



LTAT.06.010 Pervasive Data Science

Lecture 1

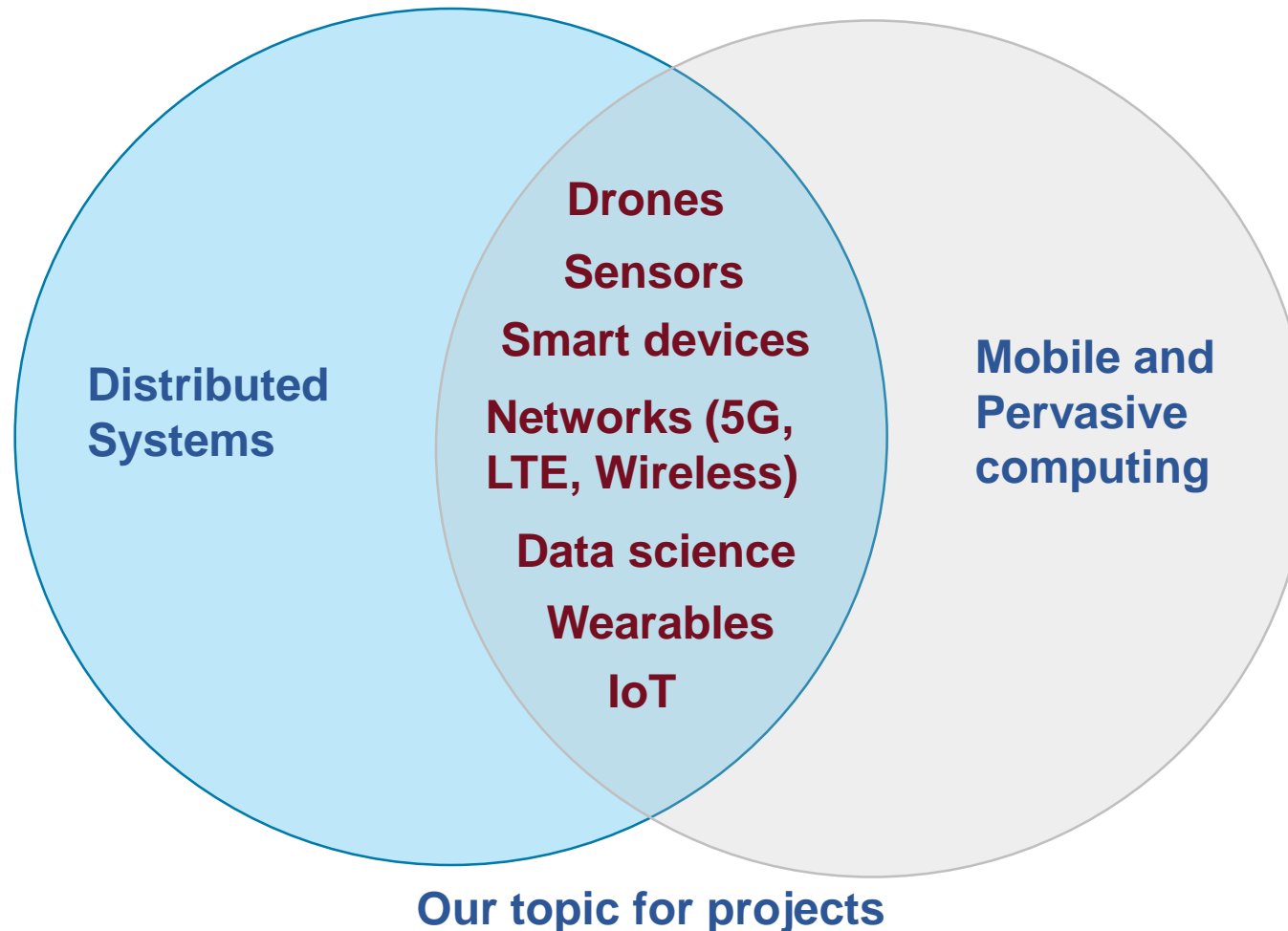
Huber Flores, PhD

ASSOCIATE PROFESSOR

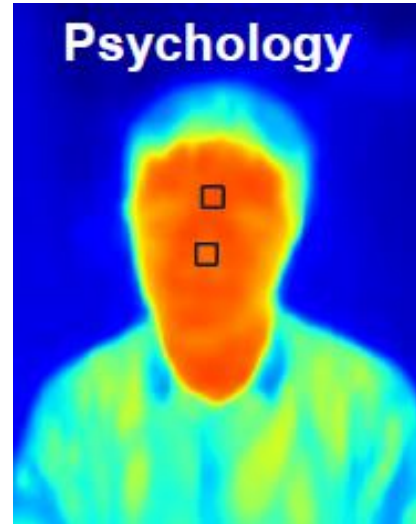
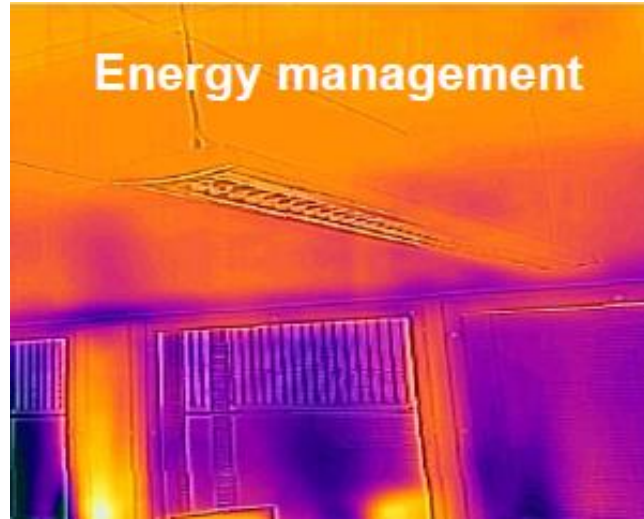
Tartu, Estonia 08/02/2021

Research agenda

We focus on solving **real world problems** with **cutting-edge research**.



Examples of pervasive science



Challenge to overcome: Aquatic plastic pollution

Objective: To equip underwater drones with sensors to recognize plastics underwater

Possible topics:

