

feedback



Driver Coach

A driving coach for everyone
to make driving safer

Sharing information to reduce traffic accidents

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- Traffic accidents don't just happen, they have causes
- Vehicle Driving Safety monitoring system
 - Distracted driving and dangerous behaviour increase risk
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 - Providing feedback to driver to reduce accidents
- Road safety ECO system
 - Multi party information sharing can make driving safer
 - Signalling dangerous situations without fear of repercussion
 - How drivers and organisations work together to make driving safer
- What to do next



feedback



Personal driver coach

Purpose and scope of this presentation

- To provide insights
- To show what is possible
- To start a discussion
- To inspire
- To move you into action
- It's an active working document
- It's part of a greater project
- This is not a design poured in concrete
- Its open for discussion

We need your expertise to make it happen

What really matters in life

Safety

Privacy

Transparency

Trust



We all have our own responsibility to take action

What we can learn from near misses

Small errors, mistakes and dangerous behaviour are predictors for more serious events.

We should keep track of every incident (no matter how small) and learn from it.

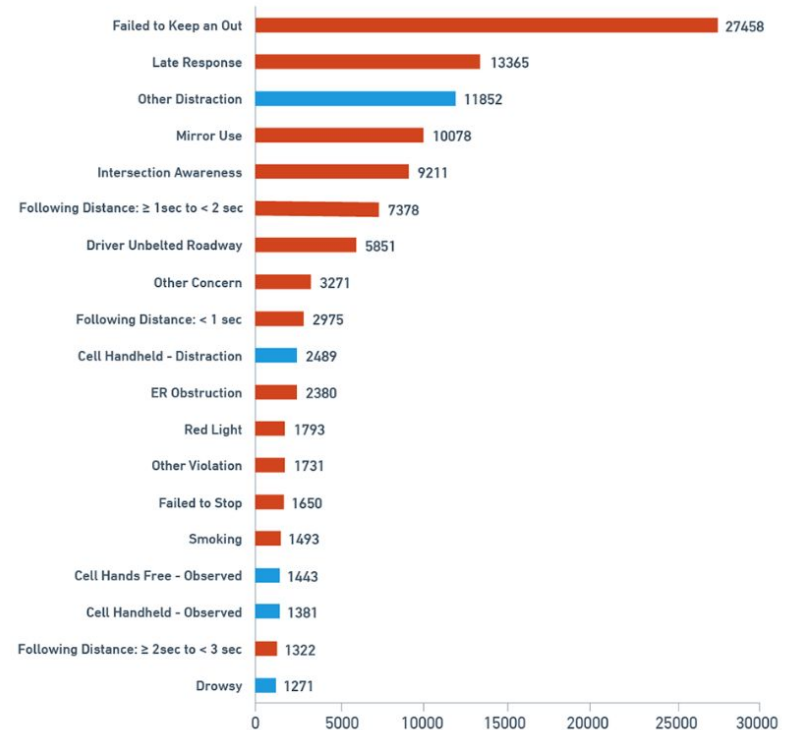
We should be more aware of our own behaviour. This may feel intrusive but injuries hurt a lot more!



Causes of near misses

The chart below shows some of the top behaviors
and how they contribute to near collisions

What would happen if we
could reduce some of these
causes?



You drive the same road every day

- You know it by heart
- Every turn
- Every tree
- Nothing special
- That's when you start day dreaming

"It came out of nowhere!"



We are all perfect drivers, but

We sometimes forget what we have learned

We are so hungry

We are so busy

We get tired



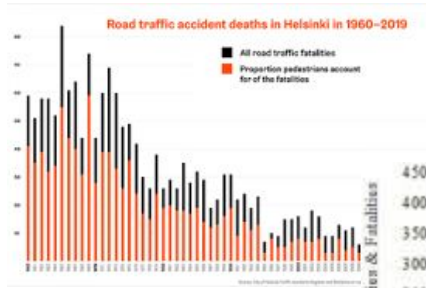
So human, so busy, totally unaware



It came out of nowhere

This results in Road Accident Statistics

According to the [British Royal Society for the Prevention of Accidents](#), driver fatigue contributes up to 20% of road accidents and up to a quarter of fatal and serious accidents. The [statistics](#) are that an estimated 1,550 deaths, 71,000 injuries, and \$12.5 billion in monetary losses each year due to driver fatigue.



s ranging from

REGIONAL BREAKDOWN OF ROAD ACCIDENT DEATHS IN 2018



I don't want to end up in those statistics



We are all perfect drivers, but

Research

- We miss what happens around us
- By tracking head and eye movement we can evaluate our level of situational awareness



What are our major distractions?

