LIBRA A.I. Technologies

Real time drowsiness detection, Alerting and reporting (RESONATE)

Yannis Kopsinis, PhD

LIBRA at a glance

OFFICES

Edinburgh, UK

Athens, Greece

CONTACT

info@libramli.ai

STAY IN TOUCH

www.libramli.ai

@libramli_ai

@libramliai

Who we are

We are a boutique Data Science Agency offering customized Machine Learning and AI business intelligence services and solutions.

Our vision

We aim to bring advanced Machine Learning and Artificial intelligence into real-life applications.

Services

- ML / AI in real-life applications
- Visual analytics & Business Intelligence
- ML Engineering

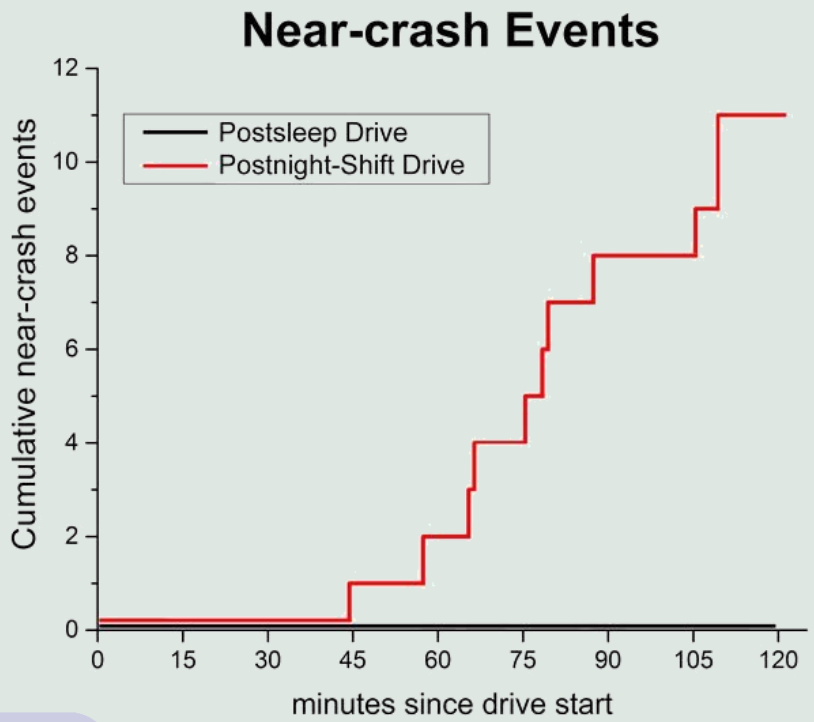
5GLOGINNOV

DOCKSTHEFUTURE NETWORK OF EXCELLENCE Towards the Port of Tomorrow

LIBRA A.I. Technologies

Drowsiness in working environment

- Shift workers, comprising **15%** of the workforce, are at particular risk of drowsiness during vehicle operations.
- Employees with drowsiness are **70%** more likely to be involved in work-related accidents.
- Around **60.5%** of crane operators and heavy machinery users continue to work even while having signs of drowsiness or fatigue.



M. L. Lee *et al.*, "High risk of near-crash driving events following night-shift work," *Proc Natl Acad*

Build a solution to fight drowsiness related accidents

5GLOGINNOV

DOCKSTHEFUTURE NETWORK OF EXCELLENCE Towards the Port of Tomorrow

LIBRA A.I. Technologies

RESONATE overview

Concept:

- **Video-based solution** for recognizing drowsiness of heavy machinery operators;
- **Non-invasive methodology;**
- Monitor the operator's condition in **real-time** identifying the level of drowsiness;
- **Trigger an alert** (e.g., by sounding an alarm, installed in the heavy machine cabin) avoid potential accidents
- **Data gathering** to drive future decisions on a heavy machinery fleet shifts.

Features:

- Hybrid exploiting **RPis and GPU server** computational resources;
- Relatively **low-cost solution** with less powerful edge devices and powerful server **over 5G** (low latency).
- **Decision Support System** (DSS) to monitor drowsiness of the fleet;
- **GDPR compliant** solution considering operators privacy.