- Autonomous navigation
- Sensor encasing
- Sensor data analysis

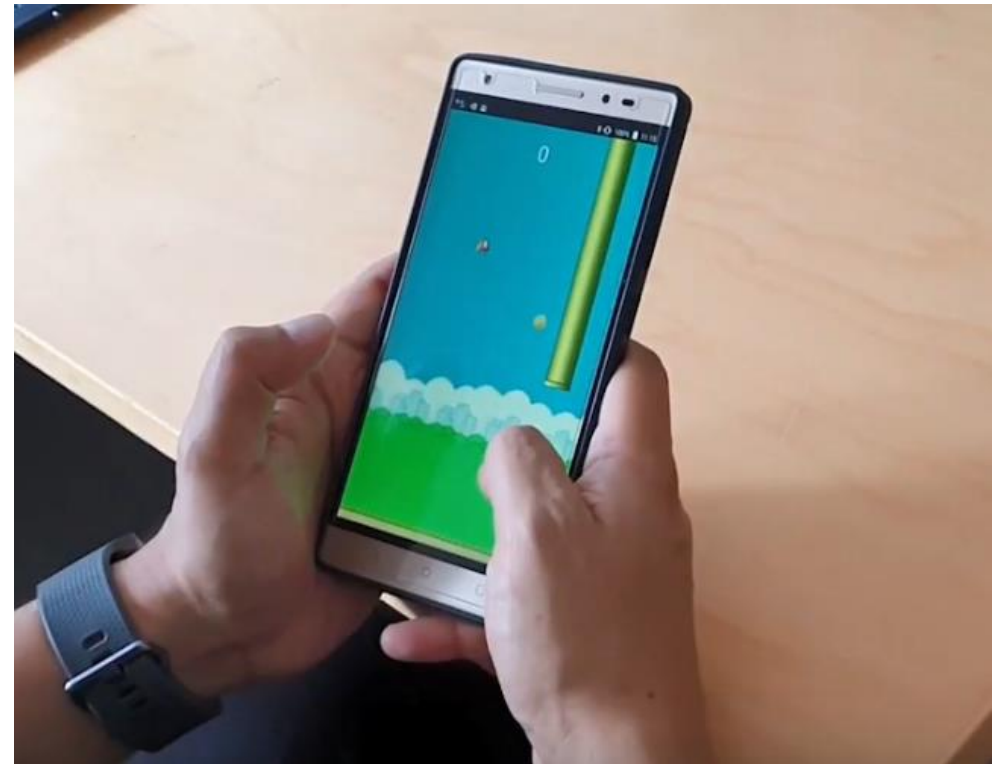


Challenge to overcome: Understanding the mobile user

Objective: To develop mobile and wearable applications that allow us to understand user behavior and mobility. For instance, contact tracing, health apps.

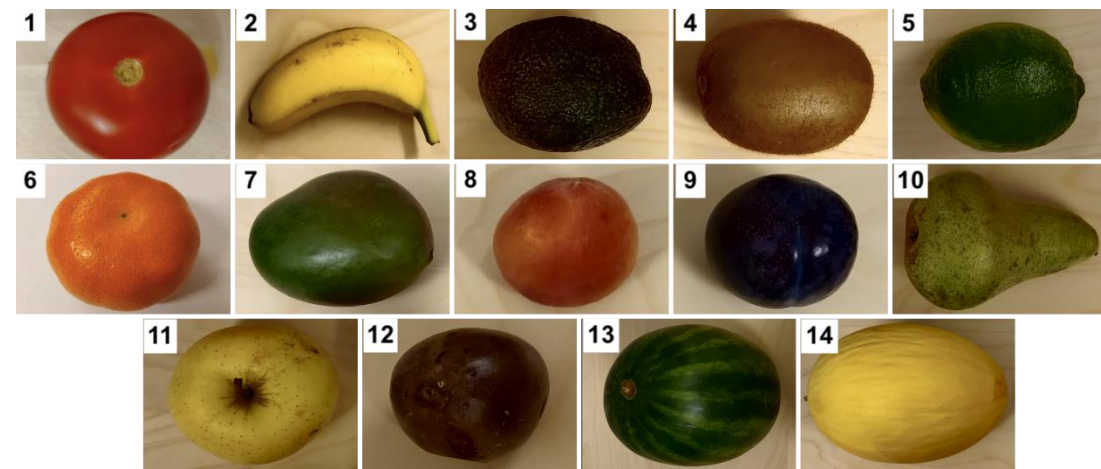
Possible topics:

- Contact tracing, e.g., mobility
- User perception, e.g., ad location and placement
- Health apps, e.g., calories and sugar intake



Challenge to overcome: Food quality estimation

Objective: To model the decomposition to organic produce with sensor data



Before (Fresh)



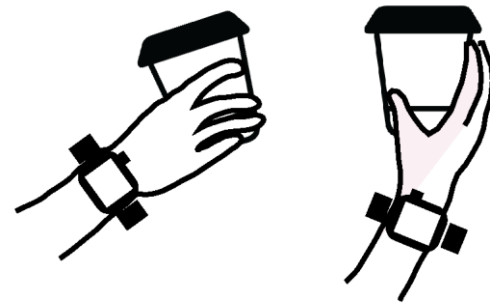
After (8 days later)