Distractions

1. We get distracted by our phone
2. We are hungry or tired
3. We get day dreaming

Resolutions

1. We should disable the phone
2. We should be in good physical shape
3. We should be focused

There are four types of driver distraction:

- Visual – looking at something other than the road.
- Auditory – hearing something not related to **driving**.
- Manual – manipulating something other than the steering wheel.
- Cognitive – thinking about something other than **driving**.

With so many potential distractions we tend to easily forget how we should drive safely. Hence we should be constantly reminded of that.



360 degree awareness

Good driving habits

- Wearing seat belt
- Active driving posture
- Hands on the steering wheel
- Looking in the general driving direction
- Checking for traffic from all directions
- Left/right/rear mirror checking
- Signalling direction changes to other drivers



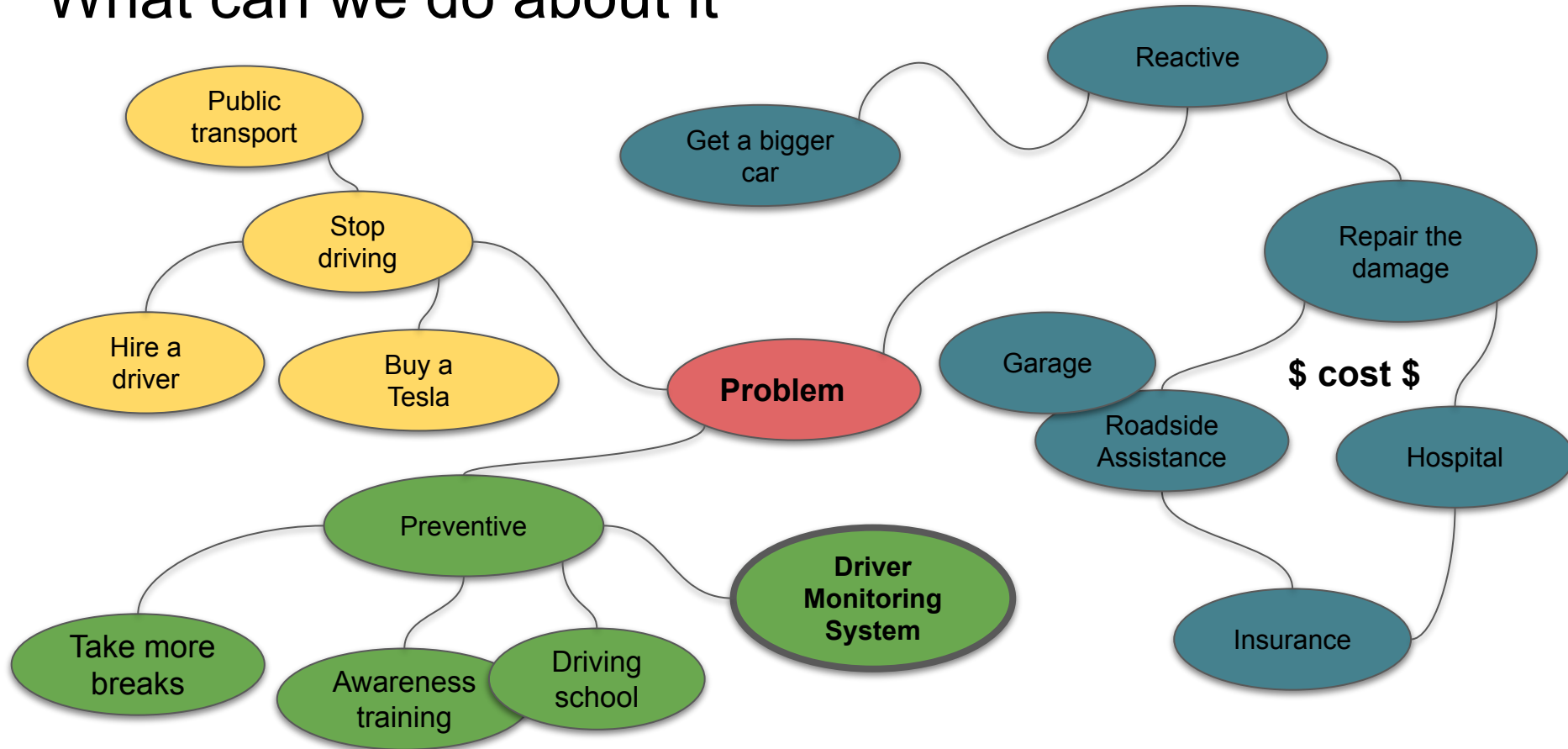
Bad driving habits

- Operating the console (NAV / media / airco)
- Talking to passengers
- Eating or drinking
- Other activities (reaching for something, singing)

Ugly driving habits

- Falling asleep
- Mobile phone usage (handheld, call, texting)

