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## Exploiting traffic data

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► **To cite this version:**

| Jan Ramon. Exploiting traffic data. 2018. hal-01879941

**HAL Id: hal-01879941**

**<https://inria.hal.science/hal-01879941v1>**

Submitted on 24 Sep 2018

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# Exploiting traffic data

Jan Ramon

INRIA Meet up

Lille, 14/12/2017



# Contents

- Introduction
- The ADEME MUST project
- Future perspectives
- Personal data protection

# Lots of data

## Car

- GPS localization
- Engine operation
- Driving behavior
- Car sensors (seat belts, windows, lights, ...)

## Driver

- Demographics
- Social network
- Agenda

## Environment

- Road network
- Meteo

# ADEME -MUST objectives

1. What value can we get from (mainly) car data?
2. Can we address
  - Congestion
  - Pollution
  - Road security
  - ... ?

## **Xee**

- Recruit drivers
- Collect data

## **INRIA**

- Analyze data
- Interpret results

# **MUST project**

## **Domain experts**

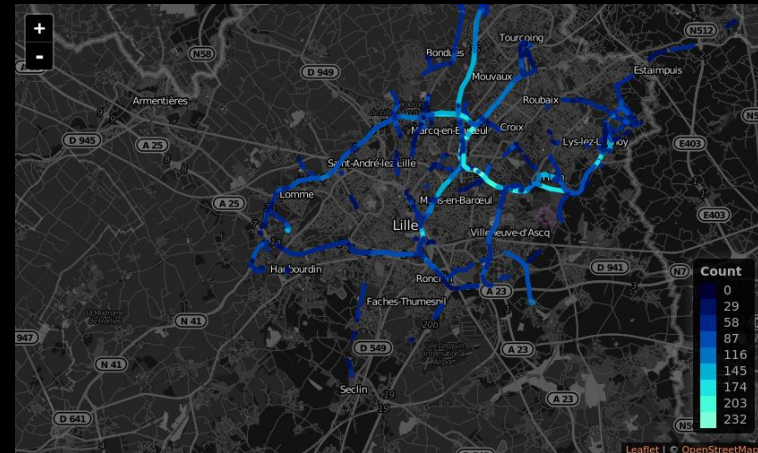
- CEREMA
- i-Trans

## **Users**

- Metropole Lille
- Industry

# Progress

- Year 1: preparation
  - algorithm development
  - driver recruitment
- Data stream since October 2017
  - 118 drivers (growing to 500)
  - 116K road segments
  - Only considering Lille area



