CROWD SENSING AND PARKING DATA

Elham Heydari

Mehdi Nourinejad, PhD

Hossein Abouee Mehrizi, PhD

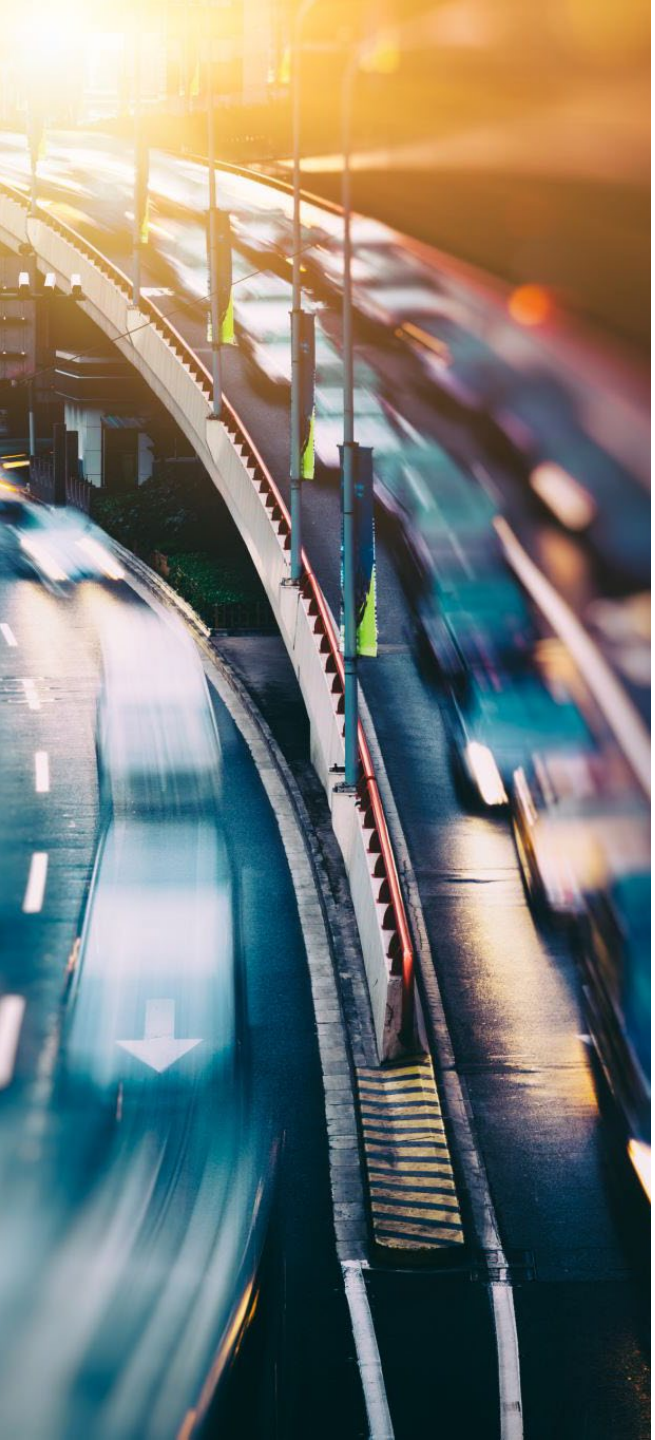
Civil Engineering Department,

York University

CLUE

LASSONDE SCHOOL OF ENGINEERING

YORK UNIVERSITÉ UNIVERSITY



PROBLEM: CRUISING FOR PARKING

Responsible for:

- Traffic in the densely populated downtown area
- Increase in travel time
- Increase in fuel consumption, and toxic emissions

SOLUTION

PARKING AREA MAP → **PARKING OCCUPANCY MAP**

Drivers will have access to the parking occupancy map through smartphones or onboard screens