What can we do about it



Driver Monitoring System (drowsiness)

- Warns when driver is tired
- Detects only drowsiness
- Build-in in expensive cars
- Most regular cars don't have this feature
- Effect on safety is limited

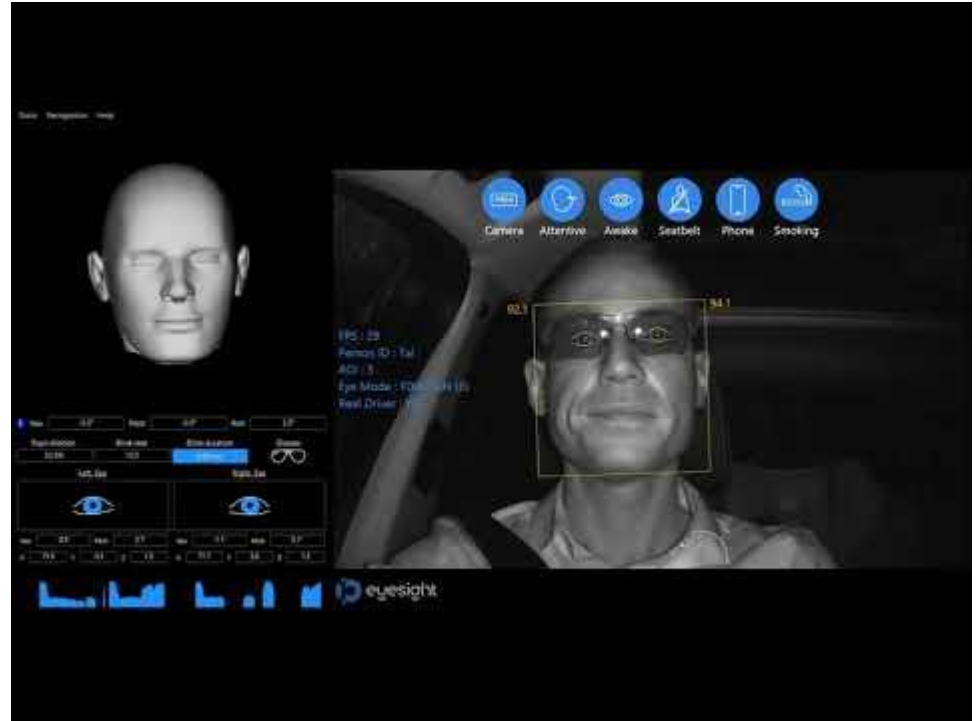


Driver Monitoring System (distractions)

Detects:

- Drowsiness
- Wearing a seatbelt
- Distractions
 - Holding a phone
 - Smoking

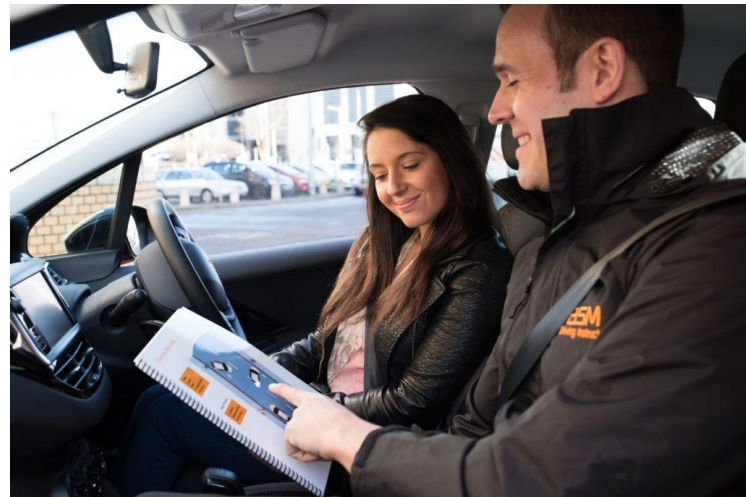
Effect on safety is better but still not complete



Driver Monitoring System (driving skills and style)

Detects:

- Drowsiness
- Distraction
- Driving skills
 - Steering
 - Acceleration/ Deceleration
 - Braking (timing)
 - Gear (timing, gear selection)
- Driving style
 - Driver alertness
 - Mirror checking
 - Over the shoulder checking
 - Indicator lights usage
 - Stop signs / traffic lights



