

Comparison of free-floating car-sharing services in cities

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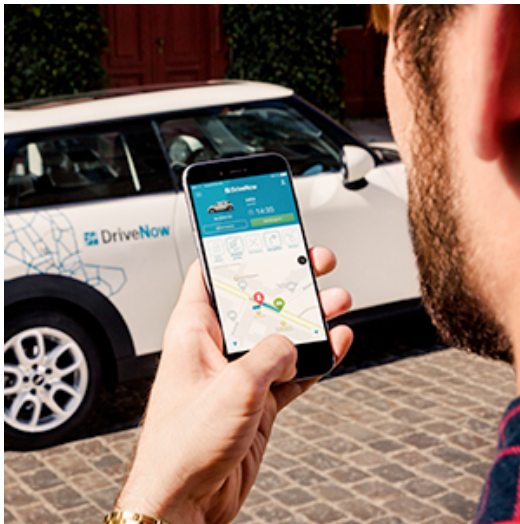
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What is free-floating car-sharing?



- Car-sharing that can be picked-up and dropped-off anywhere within a designated area
- 2 major operators:
 - Car2go – 30 cities
 - DriveNow (ReachNow in US) – 14 cities
- Many smaller companies
- Conventional and electric vehicles

The data



- 22 cities
- 3 operators
- 27 million trips

The data

- Data sampled between 2014-2016
- Origin –Destination
- Start time and end time
- Fuel level
- Type of vehicle (electric, gasoline, diesel)

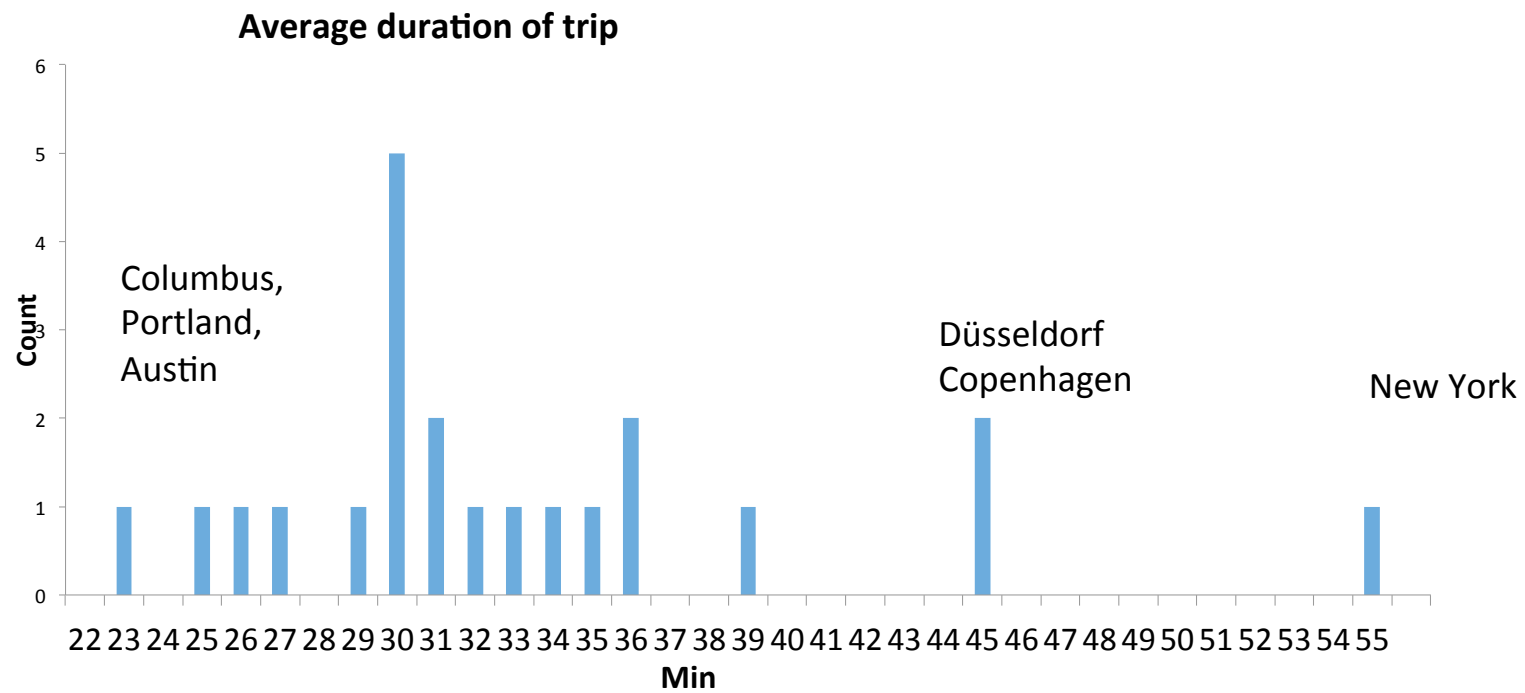
What can we say and what can't we say?

