FACULTY OF
APPLIED SCIENCES

Public transport geodata analysis

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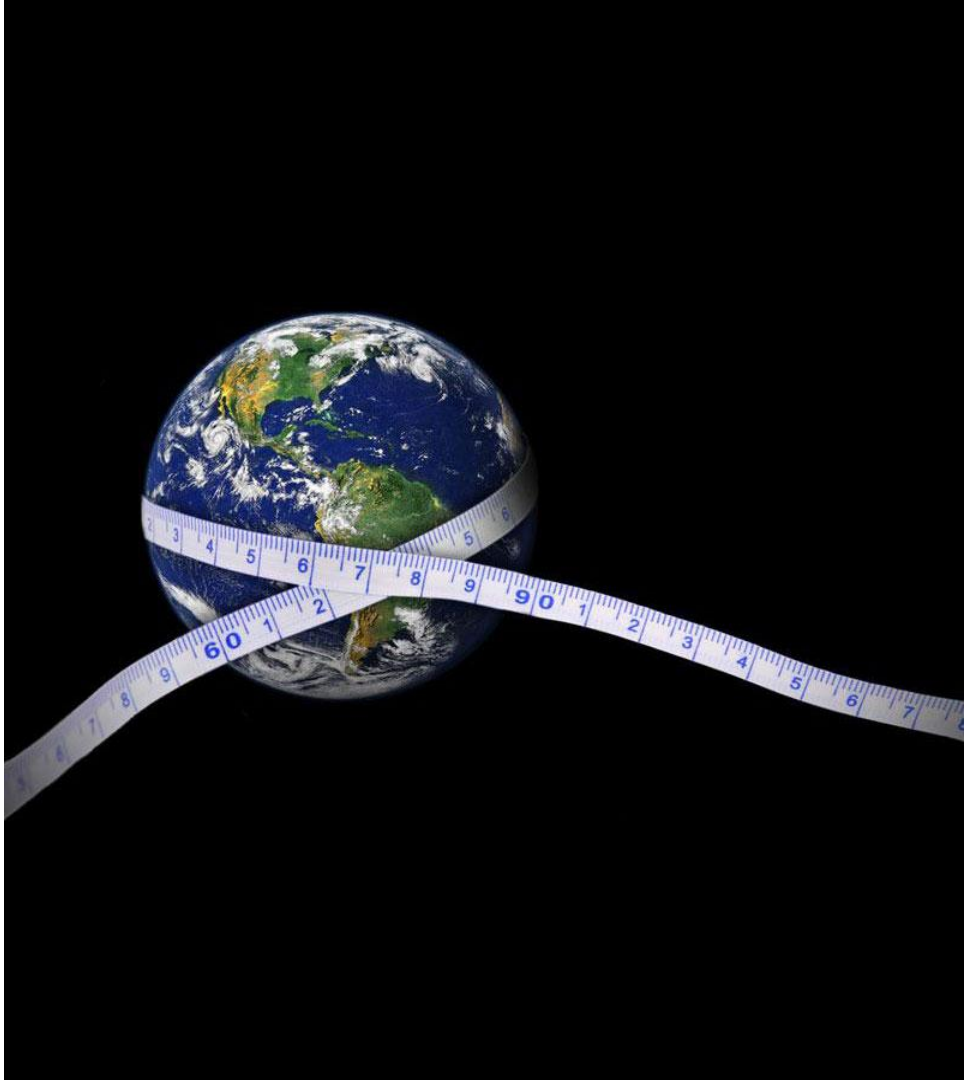
Lviv 2017

