CCG: Centro de Computação Gráfica

HUMAN FACTORS. When the future is now

Perception, Interaction and Usability

Centro de Computação Gráfica

Domains of Applied Research

CVIG

Computer Vision, Interaction

And Graphics

> *If the user is having a problem, it's our problem.*
>
> *Steve Jobs*

PIU

Perception, Interaction

And Usability

EPMQ

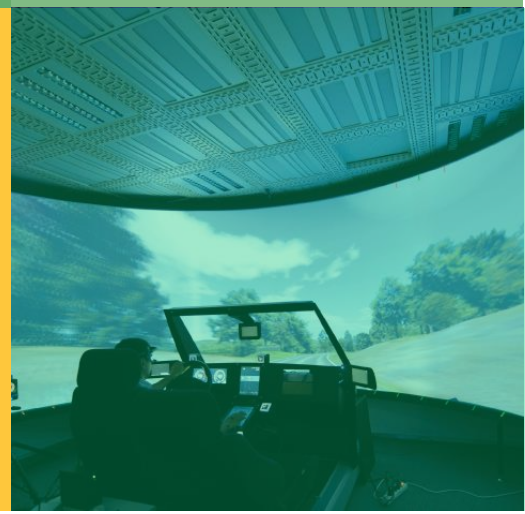
Engineering Process

Maturity and Quality

UMC

Urban and Mobile

Computing



PIU: Domains and competences

Perception

- Basic perceptual processes
- Multimodal integration
- Biological motion perception

Interaction

- Biological motion perception
- Motor execution and biomechanical analysis
- Development of new concepts, interfaces and technologies

Usability

- Needfinding and acceptance studies
- Prototyping
- Analytic and empirical methods for evaluation

D.I.A Perception, Interaction & Usability: Team

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Development Coordinatoor

PhD Experimental Psychology and Cognitive Sciences

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PhD in Electronics and computers (Cognitive Robotics)

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Researcher/Multimodal Perception and Motor execution

PhD Candidate Experimental Psychology

Rosane Sampaio

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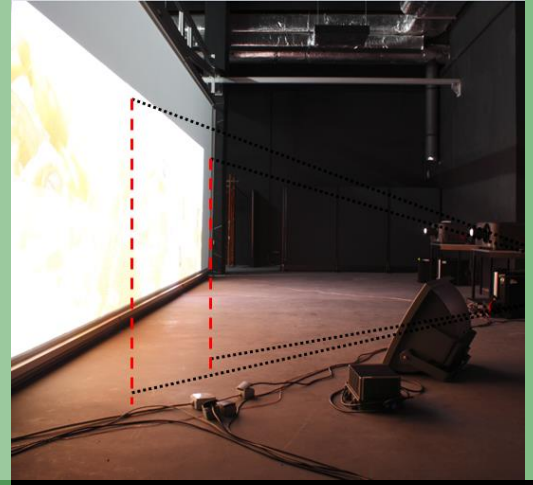
MSc Ergonomics

INFRASTRUCTURES

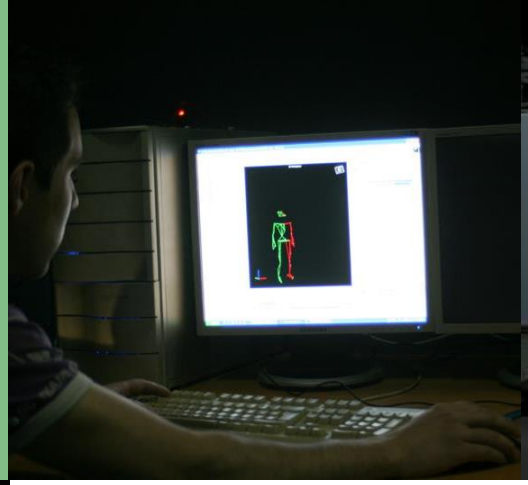


Audio-Visual Immersive System

Power-Wall ru Cave-like Projection;