RESONATE Pilot case

Piraeus Port Container Terminal (PCT)

- 4th among the busiest European Ports in terms of container
- Moving about 5.5 million TEUs on an annual basis.
- a mother vessel requires an average of 3000 stevedore moves for operation completion, e.g., for loading/unloading all containers

- port's heavy machinery, e.g., truck drivers or crane operators
  - 3x Trucks
  - **Phase 1.** Video recording for training in different conditions
  - **Phase 2.** Monitoring and alerting in real time

5GLOGINNOV

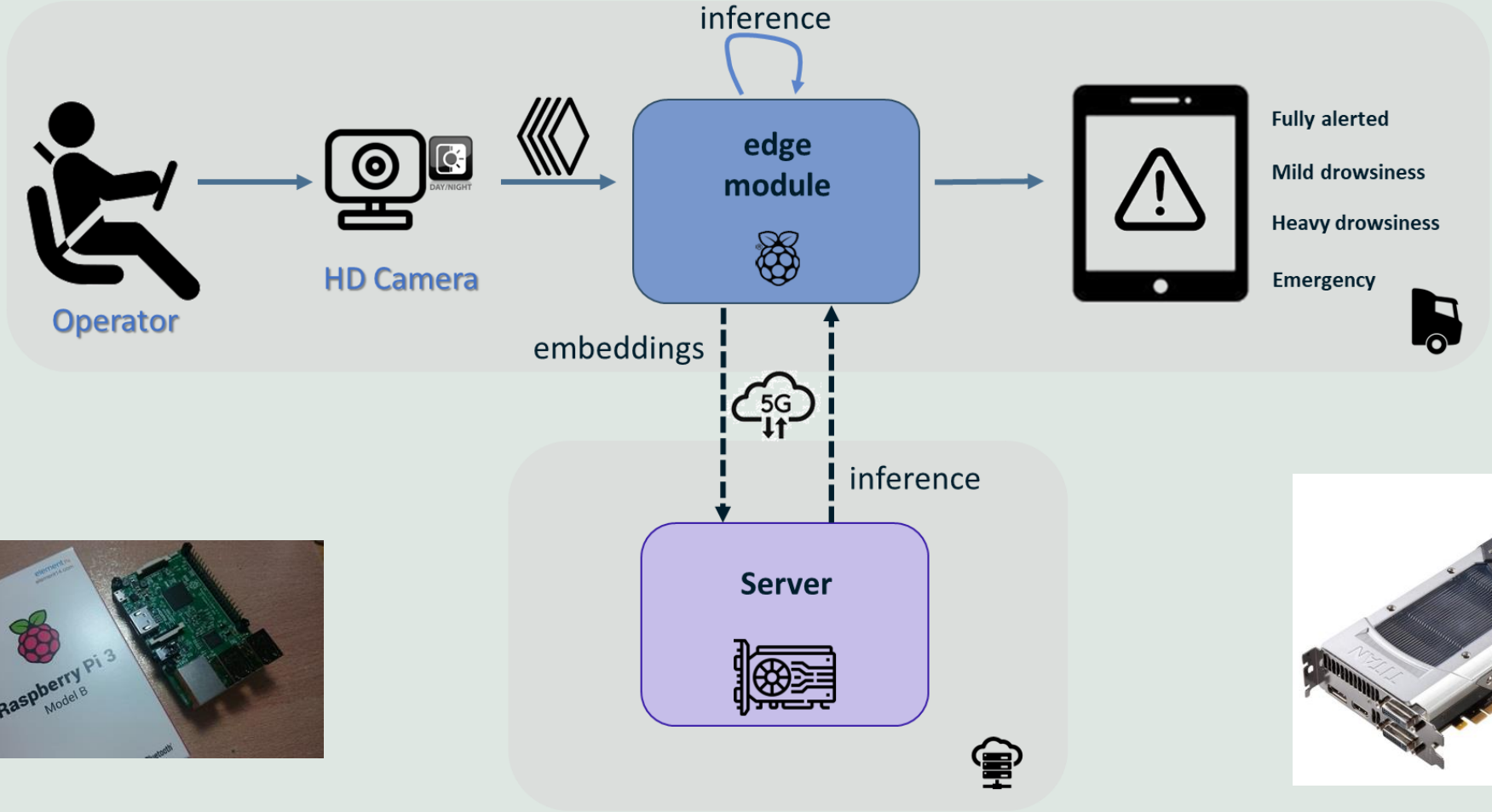
DOCKSTHEFUTURE NETWORK OF EXCELLENCE Towards the Port of Tomorrow

