

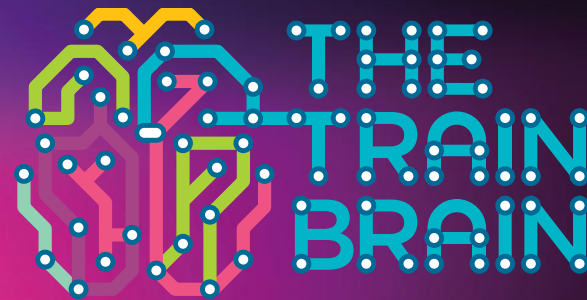
# Demonstration of a self-learning technology that identifies modes of transport used



Göteborgs  
Stad



TRAFIKVERKET



CONSATS

Because if we want to

***ACCELERATE THE  
TRANSITION TO  
SUSTAINABLE  
MOBILITY***

Then we need to understand people's behaviour

***WHAT MODES OF TRANSPORT  
ARE PEOPLE USING FOR  
EVERY LEG OF THE TRIP?***

# Data input: Train Brain Movement Analytics



## Traditional method

**Snapshots:**

*Positions per hour*

*Resolution: 35 football fields*



## Movement Analytics

**Animation:**

*Positions per minute*

*Resolution: 1 football field*



***GOALS***

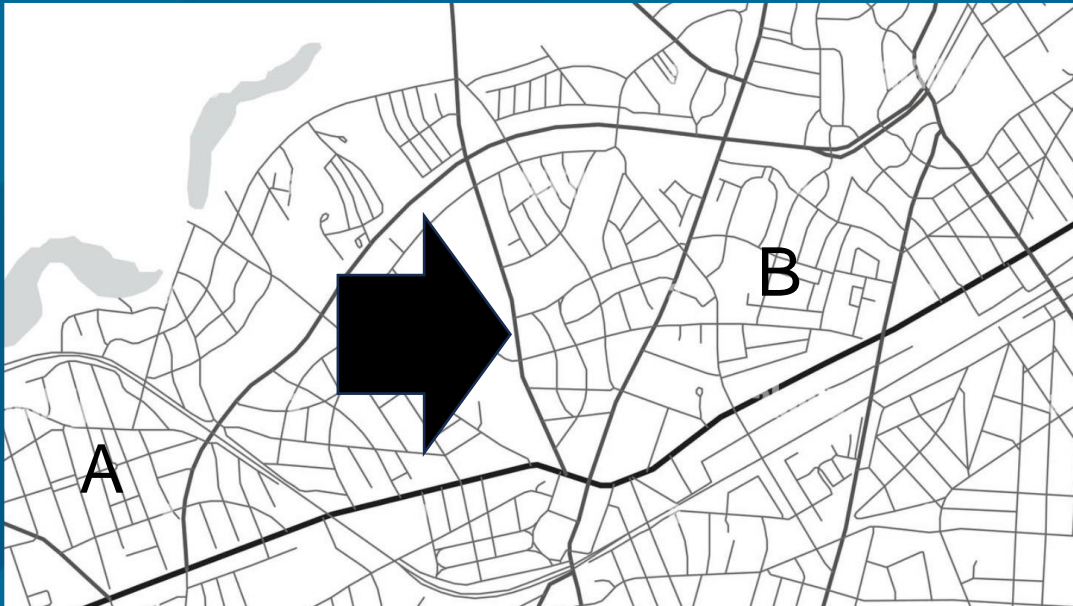
## Project goals

### **A model that can identify travel modes**

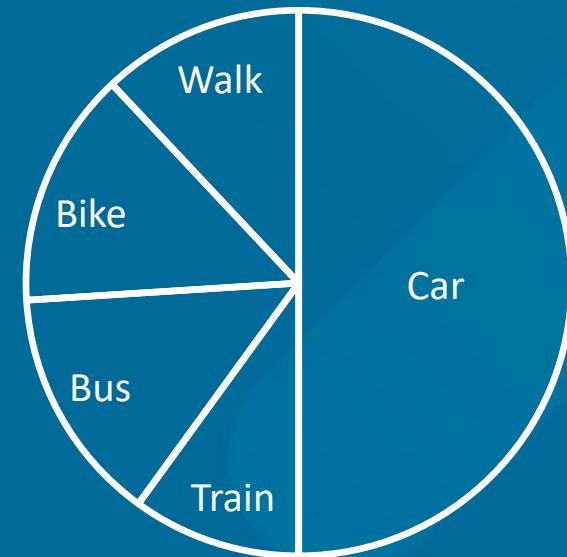
- Is fully automated
- Can be used anywhere
- Can identify legs in a trip (subtrips)
- Can assign travel modes to legs in a trip