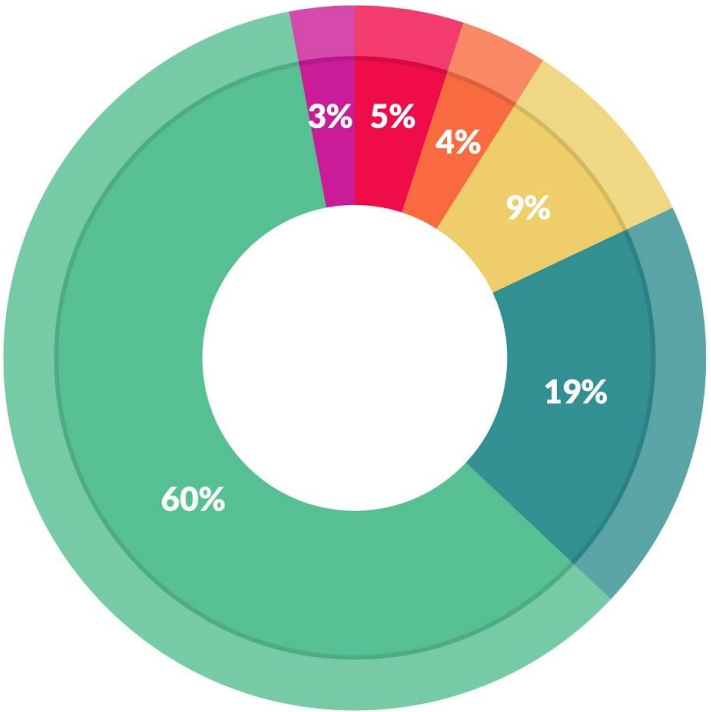
Data harvesting

- 8 routes
- 90 vehicles
- 7 days
- 342 742 records of GPS
- 45 627 km totally

(1 trip around the Earth)



80% time is for data prep



What data scientists spend the most time doing

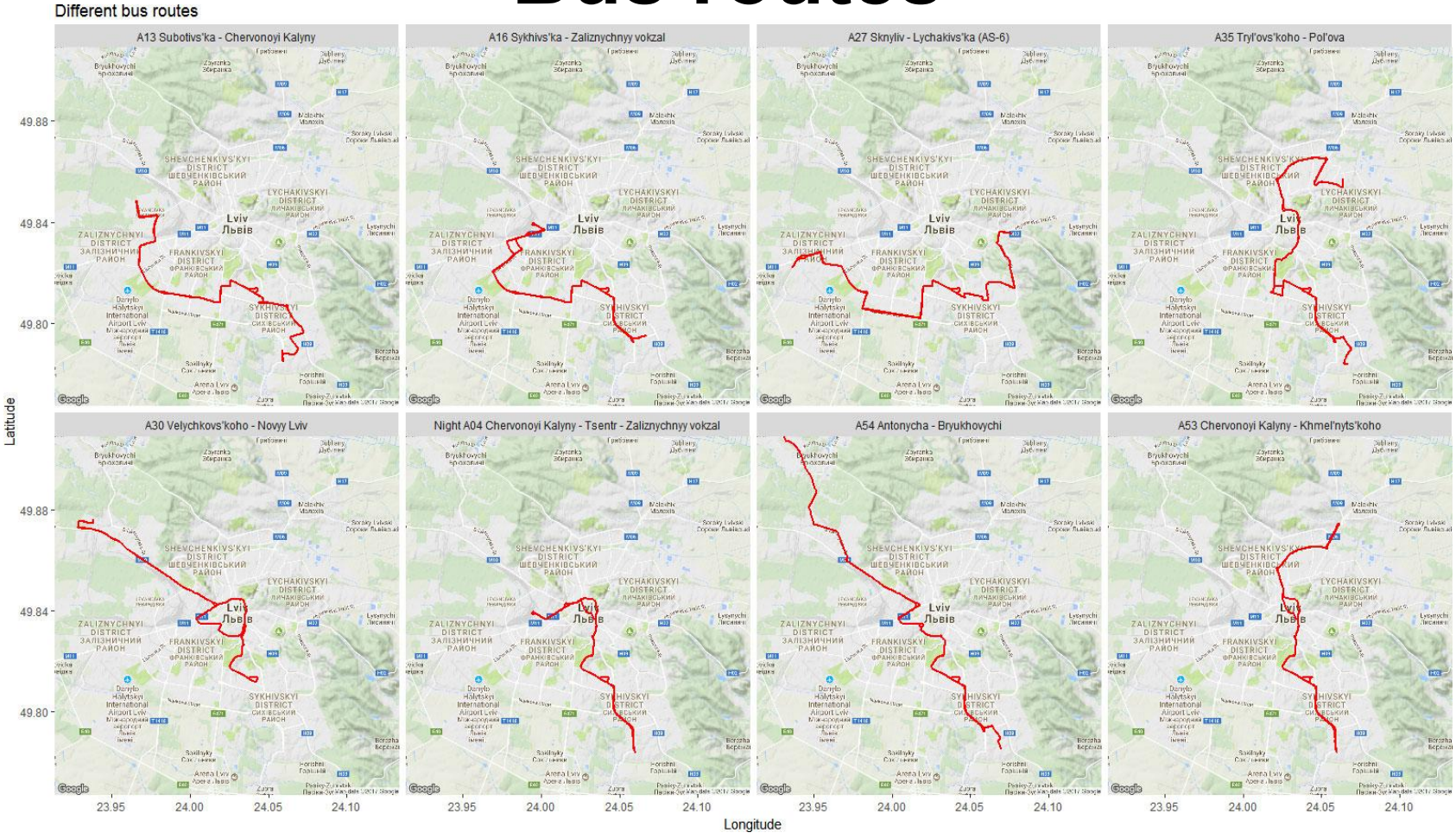
- *Building training sets: 3%*
- *Cleaning and organizing data: 60%*
- *Collecting data sets; 19%*
- *Mining data for patterns: 9%*
- *Refining algorithms: 4%*
- *Other: 5%*

Credit: CrowdFlower

Data prep:

- found route turn stops
- route segmentation (50 m)
- trip points by vehicle
- vehicle trip directions
- vehicle speed on segment
- and more ….

