

Mind-Aware, Mission-Ready

Hugo Paredes
Centre Coordinator, INESC TEC
Full Professor, UTAD

Human-Centred Computing and Information Science

HumanISE is an interdisciplinary centre focused on research at the forefront of **Human-Centred Computing** (HCC) with broad and deep expertise in **Computer Science** (CS) and **Information Science** (IS).

We aim to advance the state-of-the-art on novel ways to improve the development of **human-centred computer systems** involving **high technical and managerial complexity**, due to large scale, high heterogeneity, high uncertainty, high integrity, **strict compliance to standards and legal frameworks**, or **domain-specific organisational issues**.

HumanISE

Human-Centred Computing
and Information Science.

Personalized Health Research

Vision

Empowering researchers in the health domain achieving evidence-driven science towards personalized treatments. Two main sub-areas emerge from the main goal: **novel personalized Internet-based treatments**; and **human data storage, harmonization, controlled sharing and privacy-preserving analysis**.

Flagship topics

- Platforms and methods for Personalized Health Research
- Large Scale Health Research Infrastructures for Privacy-Preserving Computing
- New computational methods to support emerging treatments



more than a decade of research on Mental Health

2010

ICT4Depression

User-friendly ICT Tools to Enhance Self-Management and Effective Treatment of Depression in the EU (FP7)

2015

StopDepression

Stepped care treatments and digital solutions for depression and suicide prevention in primary care (FCT).

2018

Moodbuster

DIFFER Consortium
Boozebuster
Moodbuster 2.0
Support services

2023

RECONNECTED

A complex systems approach towards REsilient and CONNECTED vulnerable European communities in times of change (Horizon Europe)

E-Compared

European Comparative Effectiveness Research on Internet-based Depression Treatment (FP7)

2014

i-Care4Depression

i-Care for Depression: Blending face-to-face psychotherapy with internet and mobile digital solutions (P2020)

2016

HfPT

Health from Portugal (PRR)

2021

from pre-screening depression to cognitive profiling

Analysing individuals' interactions with digital devices, leveraging behavioural patterns that emerge from everyday use.

Grounded in digital phenotyping capturing moment-by-moment data such as typing speed, screen time, app usage, and communication habits aims to infer mental health states.

By continuously monitoring these subtle signals, it becomes possible to detect changes that may correlate with depressive symptoms—such as reduced activity, irregular sleep patterns, or social withdrawal—without relying on self-reporting.

Construct real-time, individualized cognitive maps. These profiles can then inform the personalized assignment of digital tasks, adapting difficulty, modality, or timing based on the user's current cognitive state. Create a closed-loop system where cognitive performance and task allocation continuously aligned, enhancing engagement, efficiency, and well-being.