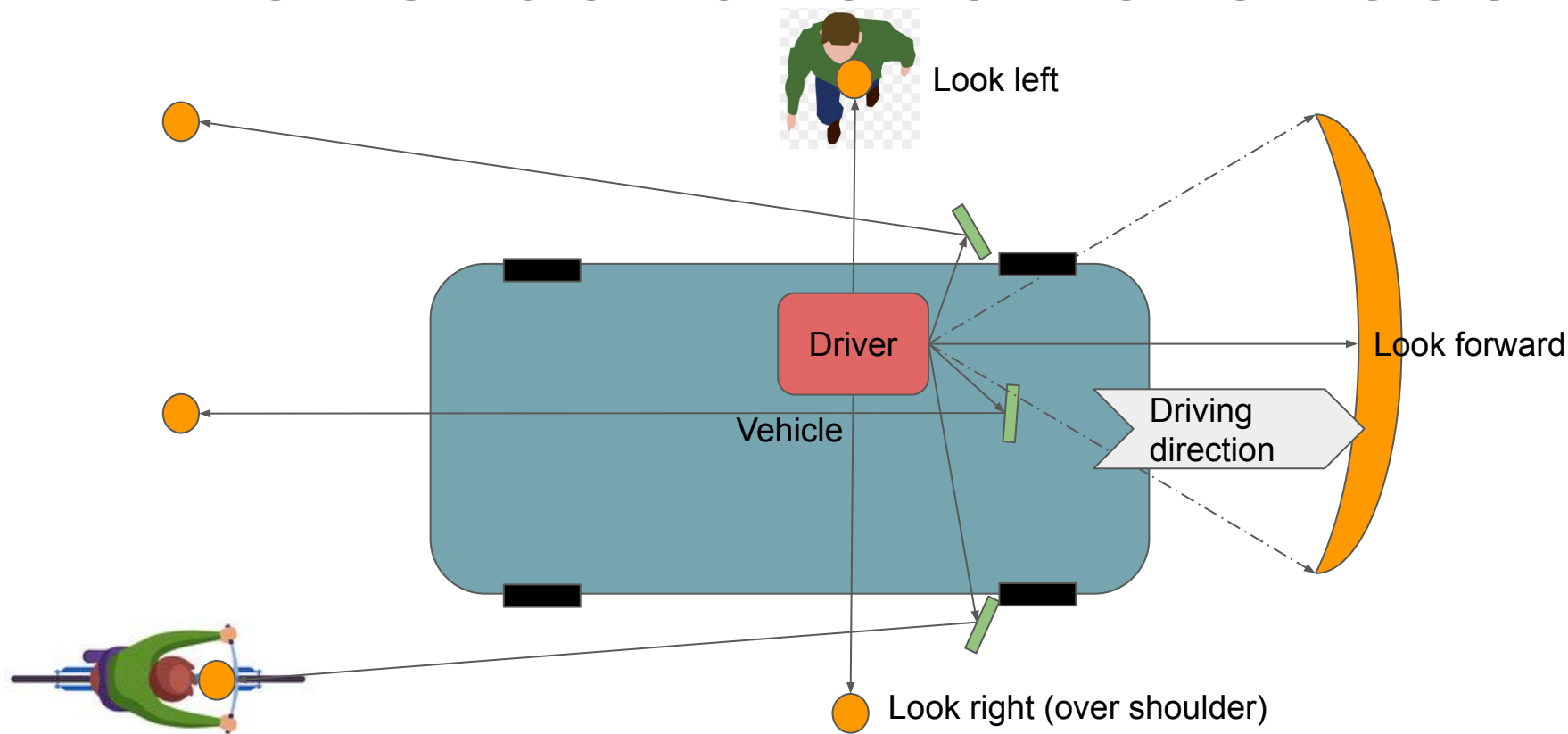
Getting a complete driver profile can make driving safer