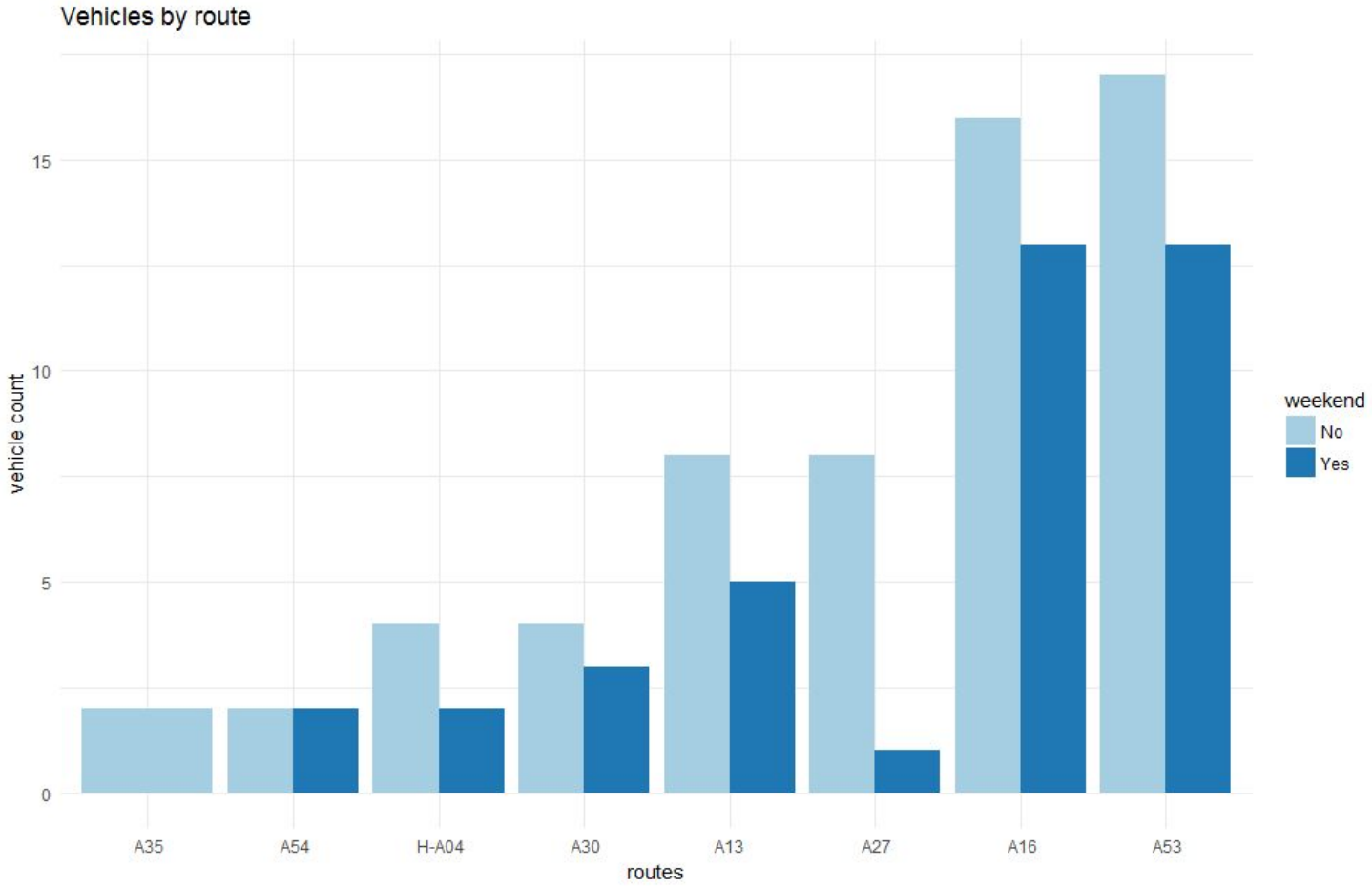
Bus routes


Different bus routes
A13 Subotivs'ka - Chervonoyi Kalyny
A16 Sykhivs'ka - Zaliznychnyy vokzal
A27 Sknyliv - Lychakivs'ka (AS-6)
A35 Tryl'ovs'koho - Pol'ova
A30 Velychkovs'koho - Novyy Lviv
Night A04 Chervonoyi Kalyny - Tsentr - Zaliznychnyy vokzal
A54 Antonycha - Bryukhovychi
A53 Chervonoyi Kalyny - Khmel'nyts'koho
Latitude
49.88
49.84
49.80
Longitude
23.95
24.00
24.05
24.10
Lviv
Львів