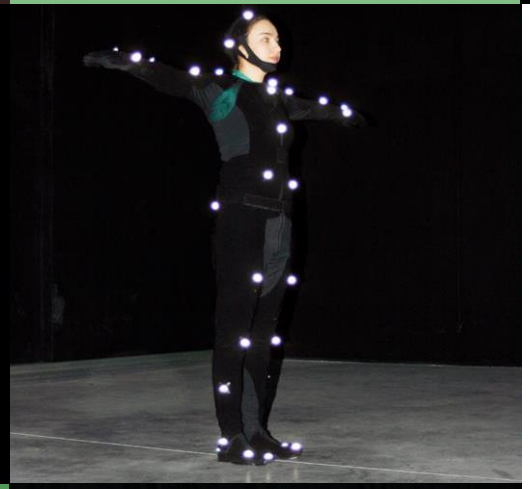
Active Stereo

Auralization and 3D sound



CAVE

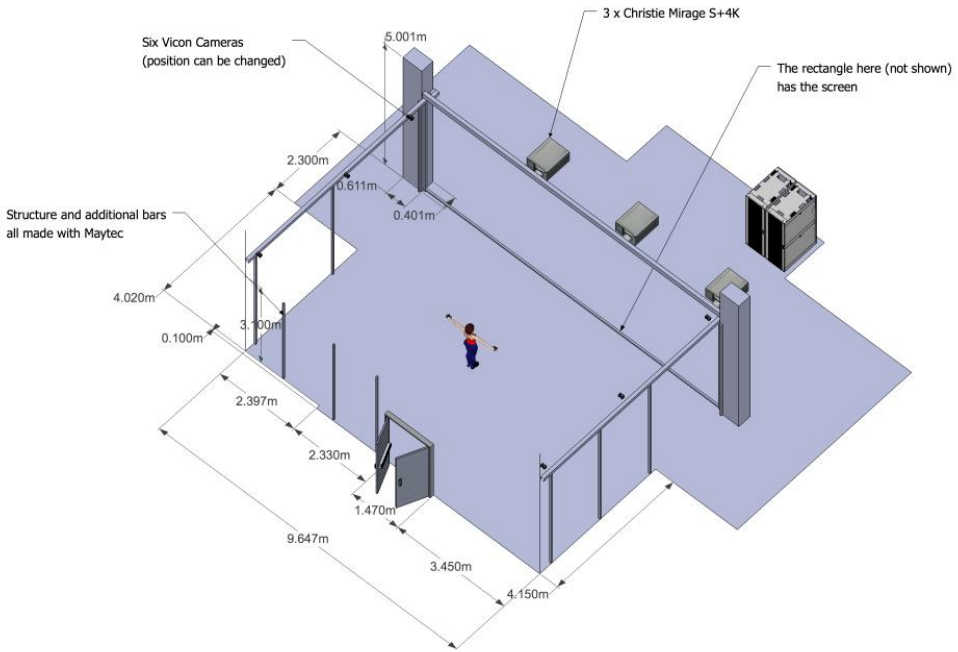
Cave Automatic Virtual Environment



Visualization system

Motion Capture System

Binaural sound



INFRASTRUCTURES

New HMI concepts

Safety studies with drivers and vulnerable road users (pedestrians)