Example: making a proper left turn

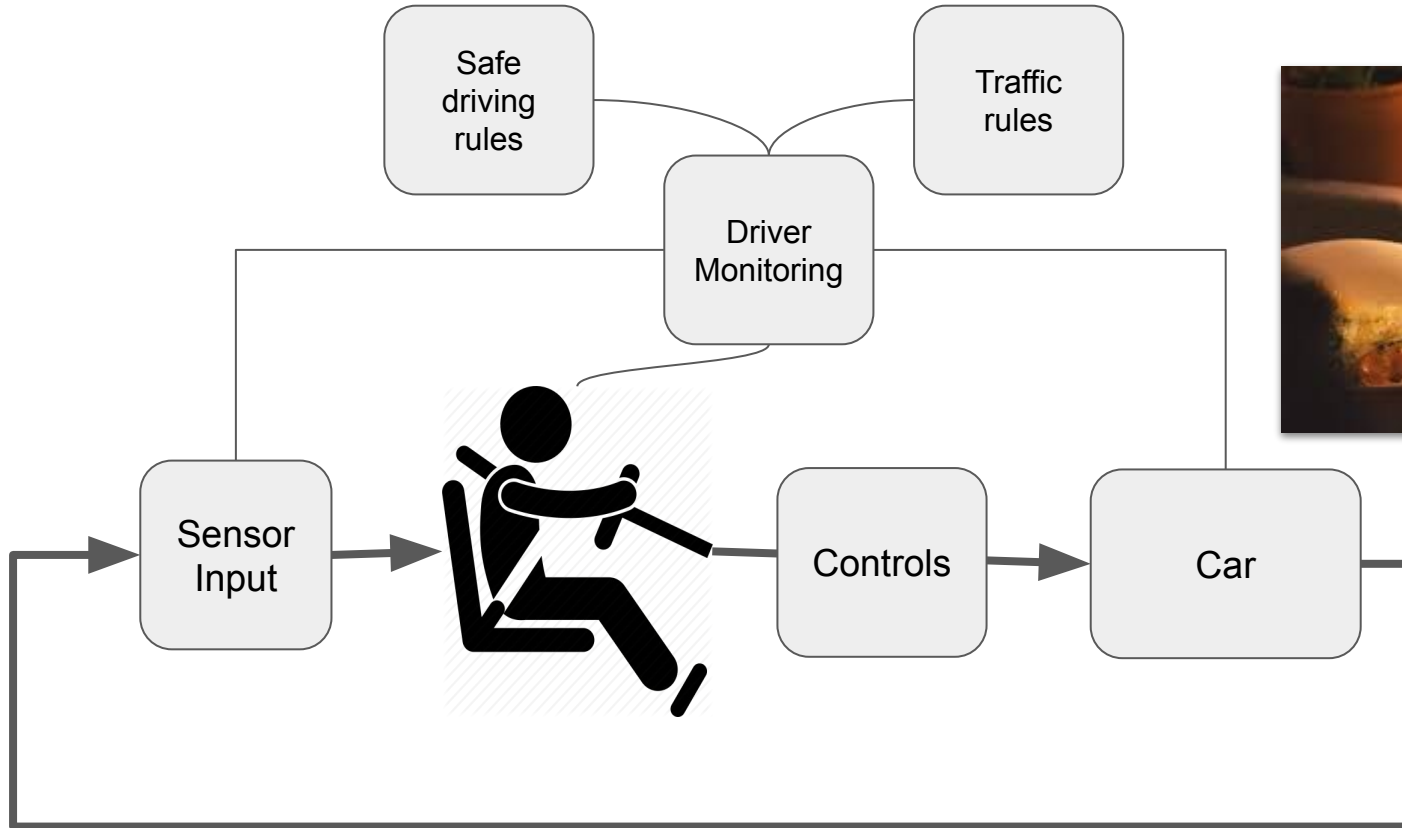
- Assess the traffic situation
 - Allowed to do (legal, traffic rules)
 - Should i do (is it safe, sensible)
- Check rear mirror
- Use direction indicator lights
- Slow down
- Come to a full stop
- Watch out for other traffic
- When traffic allows
- Check side and mirrors
- Turn left