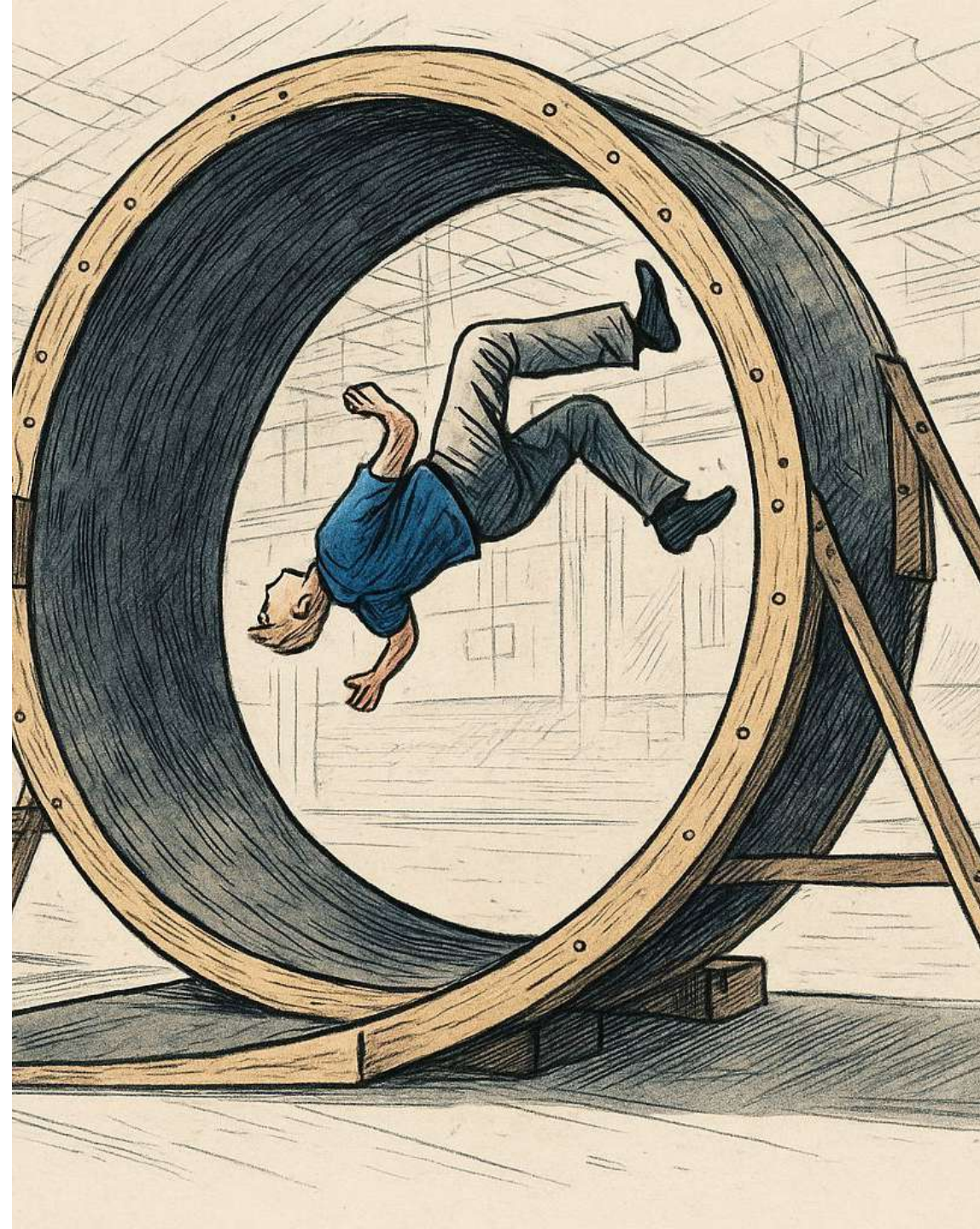
Human-Centred Artificial Intelligence

Produce AI models that humans can inspect, understand, learn with and contribute

The development of effective collaboration between AI systems and humans requires **sophisticated modelling, trustworthiness and explainability.**

Enabling **humans to inspect AI algorithms, pipelines and models** is important for avoiding and correcting errors, **increasing safety and trust.**

Verification of systems and programs becomes more complex than with ordinary algorithms. **Visualisation becomes a very important tool.**