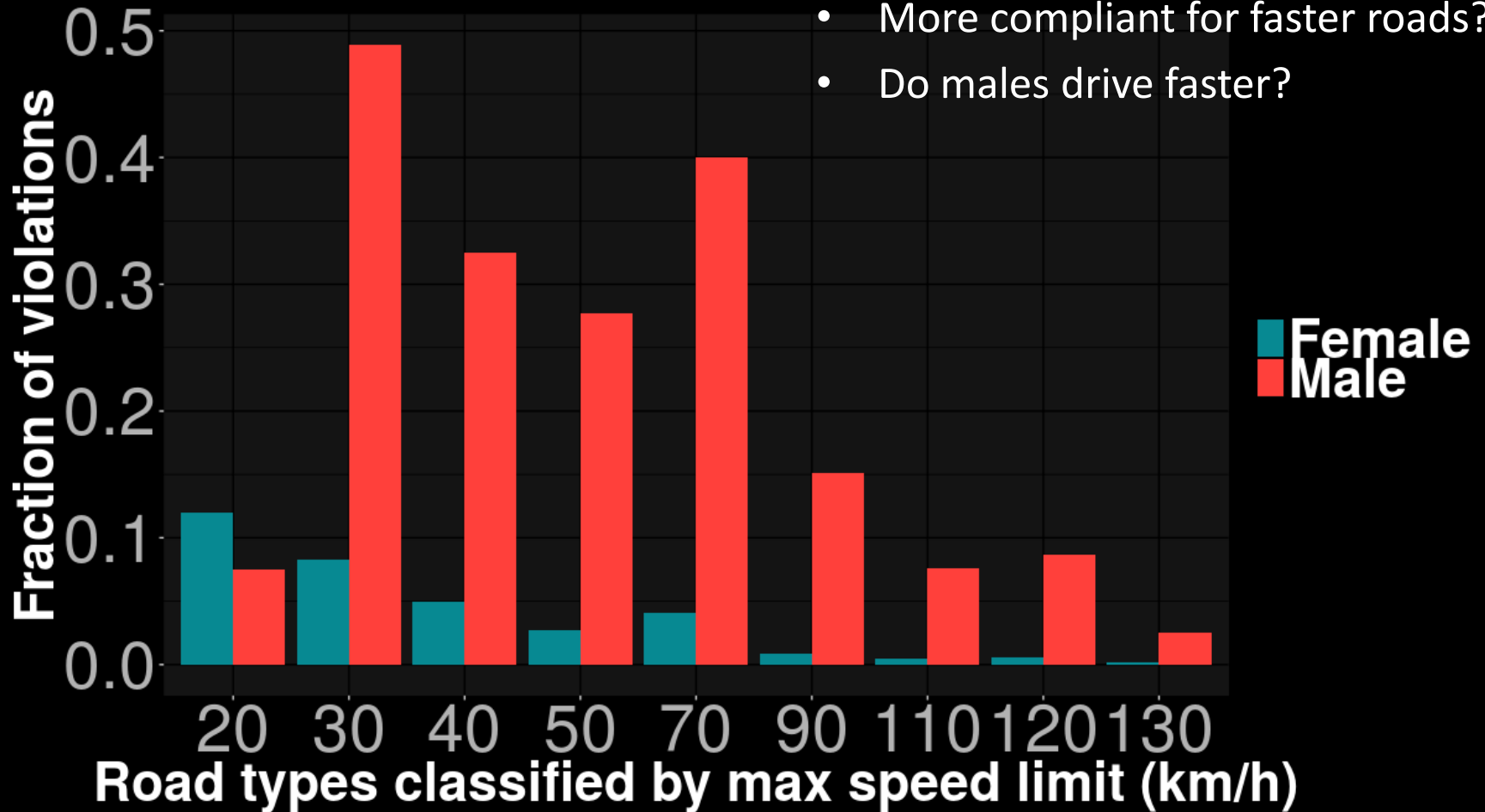
# First analysis

Age	Male	Female
18-25	8	1
25-35	32	4
35-45	26	3
45-55	7	0
55-65	6	2
65+	2	0
Unknown	27	0