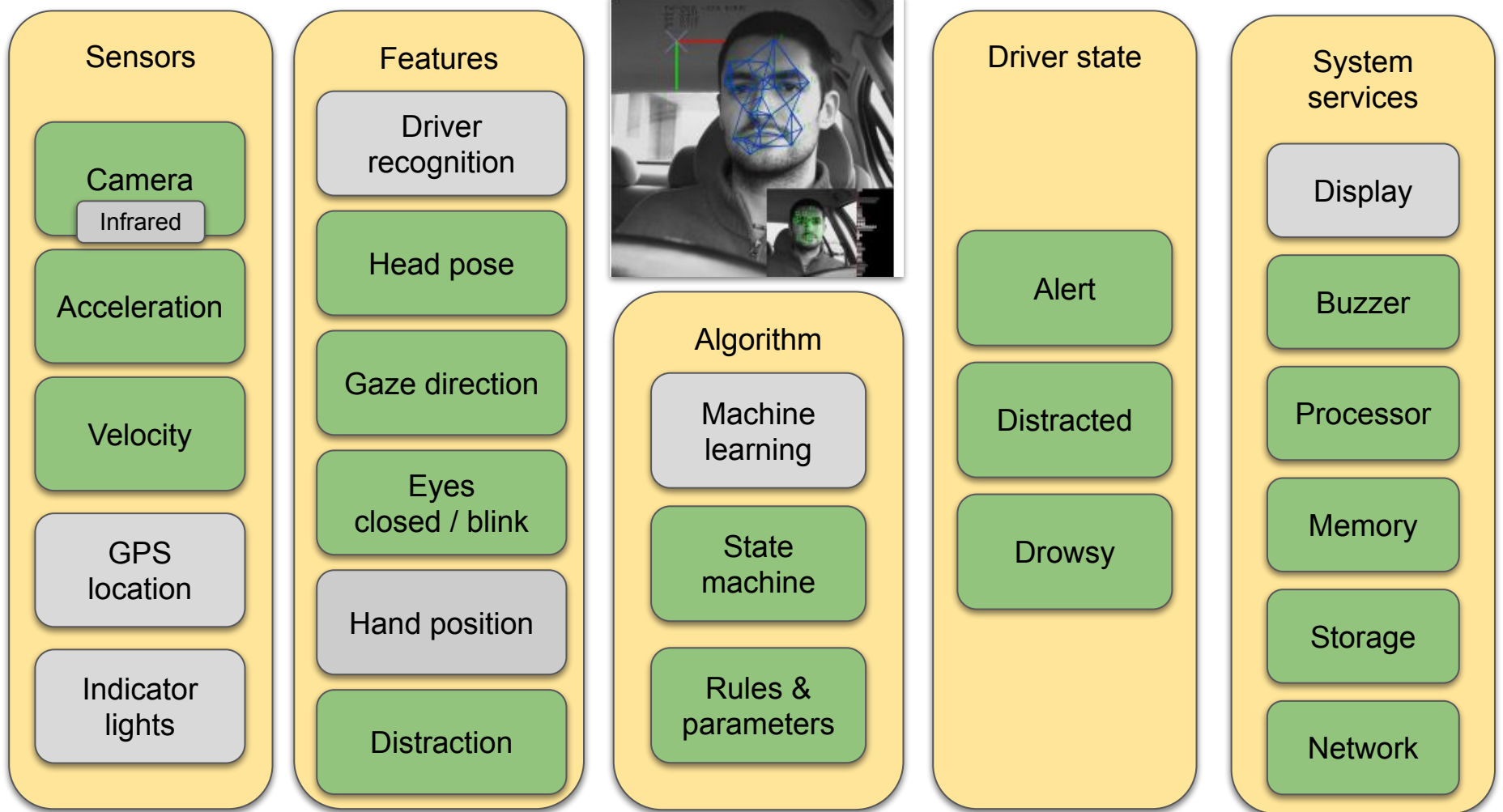


Driver situational awareness



Provide feedback to the human in the loop





System diagram

Might have

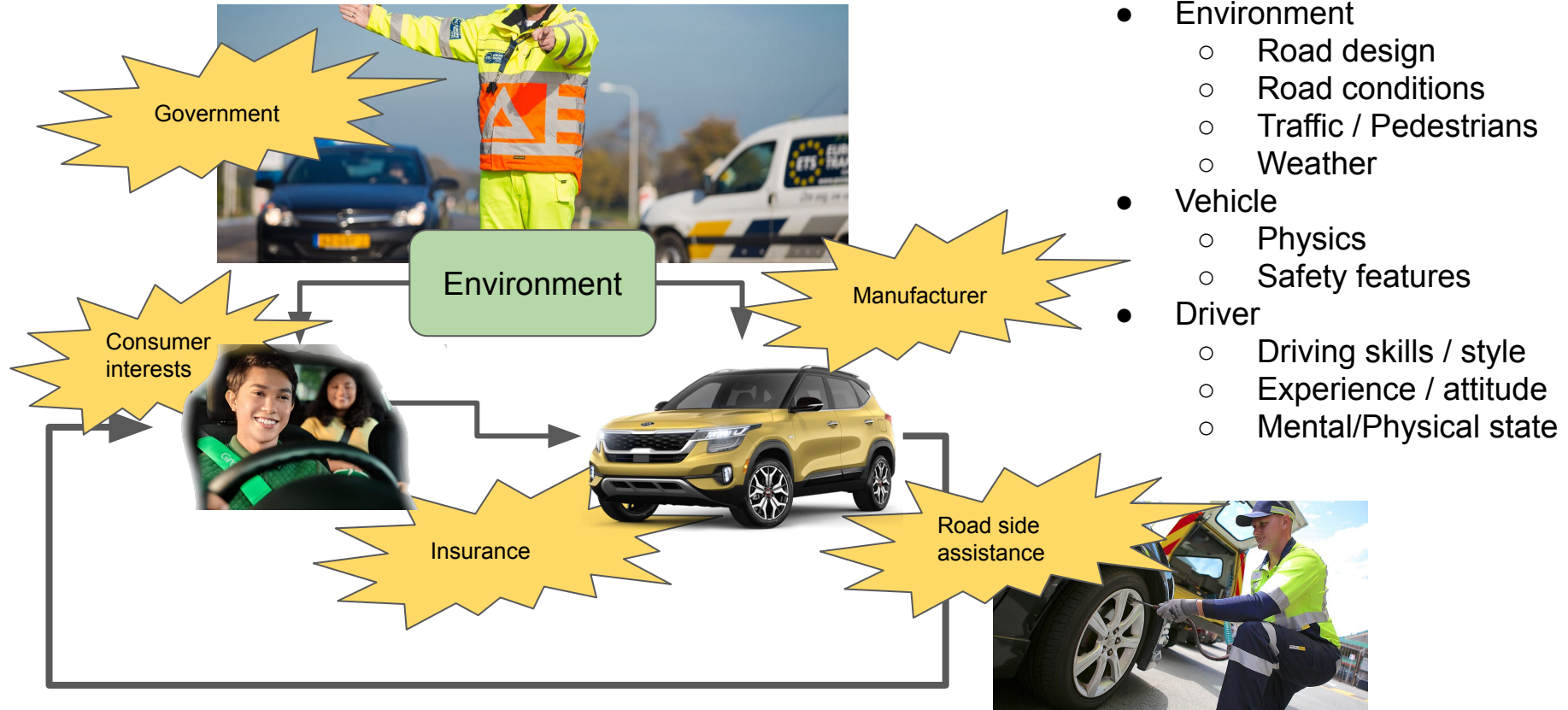
Must have

Let's take a step backward

And view it from a higher perspective



Vehicle driving ECO system



Every vehicle can sense itself, its driver and its environment

Vehicle sensors collect data

- Vehicle
- Driver
- Road conditions
- Other road users

This data can provide valuable feedback

- Vehicle \Rightarrow traffic density, speed, environmental impact
- Driving style \Rightarrow improve your driving, reduce accidents, reduce insurance costs
- Road safety \Rightarrow unsafe situations, improve roads, make your neighborhood safer
- Other road users \Rightarrow Detect near misses

Make driving safer by providing feedback to drivers, road owners and organisations



Why should we share data and learn to trust each other