In practice this means

*For any origin-destination relation*



*automatically understanding the modal split*



***NEW  
METHOD!***



# New data structure for trips – so that we can identify legs of a trip (suptrips)

*Minute-based positioning of anonymized users*

Timestamp	Long	Lat
2023-10-16T08:13:15Z	17.6465807142212	59.8561175563777



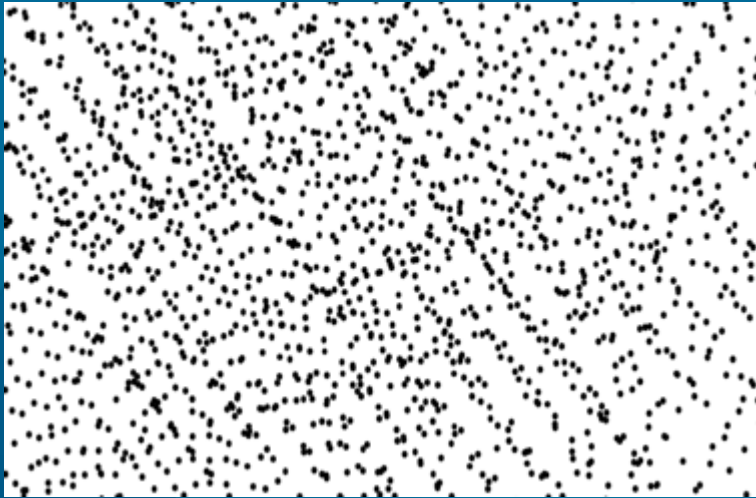
*Consolidated positioning enabling division into subtrips and 95% data size reduction*

Timestamp	Long	Lat	Full Trip (incl. stops)	Trip (in movement)	Sub trip (in movement)



# We built a model that clusters trips by speed profiles

Millions of trips

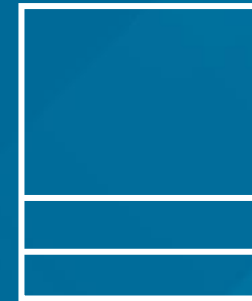


EACH CLUSTER CONTAINS A PROPORTION OF SPEED PROFILES

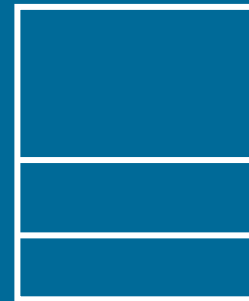
Cluster 1



Cluster 2



Cluster 3

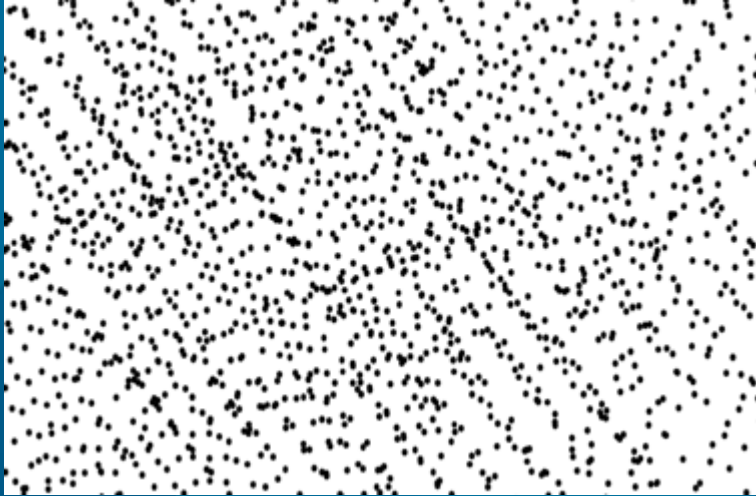


Cluster n



A human then needs to label each cluster – what is it?