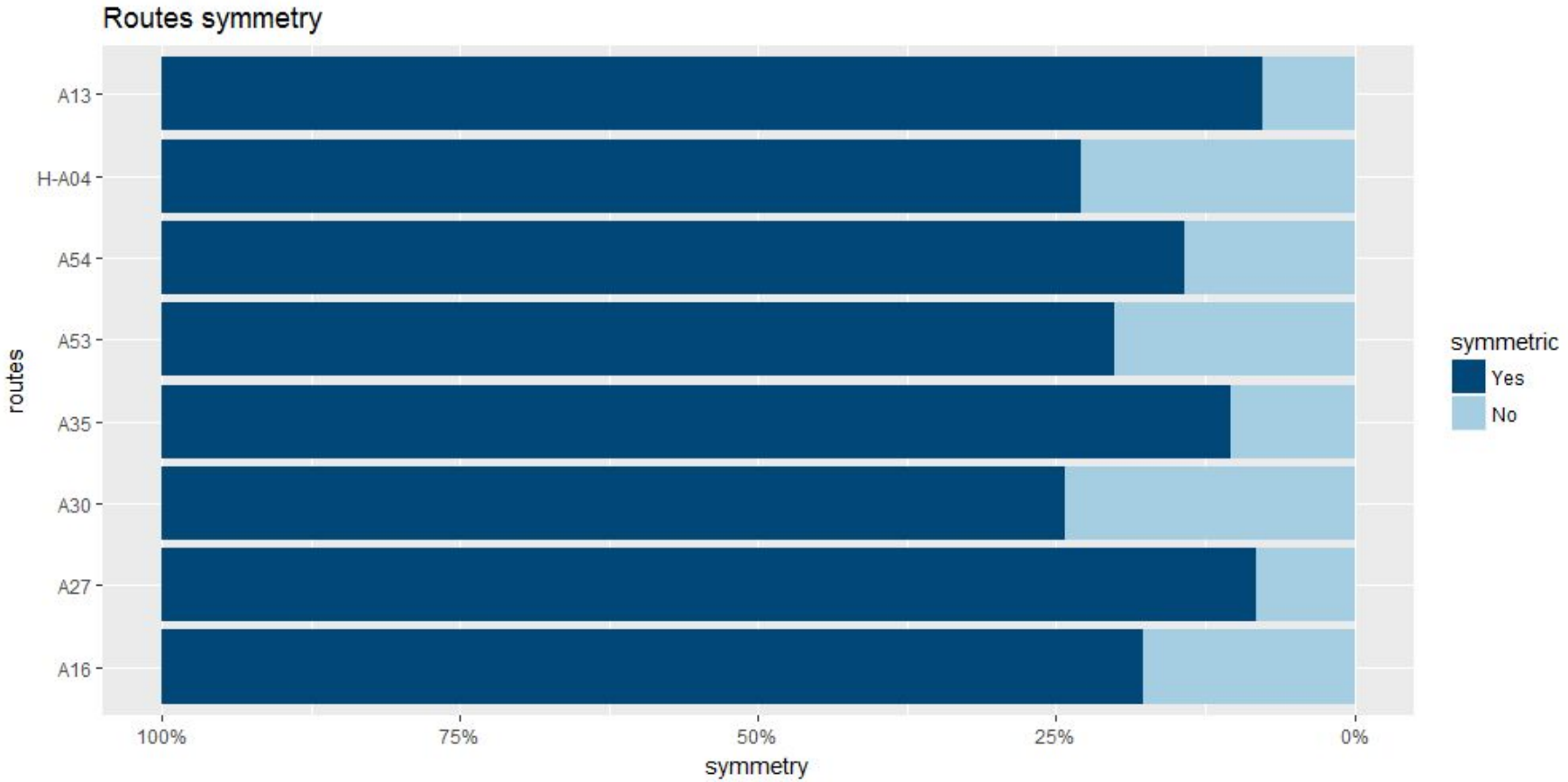
Routes information

Route	Distance, km	Symmetry, %	Avg speed, km per h			Max speed, km per h		
			day	weekday	weekend	day	weekday	weekend
A13	35.20	92.36	15.41	15.28	15.83	47.07	47.07	46.31
A16	29.53	82.27	14.58	14.31	15.28	46.71	46.71	45.91
A27	37.76	91.81	16.68	16.68	20.81	52.44	52.44	33.77
A35	38.26	89.62	8.77	8.77		45.24	45.24	
A30	31.64	75.74	15.08	14.90	15.8	53.98	53.98	47.61
Night A04	23.79	77.08	19.14	18.98	19.4	45.40	45.40	43.98
A54	47.88	85.74	16.34	15.95	17.43	51.02	51.02	47.26
A53	29.17	79.93	14.99	14.79	15.56	58.31	58.31	46.07