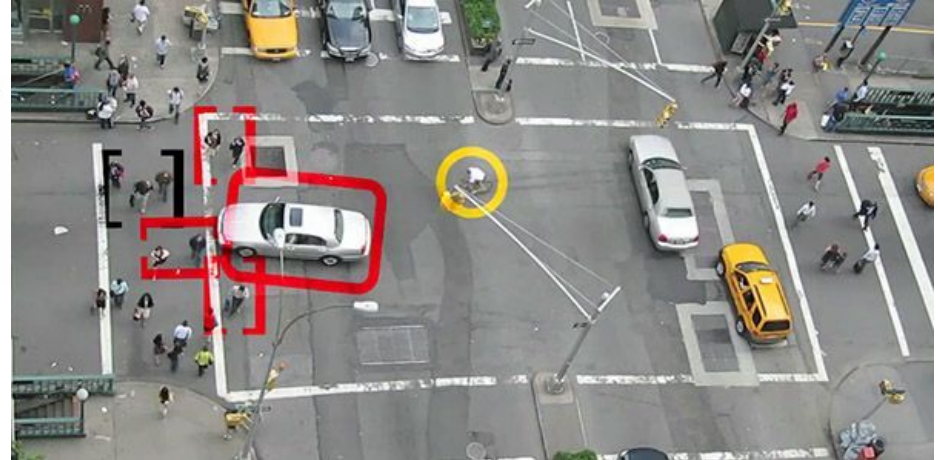
- Working together on a common goal
 - To make driving safer
 - To spot unsafe traffic situations
 - Raise driver awareness
 - Reduce number of traffic incidents
 - Because i want to make my neighborhood safer
 - To reduce cost for society as a whole
- We need to share data
 - To improve specific traffic situations (share data anonymously with local government)
 - To make vehicles safer (share driving data anonymously with car manufacturers)
 - To reduce insurance cost (share driving behaviour with insurance)
 - To improve my own driving style (calculate driving score and compare anonymously with other drivers)



Make driving safer by providing feedback to drivers, road owners and organisations

Reporting dangerous traffic situations

- Accidents / near accidents
- Dangerous driving
- Confusing traffic situations
- Obstacles
- Slippery roads
- Dysfunctional bicycle lights