- Descriptive comparison between the cities
- We can't explain the differences
- We don't have the actual route
- And no data from users
- Still unique and comprehensive data set of where the vehicles are and how often they are used

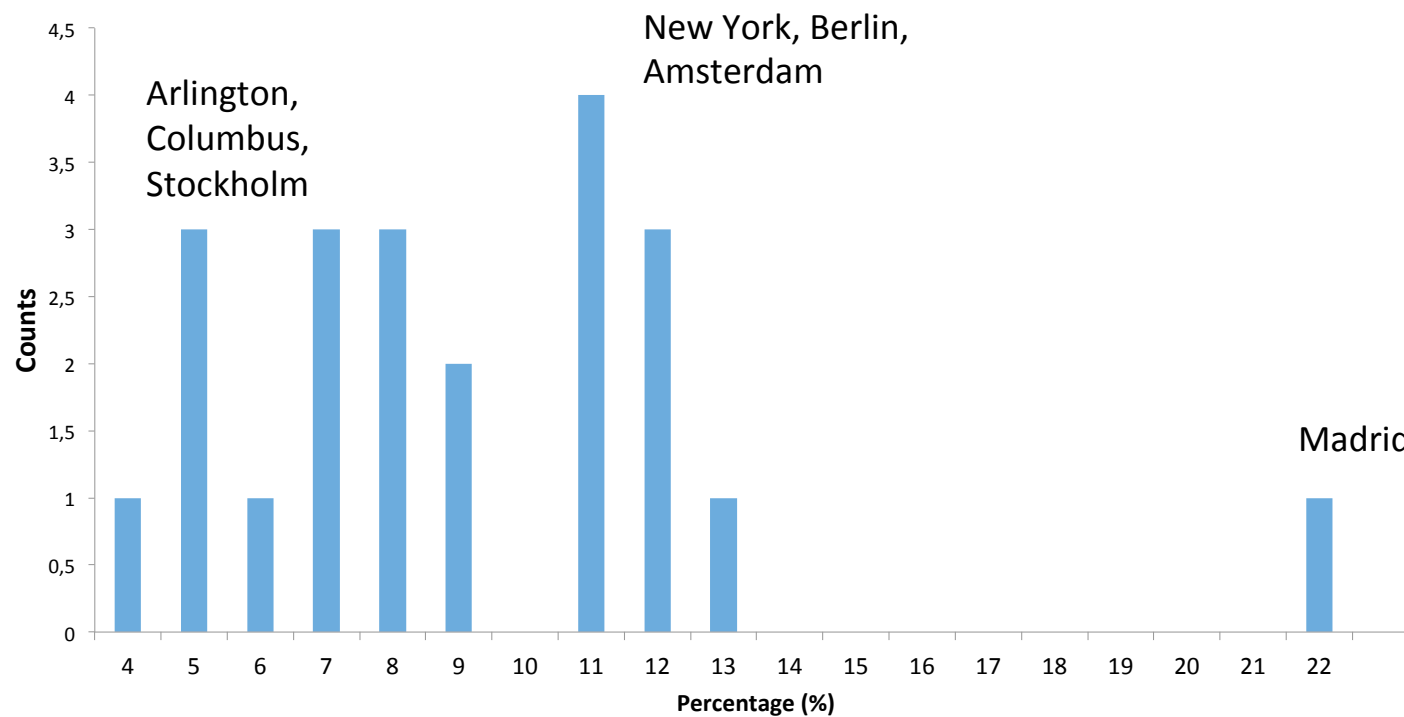
Number of vehicles per city

- Roughly around 500/ city
- Many German cities >1000 – Berlin ~3700
- US cities 200 - 500