SIMULATOR

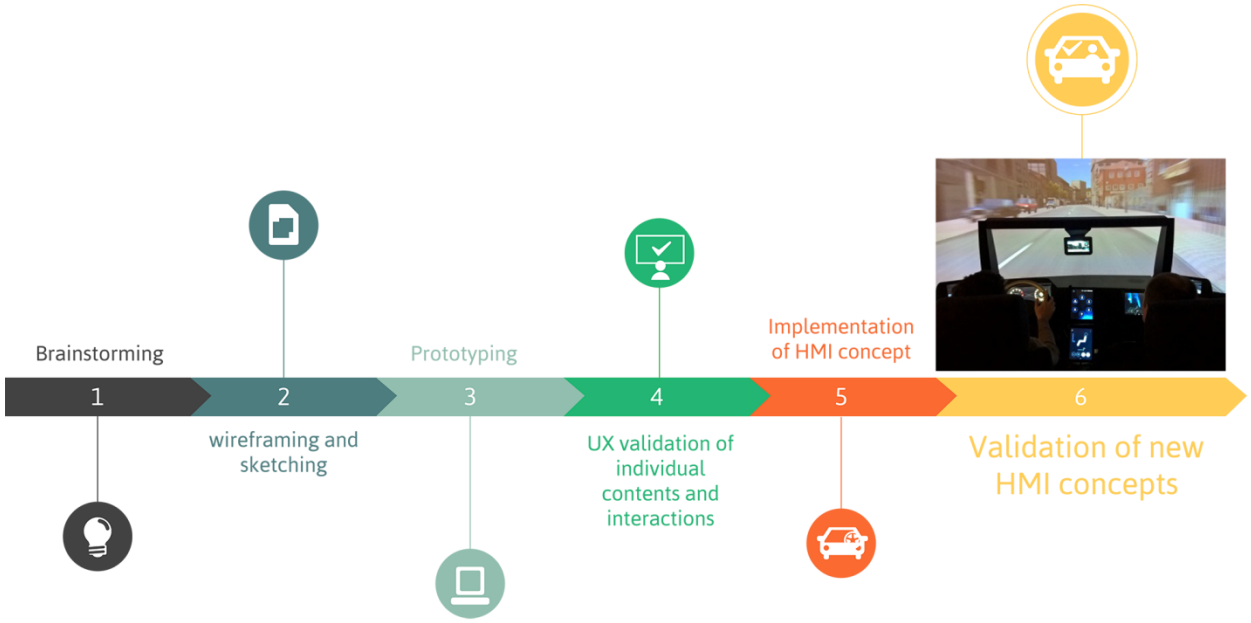
Behavioral analysis and HMI evaluation in automotive contexto

Interference studies

Driver monitoring

Driver’s states and workload management

D.I.A Perception, Interaction & Usability: Projects



HMIExcel

Multimedia solutions for Automotive industry

Bosch Car Multimedia Portugal

Universidade do Minho

2015

Industrial

- ✓ Human Factors
- ✓ Usability
- ✓ HMI Evaluation
- ✓ Ergonomics

Concepts

CONNECTIVITY

INFRA-STRUCTURE

VEHICLE

SYSTEMS

DATA

INTERFACES

AUTOMATION

CONTEXTS

COMUNICATION

Challenges

INFRASTRUCTURE

- Space optimization
- Time optimization
- *“Smart infrastructures”*

VEHICLE/SYSTEMS

- Sensors
- Atuators
- Connectivity
- Augmented reality
- Security

DRIVER/USER

- Safety
- Eficciency
- Ubiquity
- Ecology

Challenges: Requirements specifications

- Primary task
- Which phase?
- When?

SAFETY

COMMAND AND CONTROL

USABILITY AND EXPERIENCE

Challenges: Methodologies

TOOLS

METRICS

PROTOCOLS

Challenges: Driver Behavior

Driver Inattention and Distraction

Workload Management

Situational Awareness

Situation Awareness is related with the **perception** of the elements in the environment within a volume of time and space, the c**omprehension** of their meaning, and the **projection** of their status in the near future”

Challenges: User Experience and Performance

Overreliance and Trust

Skill Degradation

Multimodality

Main Research Topics

Re-engaging the driver

- Means to engage driver in driving task when system is engaged
- Means to encourage visual attention to forward roadway
- Active alerts for system failures and limitations

Main Research Topics

The user interface and the communication of automation limitations

-Clearly indicate the mode of operation

-Monitor driver’s attention to traffic conditions and vehicle operation

-Encourage drivers to attend to forward roadway conditions

Main Research Topics

The need to monitor the driver

The personalisation of automation

Acceptance studies and Needfinding

Summary

DRIVER

CITIZEN

- Multi-task
- Multi-channel
- Technological maturity
- User Profile

- Responsability
- Ethics
- Security and data access
- “*Smart citizen*”

MORAL MACHINE

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https://youtu.be/L6qOYsFPENo

Thanks For Watching

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