COMMUNITY SENSING

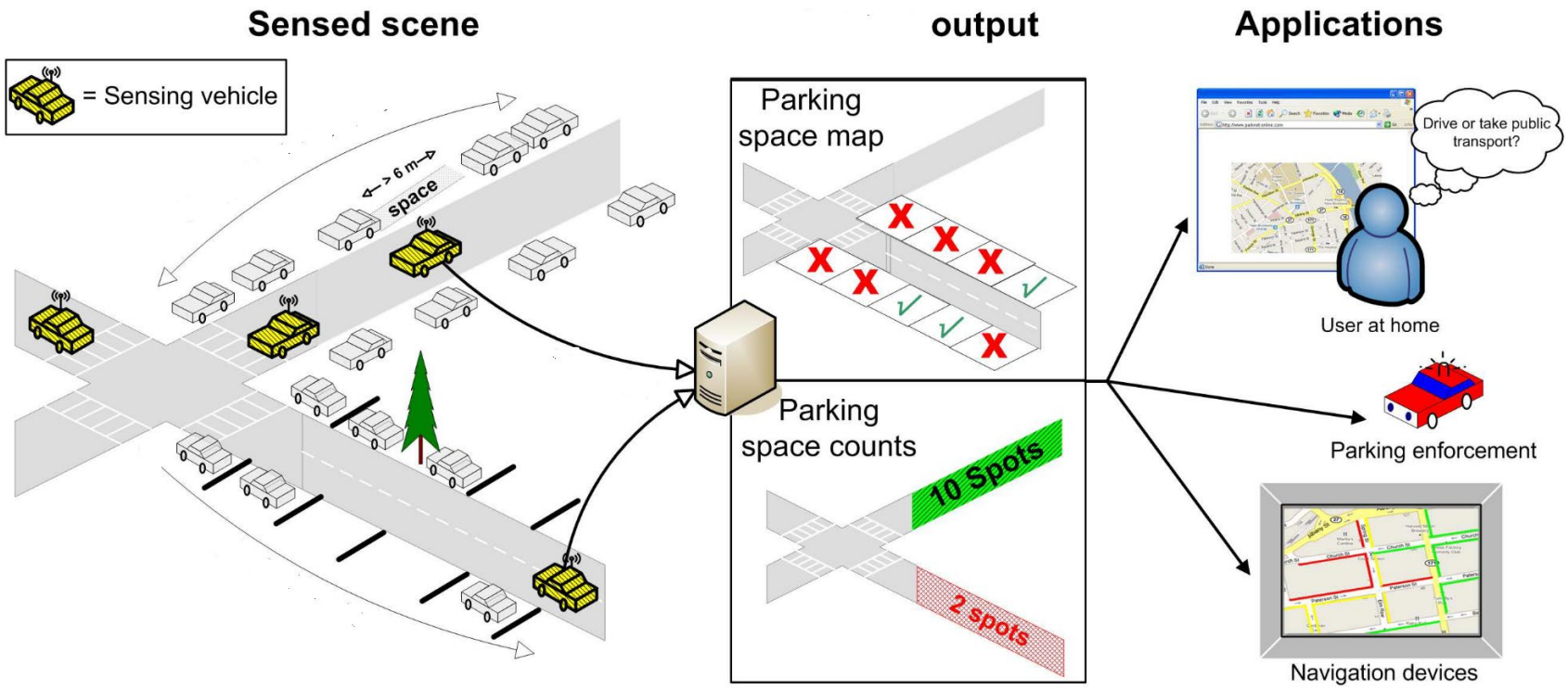


Image from Mathur S, Jin T, Kasturirangan N, Chandrasekaran J, Xue W, Gruteser M, Trappe W. Parknet: drive-by sensing of road-side parking statistics. InProceedings of the 8th international conference on Mobile systems, applications, and services 2010 Jun 15 (pp. 123-136).

COMMUNITY SENSING AND PARKING DATA

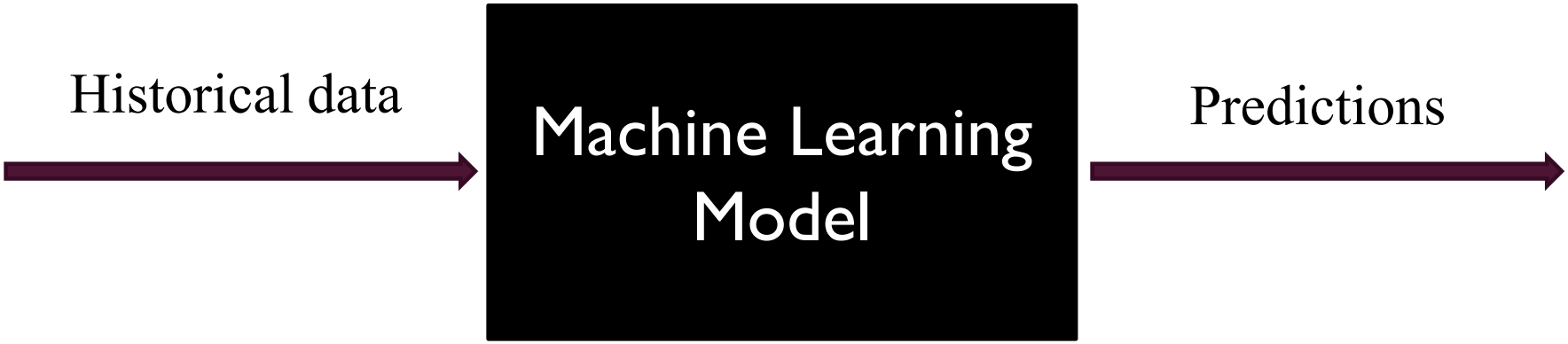
Some car producers are collaborating with engineering and technology companies to provide parking occupancy map

- ✓ Mercedes- Benz and Bosch[1]
- ✓ BMW and INRIX[2]

1 https://group-media.mercedes-benz.com/marsMediaSite/en/instance/picture/Community-based-Parking.xhtml?oid=15179538
2 https://inrix.com/blog/inrix-powers-bmw-ospi-parking-service/

PARKING OCCUPANCY PREDICTION APPROACHES

- Model-based approach
- Applying statistical and machine learning methods



DECISION-MAKING STAGES

The first stage: enter or leave?

Based on the last updated information by an equipped car

The second stage: join or balk?

Based on the actual number of the available parking spots

ASSUMPTIONS

Reward and costs:

The reward of finding an empty parking spot

The waiting cost per unit of time

The Access cost

MODEL-OBJECTIVE
(ONGOING RESEARCH)

Social welfare = Reward – (Waiting cost + Access cost)

The effect of changes in **the percentage of equipped cars** on social welfare in different settings?

What is **the optimum percentage of equipped cars** to maximize the total social welfare of drivers?

THANK YOU!

eheydari@yorku.ca