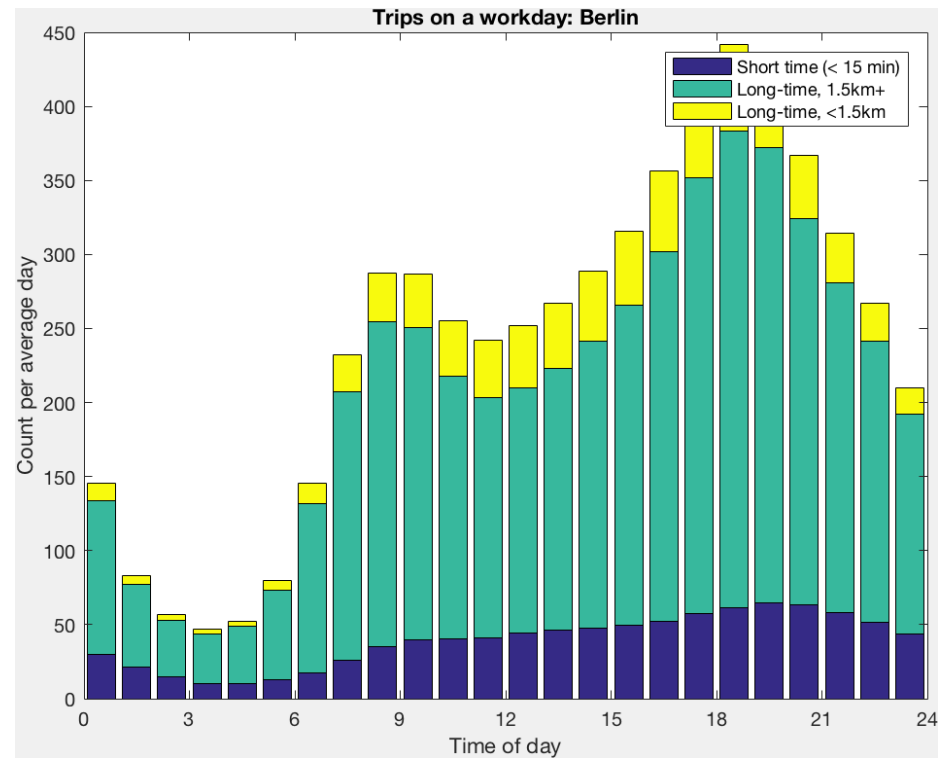
Results - trip duration

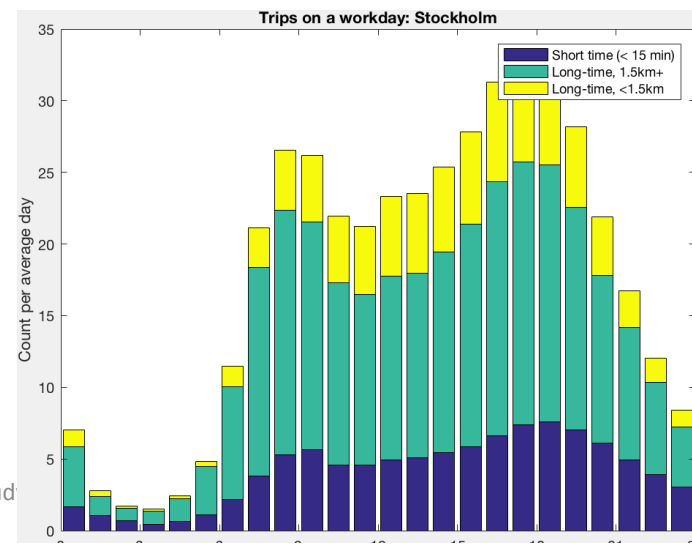