*Millions of trips*



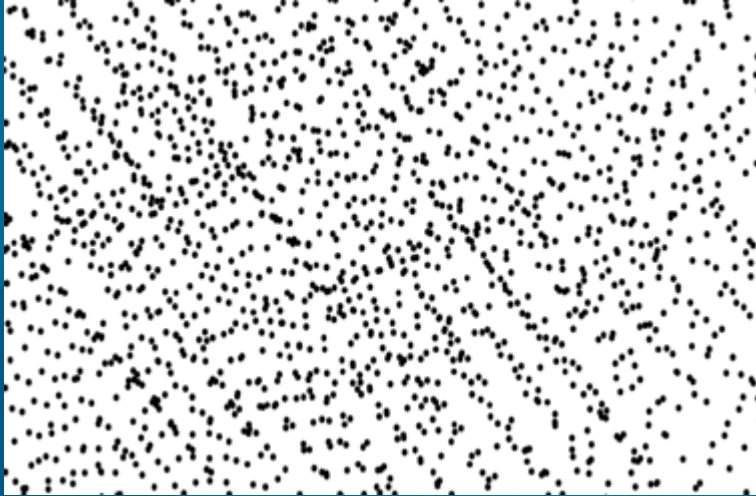
*EACH CLUSTER CONTAINS A PROPORTION OF SPEED PROFILES*

Cluster 1



A human then needs to label each cluster – what is it?