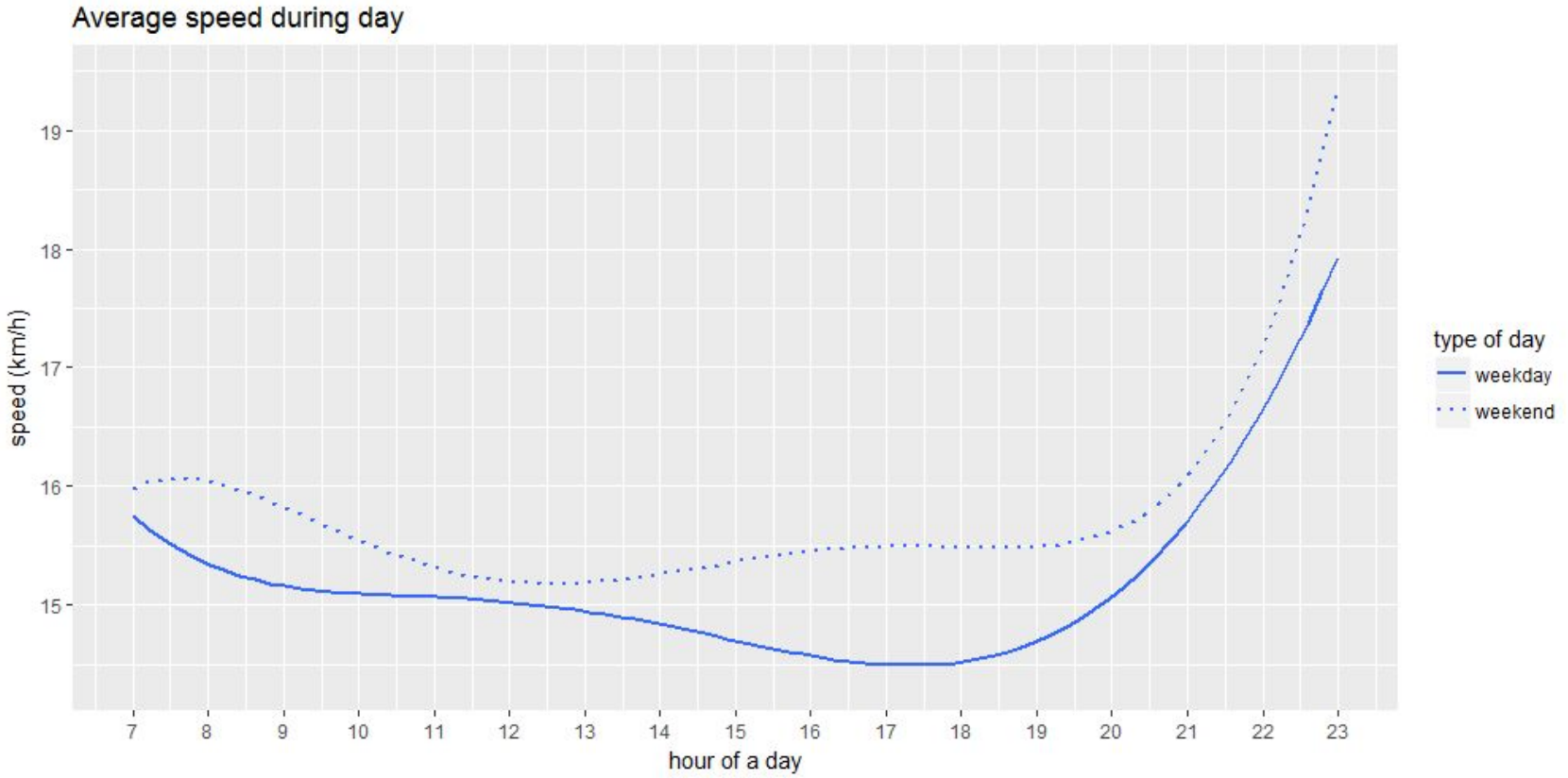
Vehicle count - weekday/weekend



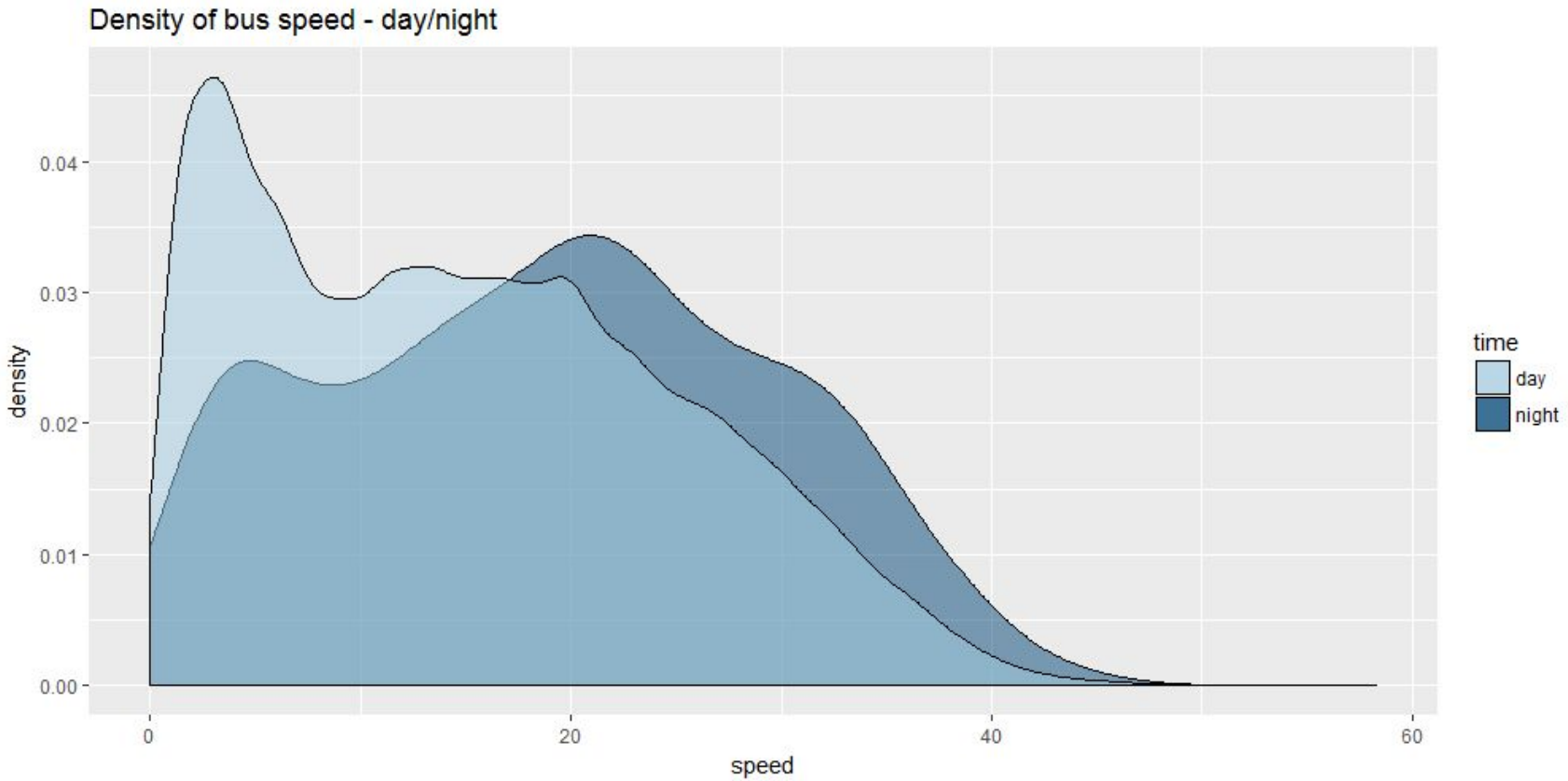
Route symmetry analysis



Bus speed by hours - weekday/weekend

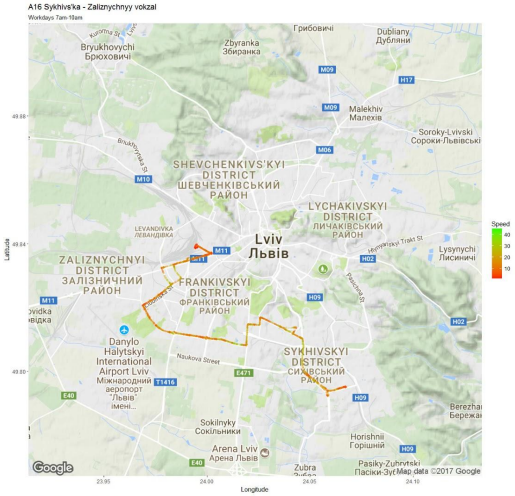