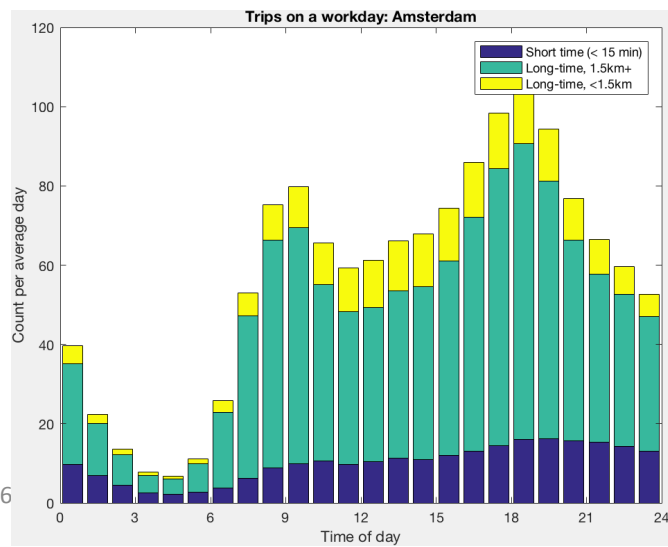
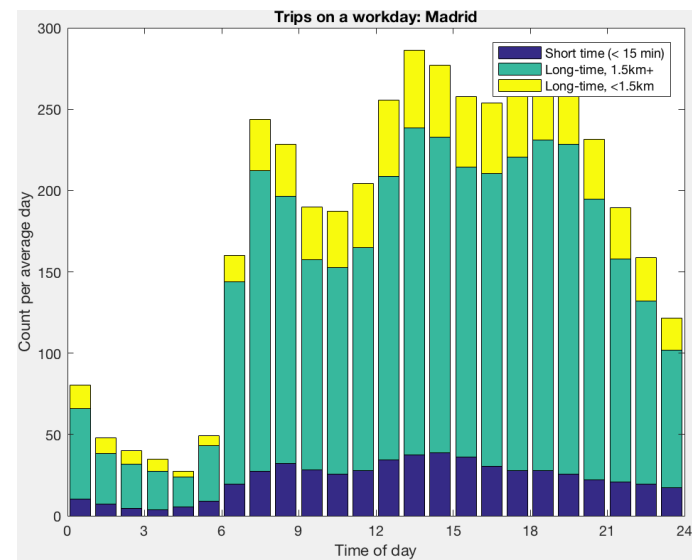
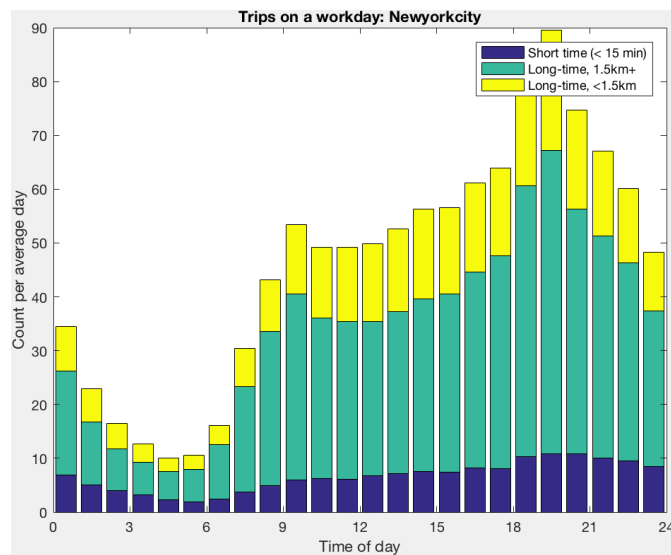