*Millions of trips*



*EACH CLUSTER CONTAINS A PROPORTION OF SPEED PROFILES*

Cluster 1

*CARS?*

*BUSES?*

**motorway**

# Geographical constraints influence likely choice of travel mode

Millions of trips



Proximity to discriminating attribute

## GEOGRAPHY

On a motorway: not biking or walking

## POI

Within a park: car impossible

## INFRASTRUCTURE

Close to rail tracks: indicates train

Probability of mode for position or subtrip

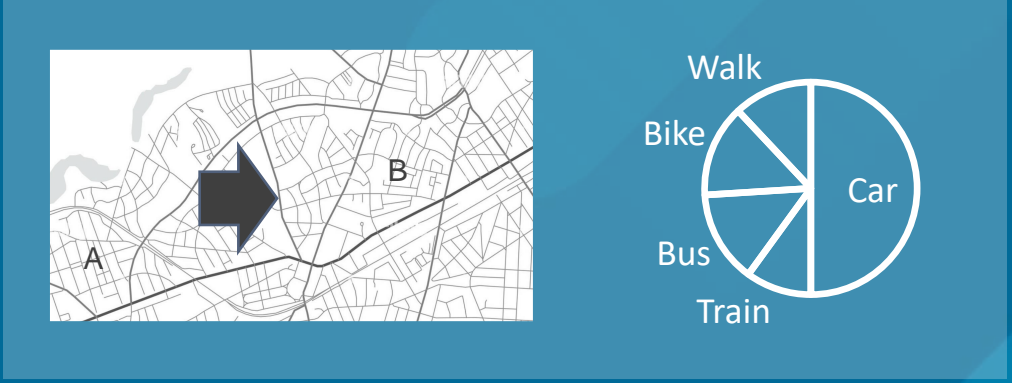
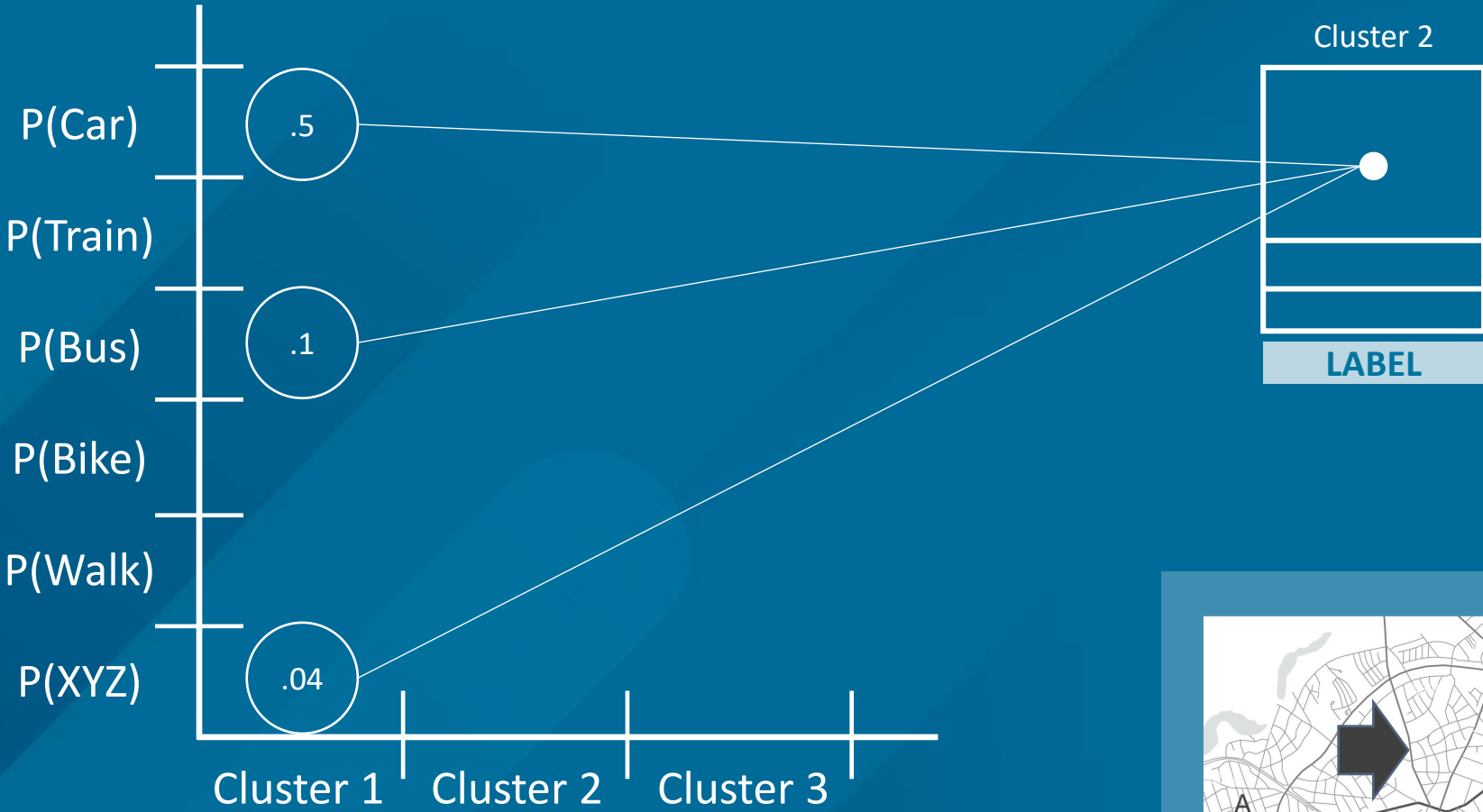
P(Car)

P(Bus)

P(Bike)

P(n)

The two steps are combined and aggregated for travel relations.  
E.g. Trips from A to B have a 50% share of cars



***RESULTS***

***RESULTS***



***TO BE CONTINUED***

# Thank you!



HELSINGBORG



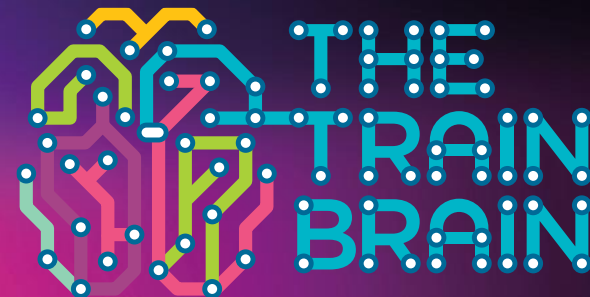
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Urban Mobility



CONSATS