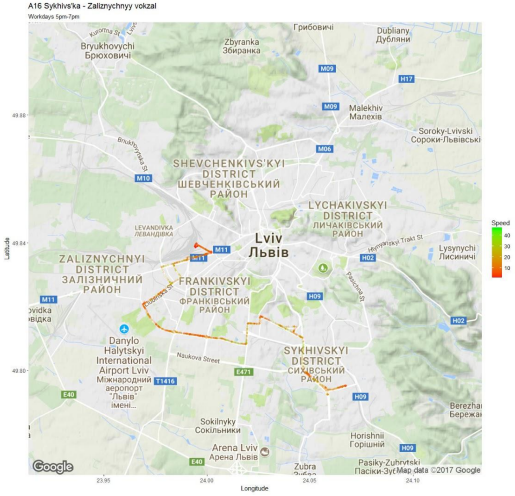
Speed density during day/night

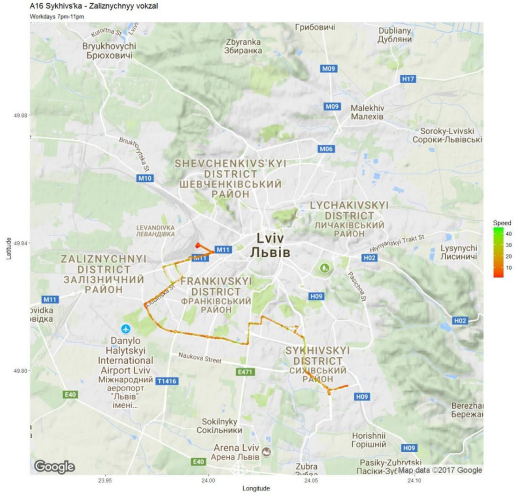


Bus route A16

Changing speed during workday

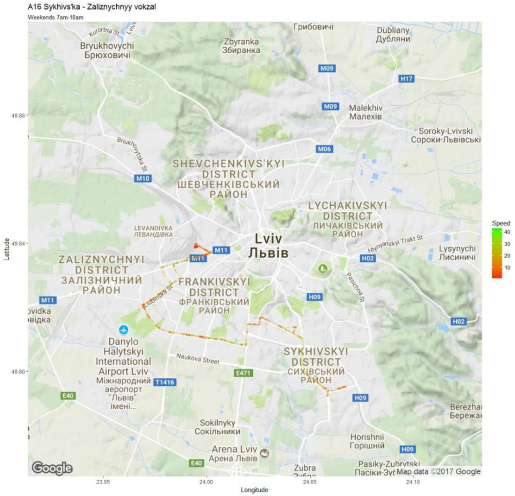


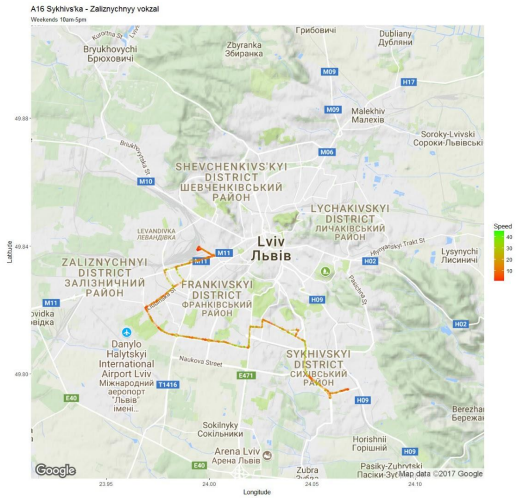