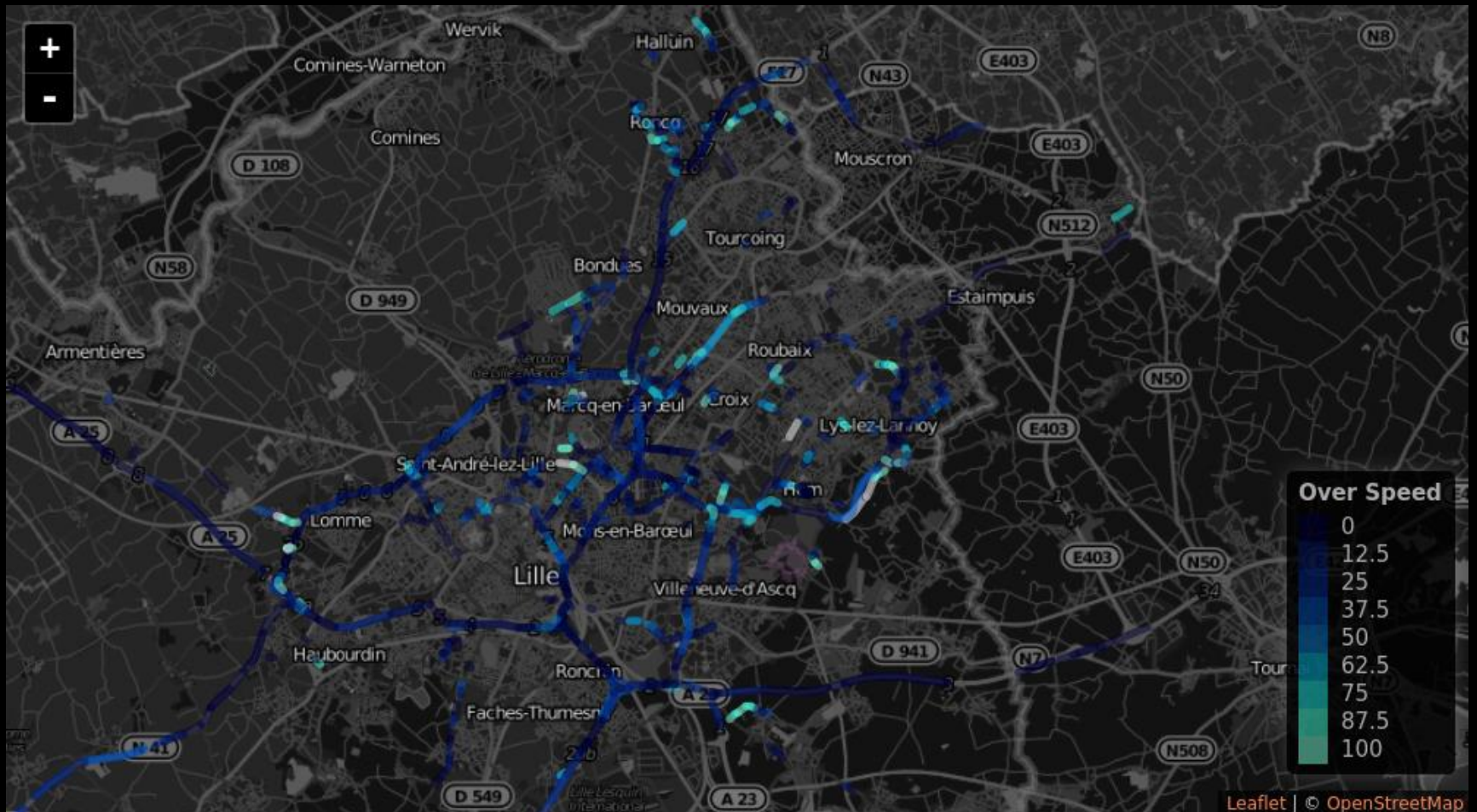


# Speeding

- Disclaimer: dataset noisy & small!
- More compliant for faster roads?
- Do males drive faster?



# Uncleaned speeding on map



# Current & next steps

- Driver behavior (acceleration, breaks, ...)
- Choice of trajectory
- Ride sharing
- Factors influencing congestions
- Fuel consumption (in practice)
- Parking (estimate duration, recommend tariffs, time to find free slot, ...)
- Effects of meteo


# Future perspectives

- Data volume:
  - New cars will have more sensors (e.g. Camera)
  - Can generate 3Tb/day
- More cars will get “connected”
  - But they still may be far apart

# Challenges

- Can't transfer data to a central place
  - 3Tb/day \* 33M cars = 100Eb =  $10^{20}$ b/day
- Personal and industrial data
  - GDPR : personal data should be protected
    - Even very innocent-looking data may leak information
  - Safety-critical data should be shared
  - Industries may not want to share some data