Results - Utilization rate

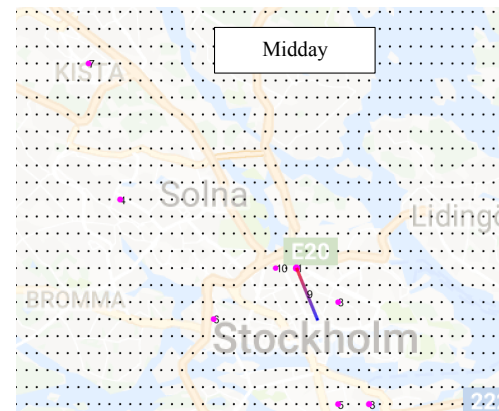
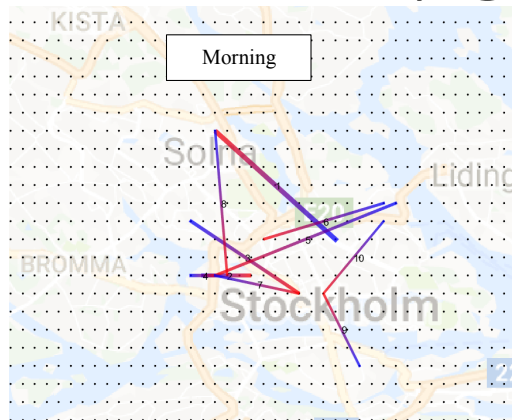


When are they used?





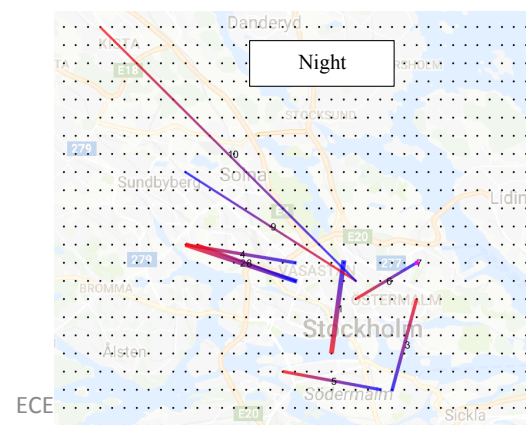
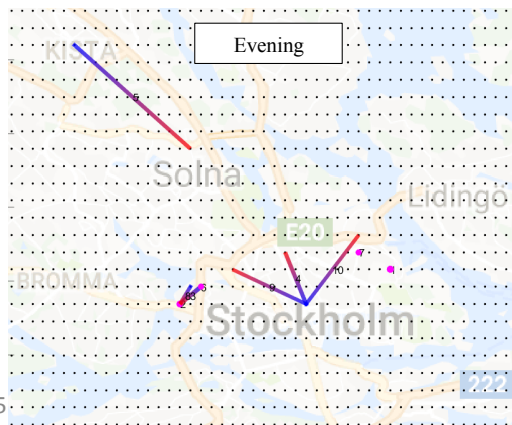
Where do they go? Stockholm as example



500*500 m grid

Most common trips
(still small share of
the trips)

