D.A.R.E.

Driver **A**lertness **R**ecognition **E**quipment

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arm

DROWSY DRIVING

1500 deaths per year are caused by sleepy driving worldwide

250K drivers fall asleep at the wheel everyday

37% of adult drivers have fallen asleep while driving

71K injuries happen each year due to drowsiness

Sources: NHTSA/ NSF/ DVR studies

CHALLENGE

- Design an **affordable** and **reliable after-market** device that can **detect drowsiness** and **inform the driver** about it.
- Create a **user friendly app** that can connect to such device to provide additional features.

DESIGN PROCESS

1 DEFINE THE PROBLEMS

Multiple constraints:
Time, budget, resources, technological knowledge

2 COLLECT INFORMATION

How can drowsiness be detected?
- Vehicle-based measures
- Physiological measures
- Behavioural measures

3 ANALYZE IDEAS

- Which board should be used?
- What additional components would prove relevant?
- Incorporate extra features?
- Where should the device be mounted?
- How should the case be built?
- What should be tested?

4 BUILD A PROTOTYPE

Split tasks between members:
- Vision algorithm
- Bluetooth connection
- Smartphone application
- Marketing

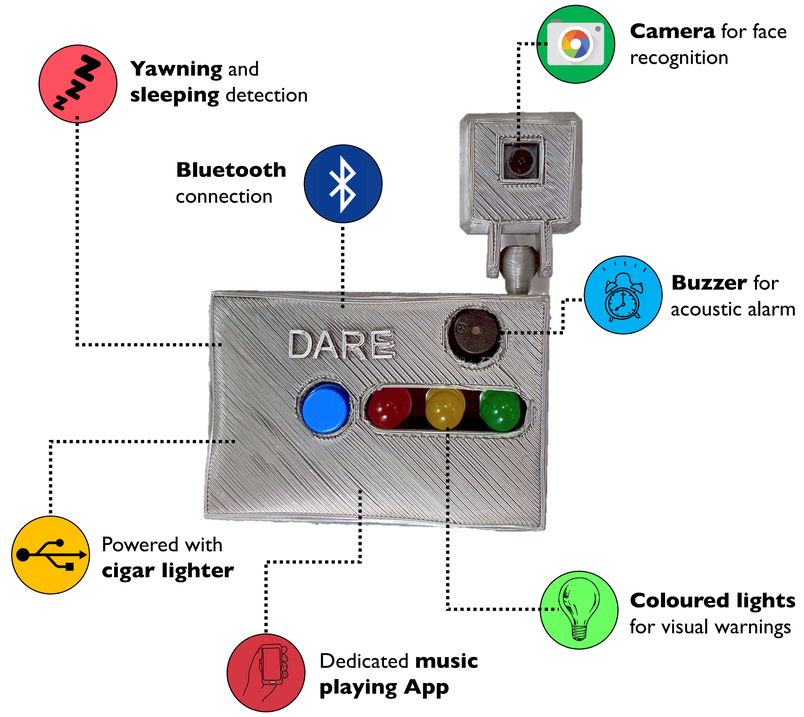
5 PRESENT MODEL FOR FEEDACK

→ Client
→ Supervisor
→ External critics

6 IMPROVE OUR DESIGN

- Include reset button
- Communicate correct functioning to user
- Add yawning detection

SOLUTION



FUTURE WORK

- Monitor more drowsiness-related measures to **better estimate the driver's state**, such as steering wheel movement, lane position, or heart rate.
- **Build a pedestal** that can fit any dashboard to mount our device on.
- **Increase** the **number of songs** available (create an interface with Spotify).
- **Improve** the **face recognition algorithm** (use active learning, computing power).

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