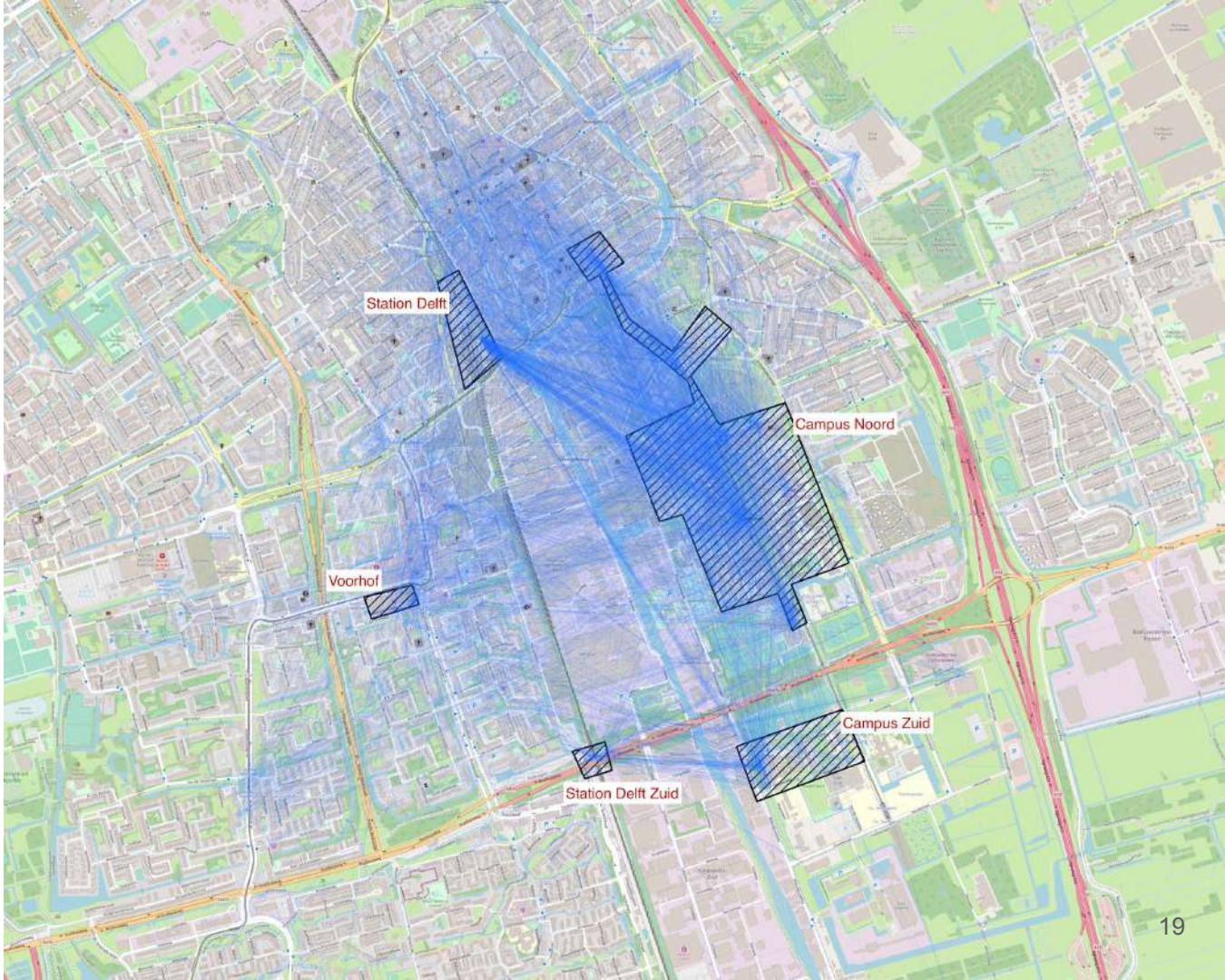
- Increase trust between government <> operator
- Improve travelers information
  a. Where is bike-sharing available?
  b. Include bike-sharing within travel advices (MaaS).
     - Encourage interoperability

bike-sharing dashboard



[Demo]

Virtual docking zones



New subscription model

Combine strenghts:

- 25 euro? per month everywhere a bike.
- Discourage not using bike (while renting) for longer then 72 hours.

Availability at stations

Ideal bike-sharing

Very flexible

Higher utilisation of parking facilities at railway stations

Second bikes cause 45% parking pressure (KiM 2018)


MTV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Questions

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Raw data available on request

Slides will be available on https://nielsvanoort.weblog.tudelft.nl/

Full thesis: https://repository.tudelft.nl/islandora/object/uuid%3A0ac0d41a-5d86-430a-b6c4-af6b44371f8c?collection=education