Blue: origin
Red: destination

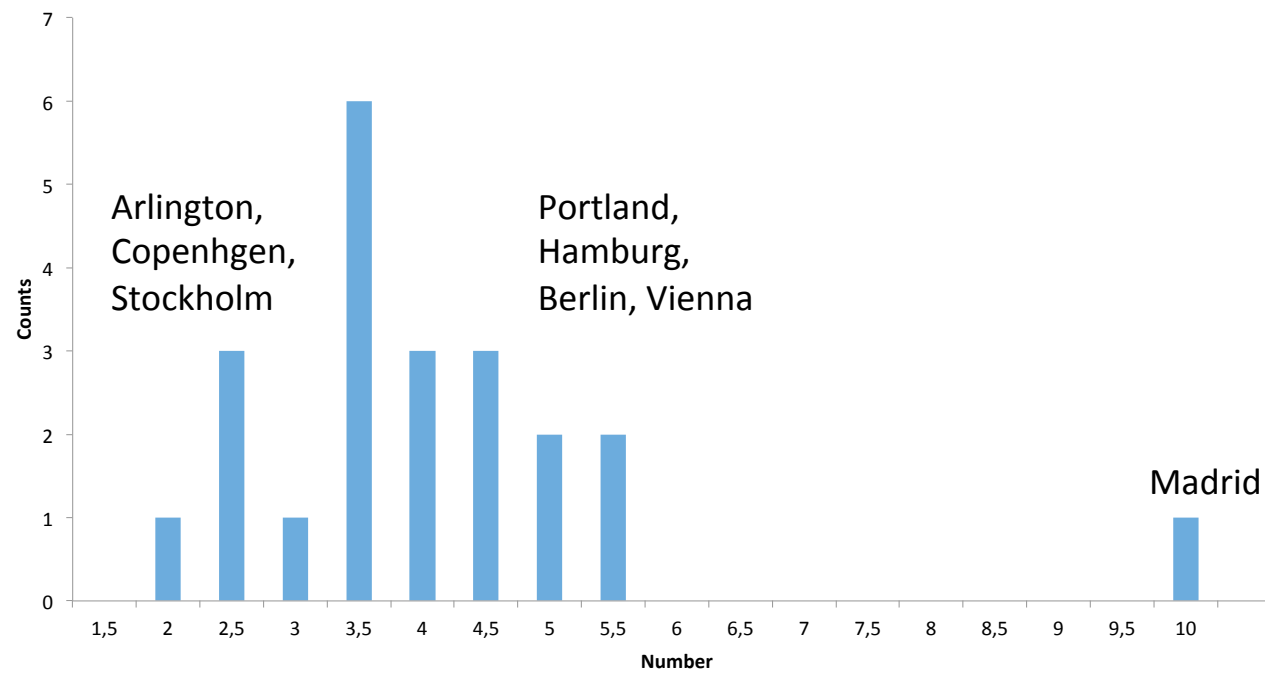


Future work

- Comparing time to walking, cykling and public transport (ongoing)
- Clustering of trips (ongoing)
- Collecting data on the cities: demographics, parking, public transport, ...
- Ideally survey of users

Extra slides

Trips per vehicle per day



City	Nr of vehicles	Average duration of trip (min)	Average distance of trip (km)	Nr of trips per vehicle per day	Utilization rate (%)
Amsterdam	350	35.4 (6.2)	3.3 (0.2)	4.6 (1.9)	11.3 (5.2)
Arlington	96	29.7 (14.4)	2.5 (0.5)	1.9 (0.5)	4.0 (2.2)
Austin	362	24.6(1.6)	3.3 (0.2)	3.3 (0.6)	5.7 (1.1)
Berlin	3774	29.8 (2.0)	4.2 (0.3)	5.3 (0.9)	11.0 (2.2)
Cologne	703	34.9 (3.0)	4.2 (0.3)	4.5 (0.9)	11.0 (2.6)
Columbus	199	22.6(2.2)	2.8 (0.2)	2.6 (0.4)	4.1 (0.8)
Copenhagen	399	44.6 (9.7)	3.1 (0.3)	2.2 (0.3)	6.8 (1.7)
Düsseldorf	685	44.2 (6.8)	3.3 (0.2)	3.6 (0.7)	11.1 (2.8)
Florence	219	26.8 (2.0)	2.9 (0.2)	3.4 (0.5)	6.4 (1.2)
Frankfurt	597	28.1 (2.2)	3.8 (0.4)	3.1 (0.5)	6.2(1.2)
Hamburg	2066	30.2 (3.8)	4.0 (0.2)	5.5 (1.2)	11.7 (2.7)
Madrid	500	31.9 (2.7)	2.8 (0.1)	9.6 (3.2)	21.6 (7.5)
Miami	296	29.4 (3.1)	4.0 (0.4)	2.4 (0.3)	4.9 (1.0)
Montreal	455	29.4 (2.5)	3.0 (0.2)	3.8 (0.6)	7.8 (1.4)
Munich	1527	32.5 (4.7)	6.0 (1.0)	3.3 (0.8)	7.7 (2.7)
New York	525	54.9 (17.0)	3.0 (0.4)	3.3 (0.7)	12.2 (3.5)
Portland	612	25.8 (1.1)	3.3 (0.1)	4.9 (0.7)	8.8 (1.5)
Stockholm	545	30.2 (3.5)	4.0 (0.9)	2.4 (0.5)	5.0 (1.0)
Stuttgart	515	35.1 (4.2)	3.8 (0.3)	4.3 (0.9)	10.5 (2.4)
Toronto	498	38.6 (6.6)	3.3 (0.3)	3.1 (0.6)	8.5 (2.5)
Washington DC	1011	29.6 (2.9)	3.0 (0.3)	3.6 (0.7)	7.5 (1.7)
Wien	446	33.7 (2.8)	3.9 (0.2)	4.5 (0.9)	10.5 (2.4)