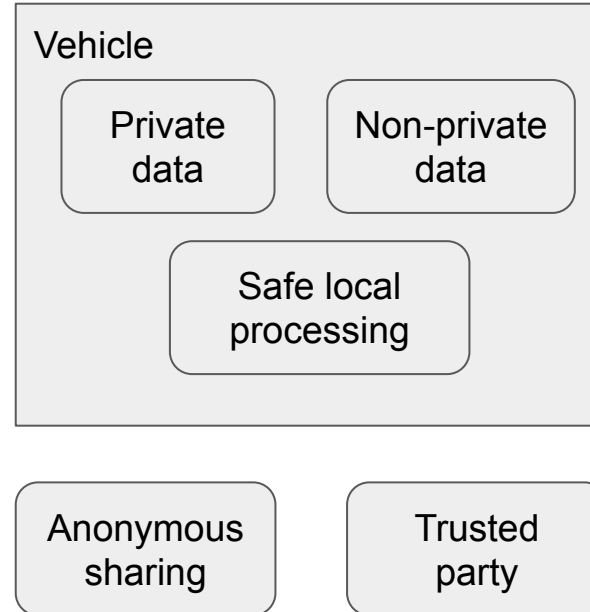


Anonymous reporting to gather road safety statistics for making driving safer, not for naming and shaming



But how about security and privacy

- Requirements
 - Data ownership
 - Assured privacy
 - Driver in control
- Local data processing
 - calculate driver safety score
 - calculate insurance risk
 - signal potential unsafe situations
- Be GDPR compliant
 - Share minimum amount of data
 - Share anonymised data anonymously
 - Crystal clear algorithms



Data ownership, privacy and mutual trust between parties are key

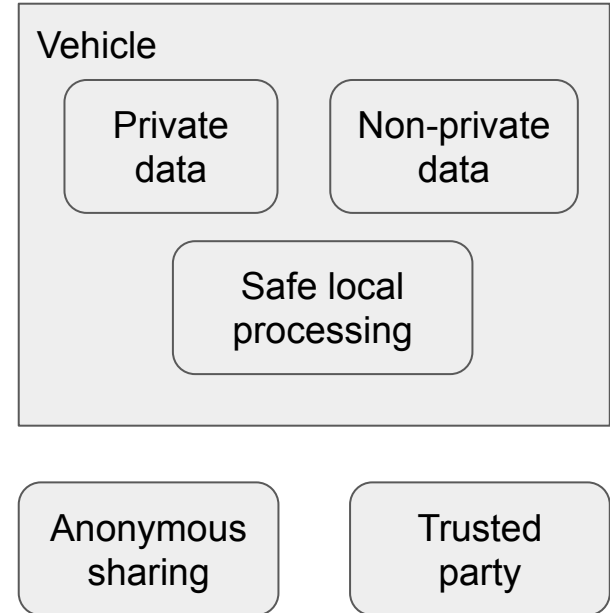
Smart mobility with multiple parties

- Parties

- Driving schools
- First responders
- Roadside assistance
- Insurance company
- Car Manufacturer
- (Local) Government

- Equal playing field

- Common infrastructure / architecture
- Open interfaces / secured data exchange
- All organisations have equal access
- Vehicle driver chooses its partners
- Open data whenever possible



Data ownership, privacy and mutual trust between parties are key

The road to success

- Start small with limited scope
 - Driving Coach for young drivers
 - Feedback on driver behaviour
- Buildup experience
- Connect to European road safety and science programmes
- Find suitable development and business partners (NGO, GO)
- Focus on developing an open ECO system
 - Open data sharing
 - Inclusive / not exclusive
 - Data ownership
 - Trust
 - Work on a common goal

What to do next, so many questions

- Questions for the audience:
 - Will these ideas help to reduce road accidents and make our life safer?
 - Are there any major issues that hinder this and need to be addressed in more detail.
 - Think what can you do?
- The next step:
 - Share these ideas within our organisation, mobility partners
 - Discuss, investigate and experiment to learn more
 - Look out for partners?

Millions of euro's are spend each year on Road Safety and scientific research programmes

The average car has safety belts and airbags but does not communicate its story

Let see if we can use innovation to make the road safe again!

Where to find more information

Dutch mobility innovations

<https://dutchmobilityinnovations.com/spaces/86/dutch-mobility-innovations>

The logo for the Dutch Mobility Innovations (DMI) Community. It consists of a dark blue rectangular background. In the center, the letters "DMI" are displayed in a bold, white, sans-serif font. Below "DMI", the word "Community" is written in a smaller, white, sans-serif font.

Github project website: <https://github.com/Tauvic/DriverAwareness>



SWOV
WETENSCHAPPELIJK
ONDERZOEK VERKEERSVEILIGHEID



Centraal Bureau
Rijvaardigheids-
bewijzen



Ministerie van Infrastructuur
en Waterstaat

VEILIG VERKEER

RB
Vereniging Rijschool Belang



VNG
Vereniging van
Nederlandse Gemeenten

OPEN DATA

Verkeerskunde.
VAKVISIE VAKKENNIS VAKMENS

STAR
Smart Traffic Accident Reporting



VERBOND VAN VERZEKERAARS



**kennis
netwerk
spv** Strategisch Plan
Verkeersveiligheid