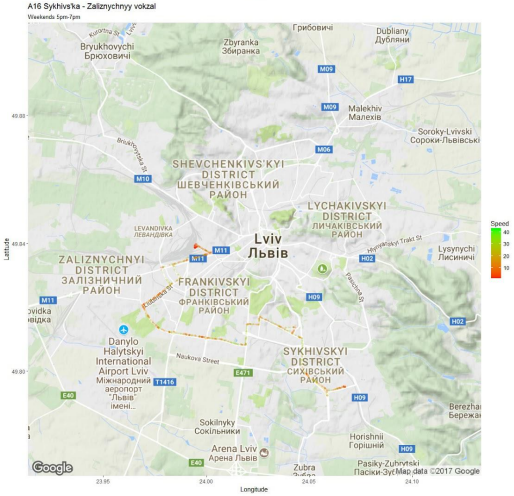


Bus route A16

Changing speed during weekday

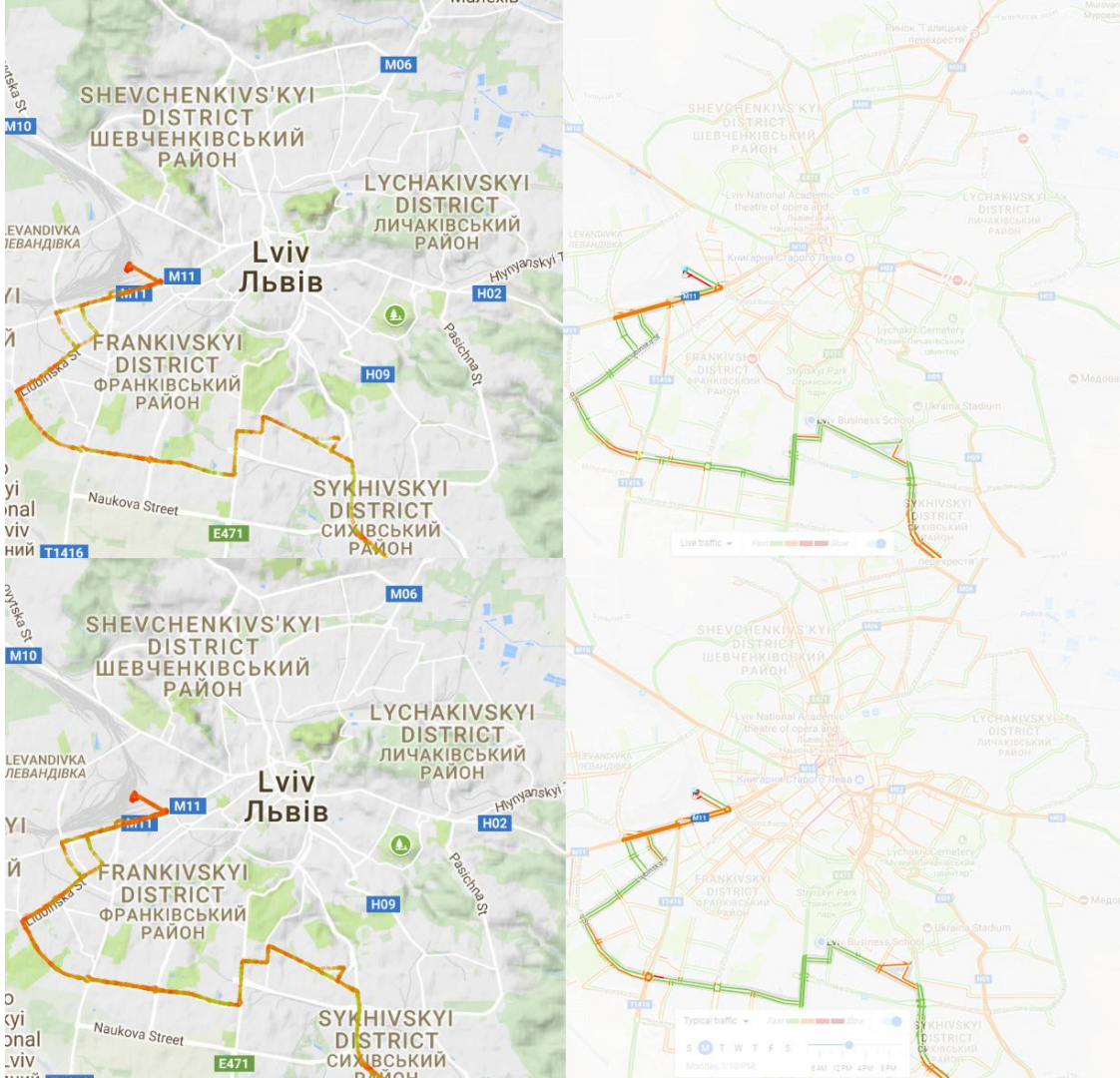






Bus route A16

Comparing with
Google Traffic



Conclusion

- Schedule 80% of time for data prep
- In unknown domain area be ready to invent your own bicycles
- The data analysis gives ability for further research and ML applications

Thank you!
Your questions?

You can find our code & data here:
https://github.com/UCUBusProj