LIBRA A.I. Technologies

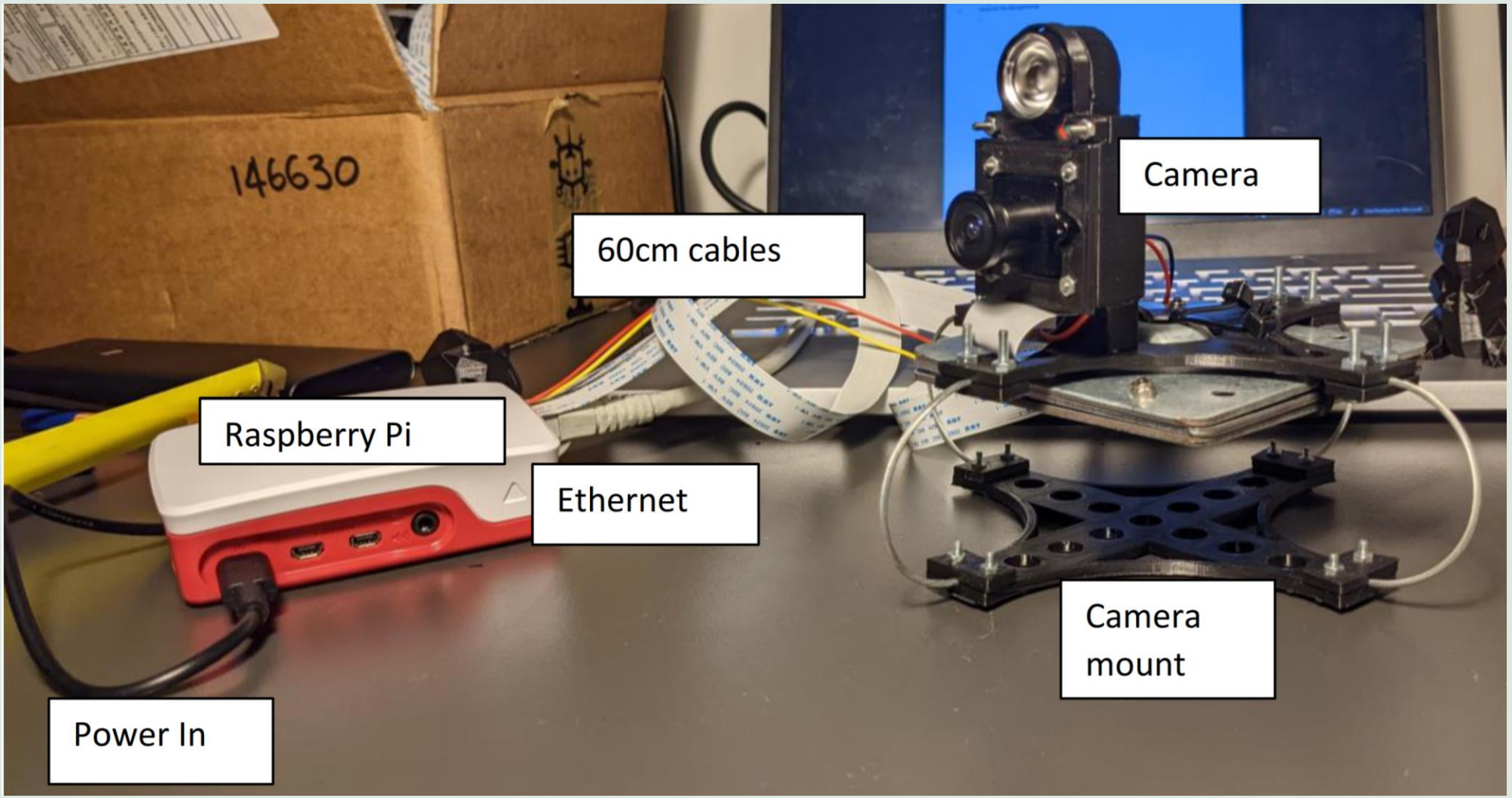
Challenges

- Lighting conditions
- Intensive high and mid-frequency vibrations
- Driver seat suspension
- Guarantee a low number of false alarms
- GPU-enabled edge devices supply limitations
- Privacy concerns

