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South Moravian Region, Brno, KORDIS JMK



**Proposal of a scooter sharing system in a small town**



Maryia Markava

# Scooter sharing system in a small town

How to get a better public transport for citizens in a small town?

Where will a parking house for scooters be?

How will it work?

Why should the small town use the scooter-sharing system?

How much will it cost?



# Scooter sharing system in a small town

## How to get a better public transport for citizens in a small town?

- Greater distance between a stop or a railway station and home in small towns
- How to solve the "last-mile" problem
- Using scooters in a small town

**The aim is to shorten time travel to the terminal, especially to work/school in the early morning and the late evening**



Source: [https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.electroworld.cz%2Fxiaomi-mi-scooter-pro-2-e-kolobezka&psig=AOvVaw2B4DQHpsbbkONi9HnBy4HH&ust=1631190222203000&source=images&cd=vfe&ved=0CAsQjRxqFwoTCMCh66Cv7\\_ICFQAAAAAAdAAAAABAK](https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.electroworld.cz%2Fxiaomi-mi-scooter-pro-2-e-kolobezka&psig=AOvVaw2B4DQHpsbbkONi9HnBy4HH&ust=1631190222203000&source=images&cd=vfe&ved=0CAsQjRxqFwoTCMCh66Cv7_ICFQAAAAAAdAAAAABAK)



# Scooter sharing system in a small town



# Scooter sharing system in a small town

## Where will a parking house for scooters be?

- Near railway and bus stations
- Near the town hall for the future
- A room in the railway station



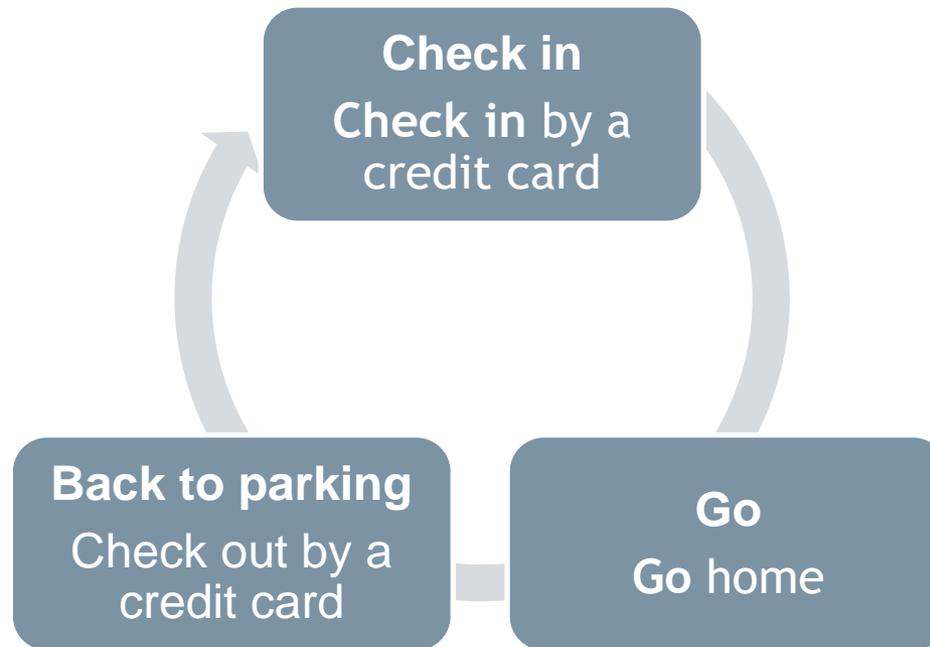
Source: [https://www.google.com/url?sa=i&url=https%3A%2F%2Fbikexbox.cz%2Ffen%2Fexisting-boxes%2F&psig=AOvVaw2\\_qiMa-3\\_cb-9oSkMG2VAX&ust=1631194071397000&source=images&cd=vfe&ved=0CAsQjRxqFwoTCOCapcy97\\_ICFQAAAAAdAAAAABA0](https://www.google.com/url?sa=i&url=https%3A%2F%2Fbikexbox.cz%2Ffen%2Fexisting-boxes%2F&psig=AOvVaw2_qiMa-3_cb-9oSkMG2VAX&ust=1631194071397000&source=images&cd=vfe&ved=0CAsQjRxqFwoTCOCapcy97_ICFQAAAAAdAAAAABA0)



Source: [https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.themayor.eu%2Ffen%2Fa%2Fview%2Fbarcelona-metropolitan-area-to-get-a-public-bike-service-8512&psig=AOvVaw2\\_qiMa-3\\_cb-9oSkMG2VAX&ust=1631194071397000&source=images&cd=vfe&ved=0CAsQjRxqFwoTCOCapcy97\\_ICFQAAAAAdAAAAABBI](https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.themayor.eu%2Ffen%2Fa%2Fview%2Fbarcelona-metropolitan-area-to-get-a-public-bike-service-8512&psig=AOvVaw2_qiMa-3_cb-9oSkMG2VAX&ust=1631194071397000&source=images&cd=vfe&ved=0CAsQjRxqFwoTCOCapcy97_ICFQAAAAAdAAAAABBI)