# A decentralized approach

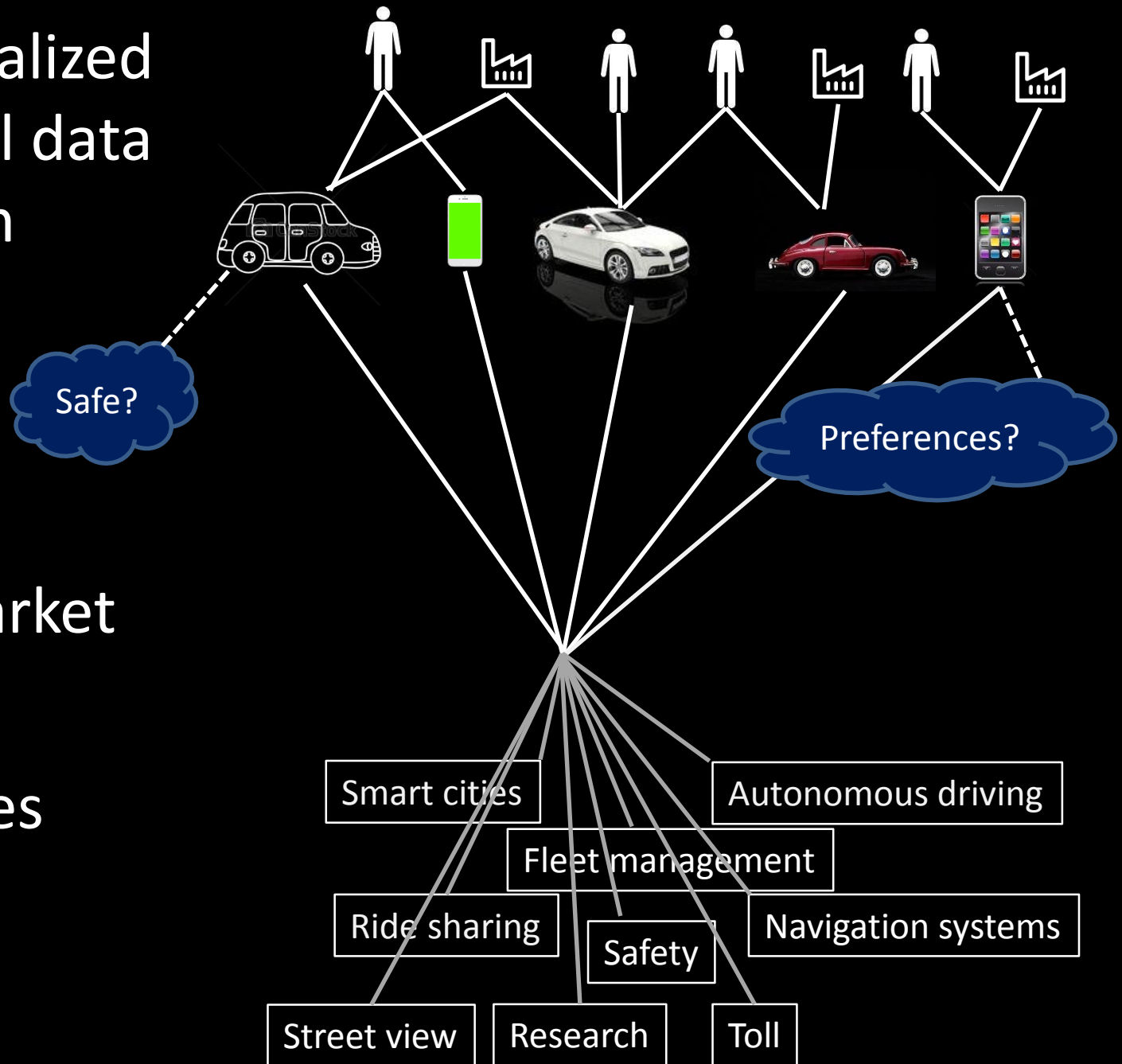
- Don't transfer data if not really needed
- Lower costs
  - Save on central storage
  - Save communication costs (or share only locally)
  - Exploit decentralized computational power
- More potential applications
  - Real-time
  - Perform tasks which are hard in a central HPC model (and even tasks where “move code to car” is not sufficient)
    - E.g. Street view updating
- Lower risks
  - More control on personal/industrial data use by citizen/OEM
  - Data not collected centrally can't leak/reveal information
- ERC  -PoC SOM project

- Decentralized personal data platform

- AI

- Data market

- Use cases



# Conclusions

- ADEME-MUST: (wider) exploration of exploitation of mobility data
- Preparing for future challenges
- Lots of possible application, protection of data needed.



Questions?

