Non-contact, Non-intrusive Machine Vision-based In-vehicle Distraction Sensor (mDrive)

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TTP Problem

Driver distraction: a major problem for **road safety**.

Sources of distraction

And more!

Types of distraction
- **Visual**
- **Cognitive**
- **Manual**

Difficult to define unambigously!

Especially difficult problem for **professional** drivers.
- Long hours on the road
- Challenging tasks are **rare**, but require **sudden** attention
- Potentially **huge damage** in accidents

TTP Solution

Idea

Hand position on the wheel can be used as proxy for detecting driver distractions

This is not a perfect solution, but it is **well defined, observable,** and therefore appropriate for large-scale deployment in even in commercial environments (objective measurements)

Constraints

Commercial use

Zero maintenance

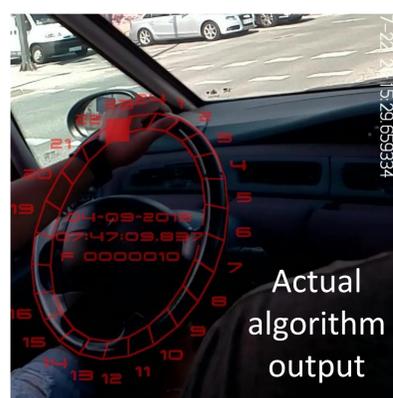Suitable for retrofitting

No changes to the steering wheel

Remotely manageable and upgradeable

mrive Store

Use: positive feedback

Good driver

Solution

Actual algorithm output

- **Machine vision**-based solution
- **Embedded** vision system based on Raspberry Pi 2
- 4 core 900 MHz ARM
- ~2 cores used @ 10 FPS

Raspberry Pi is a trademark of the Raspberry Pi Foundation.

TTP Challenges

- Adapt the system to automotive environment
- Fully autonomous operation: NO buttons, NO interaction with the driver, 100% self contained
- Streamline HW design
- Analyze privacy impact, with input from the Information Commissioner – to avoid the label "video surveillance device"!
- Perform large scale test, to provide accuracy % used in marketing of the product

TTP Impact

- According to EU, **road safety** is major societal issue
- In 2011, **30.000** people **died** on EU roads.
- Driver distraction is a major issue in road safety.
- Collision warning systems do little to prevent driver distraction, actually, they may make situation worse
- mDrive will provide a mechanism for fleet managers to **reward responsible professional drivers** based on **objective** data.

- mDrive will be a **versatile** automotive **machine vision** platform with CPU power to spare.
- After release to the market, TiBoPo will continue to develop machine vision algorithms to address **other safety issues** on the same automotive HW platform (e.g. object detection)
- mDrive will further contribute to road safety and TiBoPo's revenue stream

TTP Facts

Univerza v Ljubljani

TiBoPo