# Scooter sharing system in a small town

## How will it work?



# Scooter sharing system in a small town

## Why should the small town use the scooter-sharing system?

-  Low price
-  Simplify commuting for residents and support environmental transport
-  The traffic on the street can be reduced
-  Resolve the problem of commuting when there is no connecting bus line



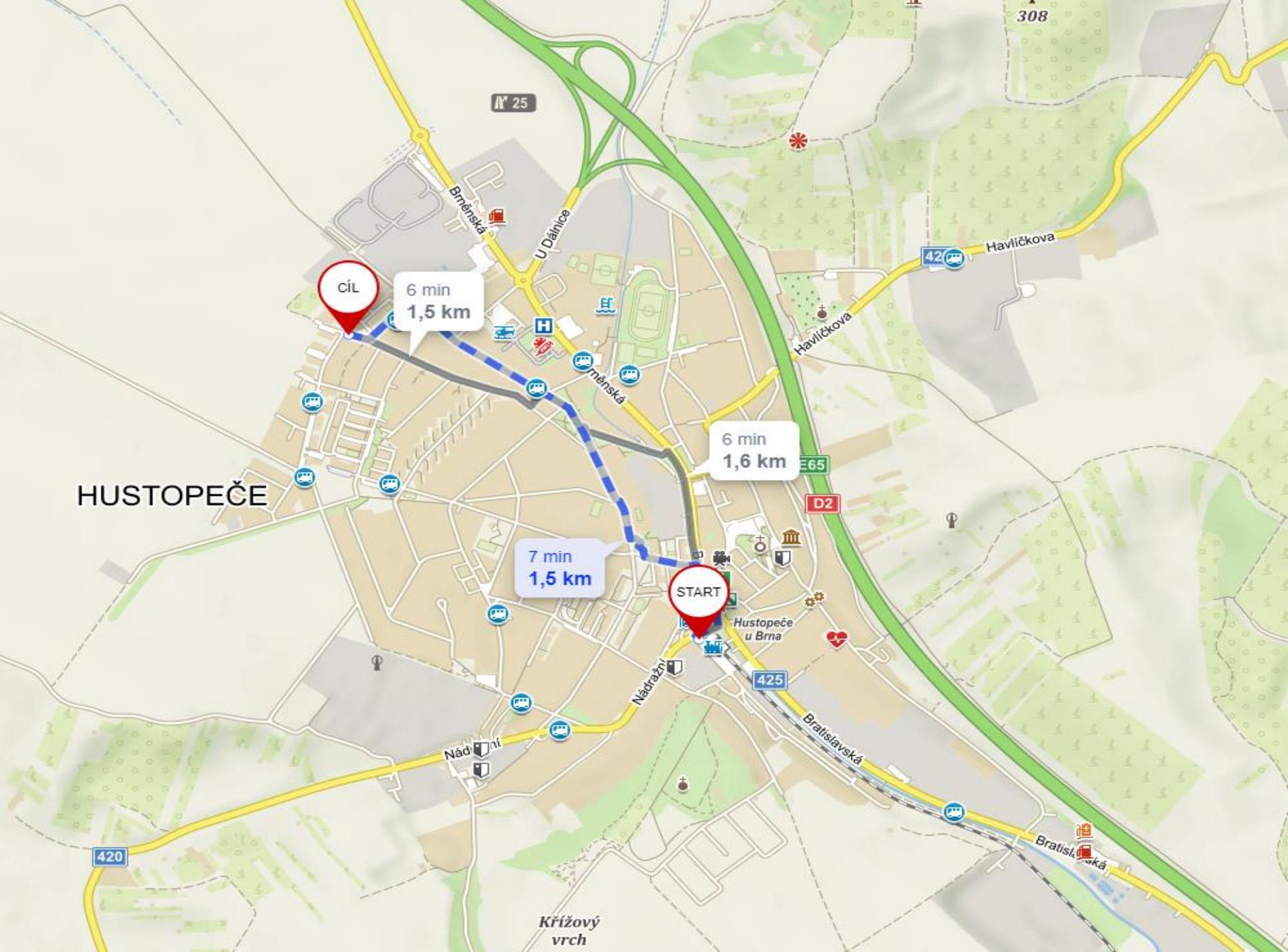
# HUSTOPEČE

**cíl**  
6 min  
1,5 km

7 min  
1,5 km

6 min  
1,6 km

**START**



Křížový vrch

# Scooter sharing system in a small town

## How much will it cost?

- The price of a scooter is 400-450 EUR
- It will be enough to have less than 10 scooters at the beginning
- The lifetime period of a scooter is 3-5 years
- 3 options of fare model



Source: <https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.forex24.cz%2Faktuality%2Fpokles-ceske-ekonomiky-zatim-vliv-na-korunu-neme%2F&psig=AOvVaw0e8gJ9eWd6MmatdmyPitmd&ust=1631283447132000&source=images&cc=ved=0CAsQjRxqFwoTCLjpvS2K8vICFQAAAAAAdAAAAABAD>