RESONATE architecture

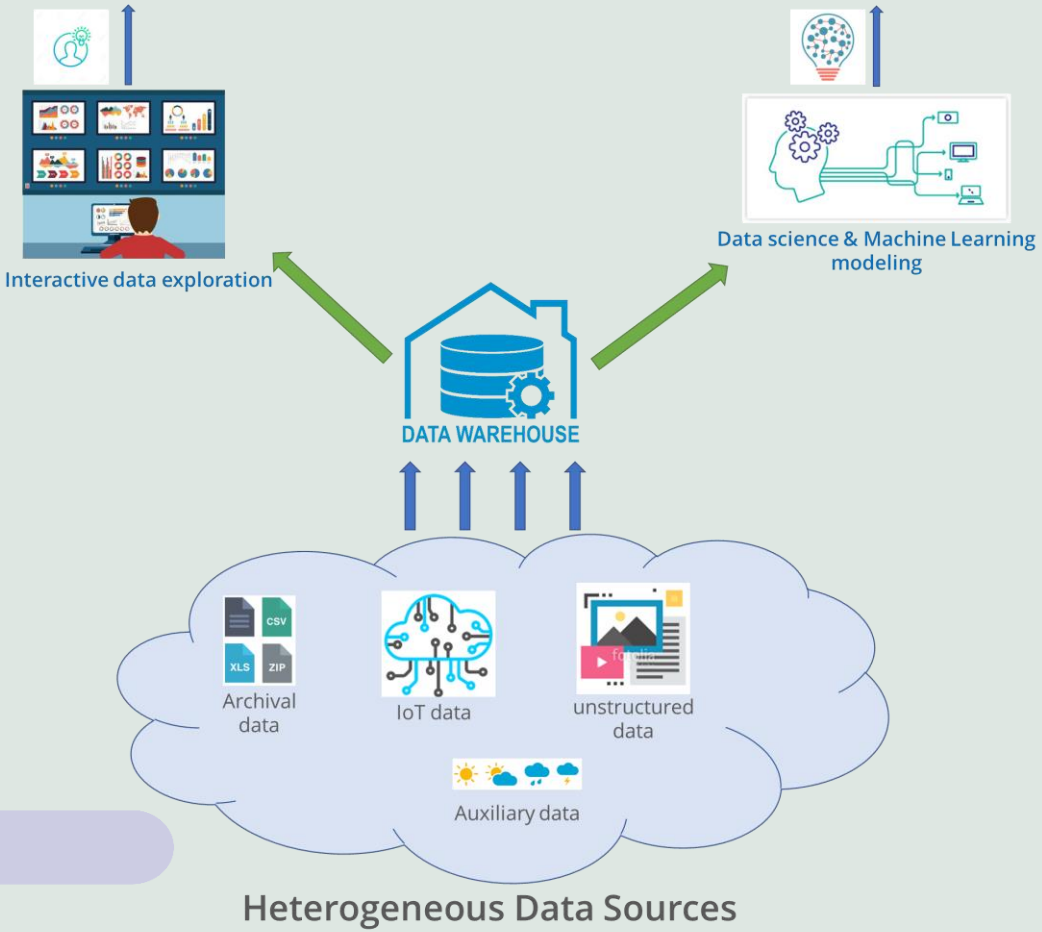


Prototype (A version)



RESONATE decision support system

- Interactive data exploration capability for human experts
  - 360o view of the fleet alertness performance
  - Draw Insights that drives & supports safety decisions
  - Real time monitoring
  - Derive and track KPIs



LIBRA A.I. Technologies

THANK YOU!
Any questions?