Challenge to overcome: Waste management

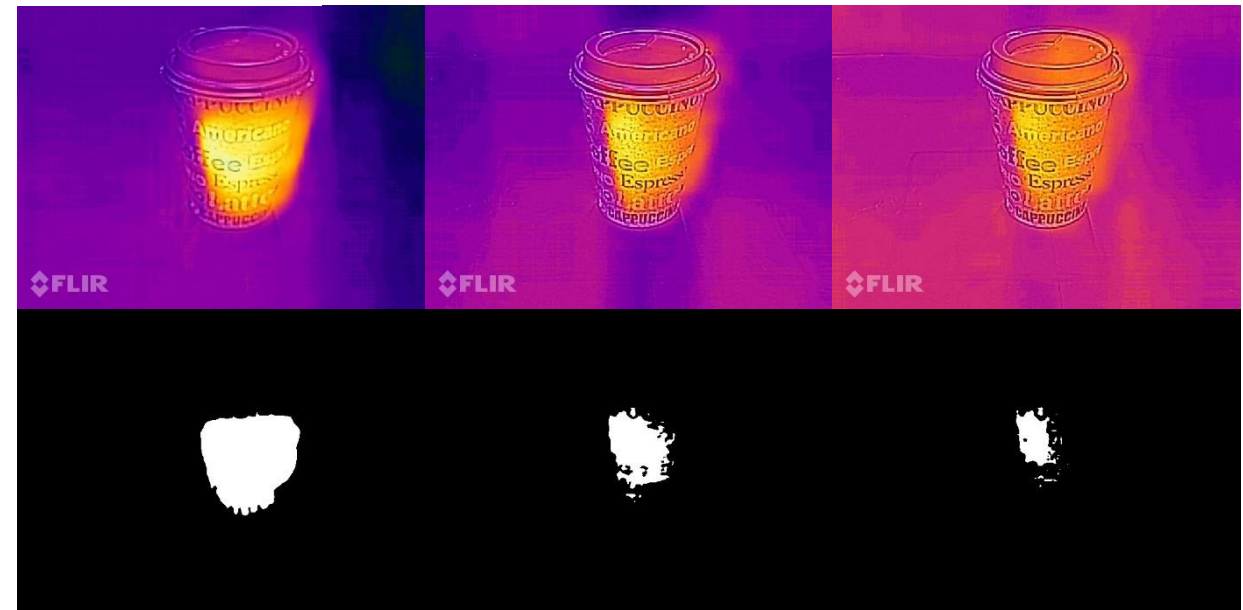
Objective: To classify waste material before turns into mixed waste

Possible topics:

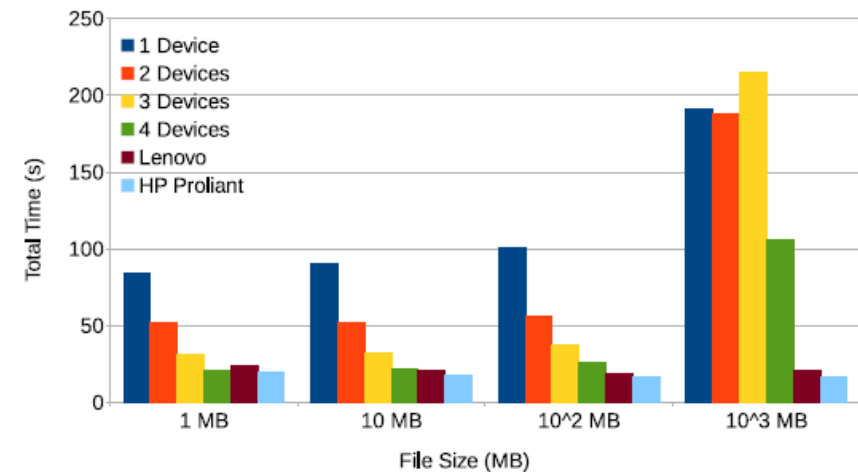
- Object recognition
- Thermal imaging analysis with cameras
- User studies



Transferred human heat is used to classify waste object materials



Challenge to overcome: Transform old smartphones into a micro-data center



Summary

- **We do a lot of new exciting stuff**

- Practical and experimental test-beds
 - Analysis of pervasive data
 - Conceptual modelling

- **Relevant topics**

- Sensing underwater plastics and micro-plastics

- Recycling of waste (old smartphones)

- Designing new sensors

- Multi-device systems and applications

- Exploring AI for pervasive sensing and multi-device applications





Next lecture

Available topics



Questions?

E-mail: huber.flores@ut.ee