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 **Artificial intelligence**

 Maryia Markava

# Artificial intelligence

- Use of AI for automatic anomaly detection system in IDS JMK operation. Feasibility study - technical part
- 3 levels of AI
- Areas of AI: traffic management, traffic safety, public transport, and urban mobility



Source: [https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.traffictechnologytoday.com%2Ffeatures%2Fwhite-paper-how-ai-and-iot-can-reshape-public-transit-in-the-covid-era.html&psig=AOvVaw22139YjNzKJmy4c6PtXj3T&ust=1631280458858000&source=images&cd=vfe&ved=0CAsQjRxqFwoTCLjAzbb\\_8f1CFQAAAAAAdAAAAABAC](https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.traffictechnologytoday.com%2Ffeatures%2Fwhite-paper-how-ai-and-iot-can-reshape-public-transit-in-the-covid-era.html&psig=AOvVaw22139YjNzKJmy4c6PtXj3T&ust=1631280458858000&source=images&cd=vfe&ved=0CAsQjRxqFwoTCLjAzbb_8f1CFQAAAAAAdAAAAABAC)

# Artificial intelligence

## Concept of anomaly detection in IDS JMK with the help of GPS

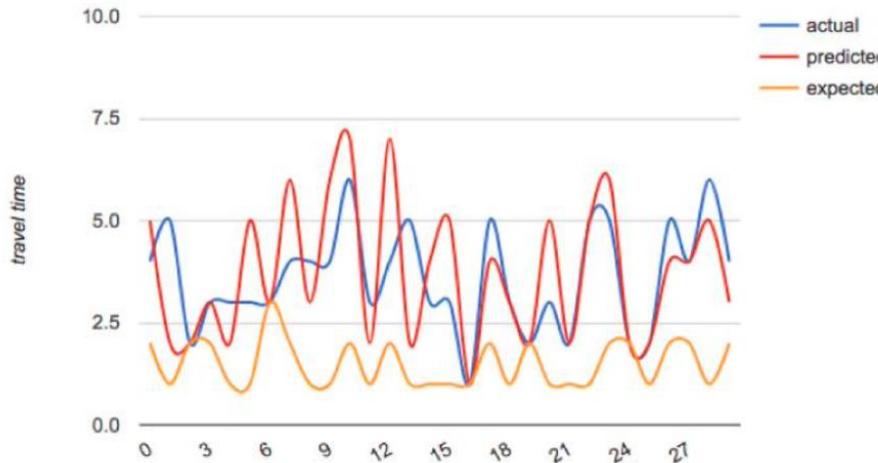
- Vision to use AI
- Deploy AI in the system
- To fix a potential problem on the road before the problem even occurs
- Notice a problem before a bus starts to gain a delay
- Problems like unexpected road closures, accidents, weather and so on



# Artificial intelligence

## Examples

### Singapur - bus travel time



Bus travel time actual (blue), predicted by the simulator (red) and predicted by the transport authority (yellow). Source: Use of AI for automatic anomaly detection system in IDS JMK operation Feasibility study - technical part

### Bombaj - car travel time

Algorithm Name	Percentage of Data in Test Set			
	40%	50%	60%	80%
	<b>Accuracy</b>			
Decision Tree Regression	42%	54%	68%	73%
Random Forest	56%	62%	74%	83%
Multivalued Linear Regression	48%	69%	75%	84%
Logistic Regression	48%	63%	78%	85%
SVM	35%	60%	68%	70%

Comparison of the accuracy of the selected AI models on the travel time estimation task. Source: Use of AI for automatic anomaly detection system in IDS JMK operation. Feasibility study - technical part



# Artificial intelligence

## Examples

- Beijing - prediction of the number of passengers

Date	GUOMAO Station		ANHEQIAO North Station	
	Actual Value	Predicted Value	Actual Value	Predicted Value
2018/12/17	77910	77372	11553	11530
2018/12/18	78050	78366	11777	11619
2018/12/19	78683	78262	11490	11412
2018/12/20	77921	77458	11478	11551
2018/12/21	80860	81248	12249	12272
2018/12/22	43088	43093	7091	7029
2018/12/23	41197	40167	6263	6334

Actual (left) and predicted (right) passenger counts for two selected stops of Beijing GUOMAO Station and ANHEQIAO Station in 2018. Source: Source: Use of AI for automatic anomaly detection system in IDS JMK operation Feasibility study - technical part

- Stockholm - detection of collective delays (delay of multiple buses in line instead of calculating delays for single bus only).



## Summary

- Traffic planning for the future
- Public transport will function as a whole more efficiently
- Effort to reach a state where people won't have to worry about the travel
- KORDIS has a vision to use AI



Source:<https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.aiglobalmedialtd.com%2Fhow-the-green-new-deal-could-save-public-transit-industry-post-covid%2F&sig=AQvYw1Ky6VCys7sPnt33Fyb1ye&ust=1631284801086000&source=images&cd=vfe&ved=OCAsQjRxqFwoTC0jo9NSP8vICFQAAAAAAdAAAAABAK>

# Thanks for your attention

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