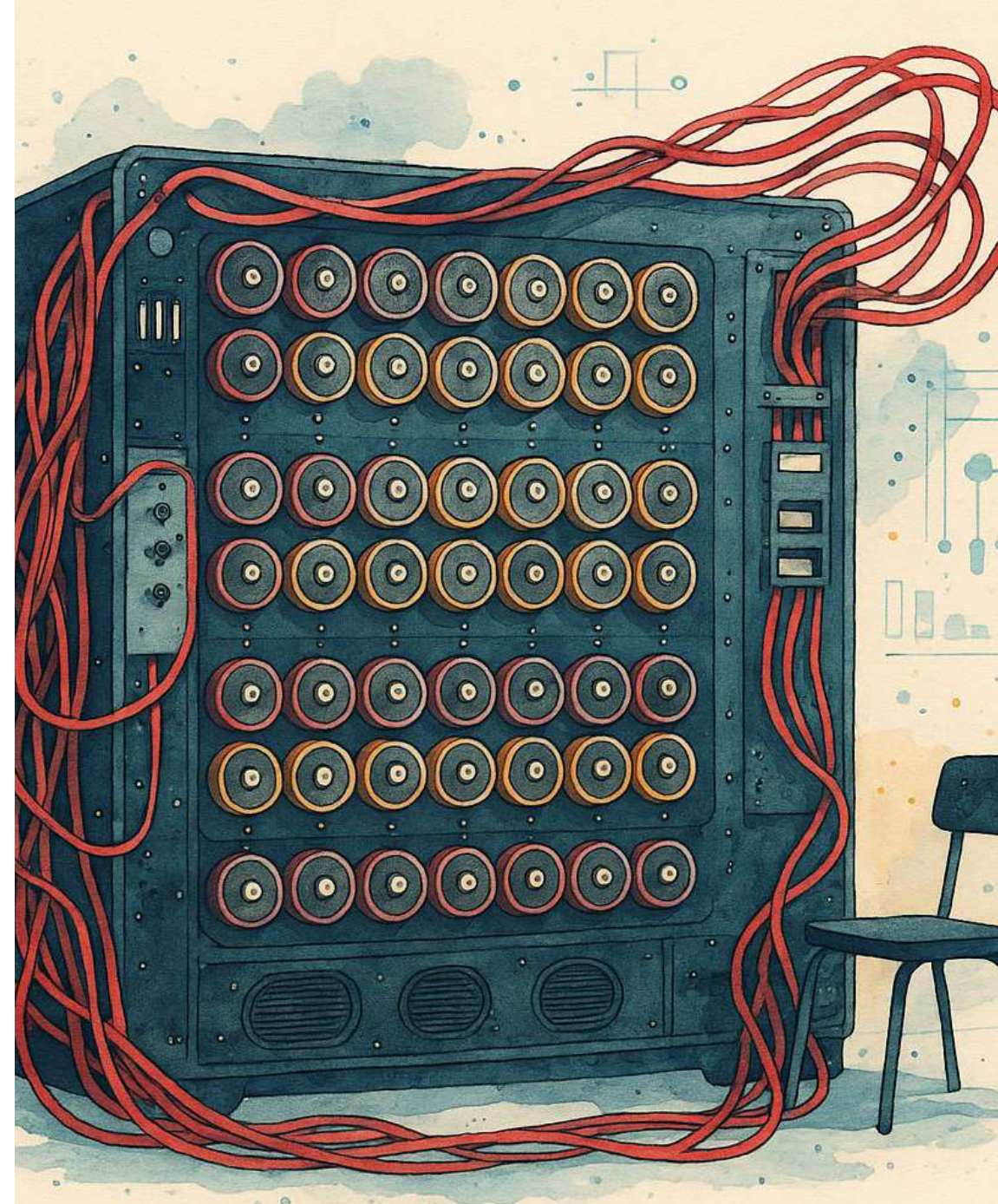
Software Engineering

Ensuring Software Quality

The integration of AI components into software systems is introduce **heightened complexity, and volatility** due to their **non-deterministic and data-driven nature**.

Conventional quality attributes such as reliability, testability, and maintainability **may no longer be sufficient**; novel ones are required; The conventional software development lifecycle is also affected, requiring **stronger or even novel activities and tools**.

To what extent should software engineering be redefined to accommodate the unique behaviours and risks inherent in AI-driven components ensuring the level of quality required?



Multisensory Immersive Environments

Improve Computational Systems for a better Human-Technology Symbiosis

Leveraging multisensory stimulation and haptics to attain perceptually equivalent scenarios for extended reality systems.

Create multisensory virtual environments for training and simulation that **deliver perceptual equivalent stimuli** and thus **enable the certification of trainees using only VR technologies**

Make use of **virtual reality technology to enhance human abilities** to address global challenges and improve quality of life.



Thank You!



HUGO PAREDES
hugo.paredes@inesctec.pt
T: +351937011515

Centre Coordinator
Human-Centered Computing and
Information Science

www.inesctec.pt



**WE ARE SCIENCE.
WE ARE TECHNOLOGY.
WE ARE INNOVATION.
WE ARE INESC TEC.**

