

Ergonomic and sustainable criteria for Human-centered design of autonomous cars



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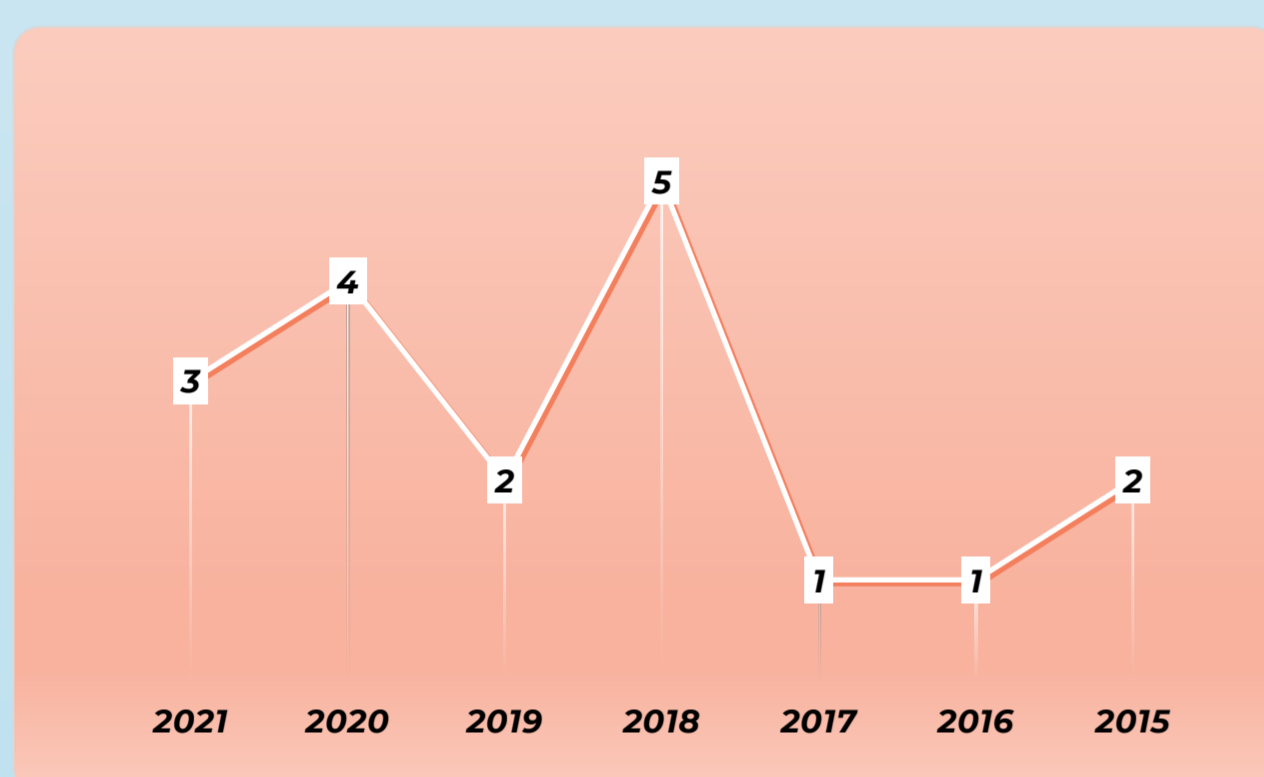
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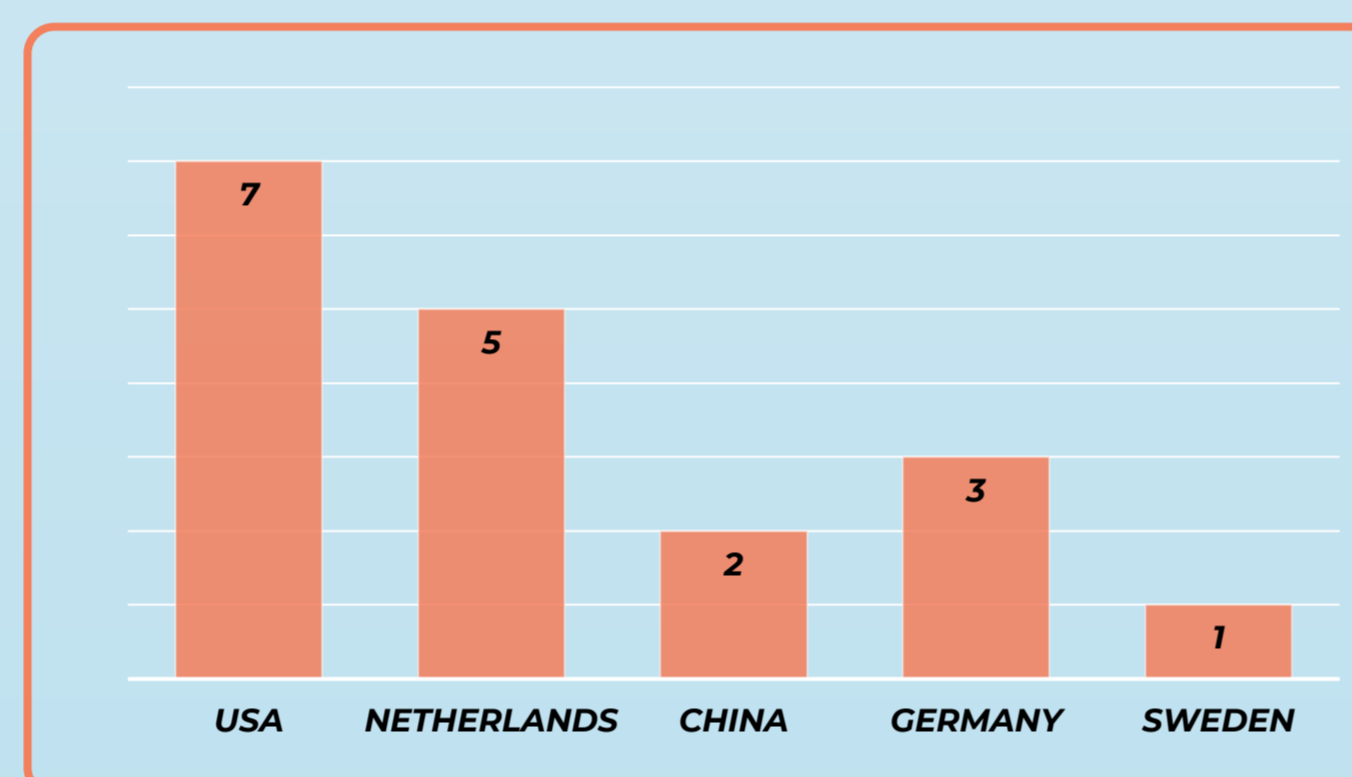
2022 Annual Conference

Motivation

- Autonomous cars will be leading the **future development of personal transportation**.
- Autonomous car represents a **significant step forward in terms of sustainable development**.
- Traditional car interior must be **redefined**.
- Literature review showed that a **small number of studies applied ergonomics** for autonomous car improvement.
- The largest number of studies was published in **2018**, country with more papers published was **USA**.
- Sufficient physical ergonomic assessment** has not yet been carried out with people.



Number of studies that applied ergonomics for autonomous cars per year



Number of studies per country that applied ergonomics for autonomous car interior



Research + Objective Question

How to make **human-centered autonomous car interior design** with consideration of ergonomic criteria?

Provide criteria based on ergonomic methodologies to be integrated into innovative car interior, adaptable to the new mobility paradigms, specifically level 4 and Level 5 autonomous vehicles interior according to ergonomic principles and evaluations



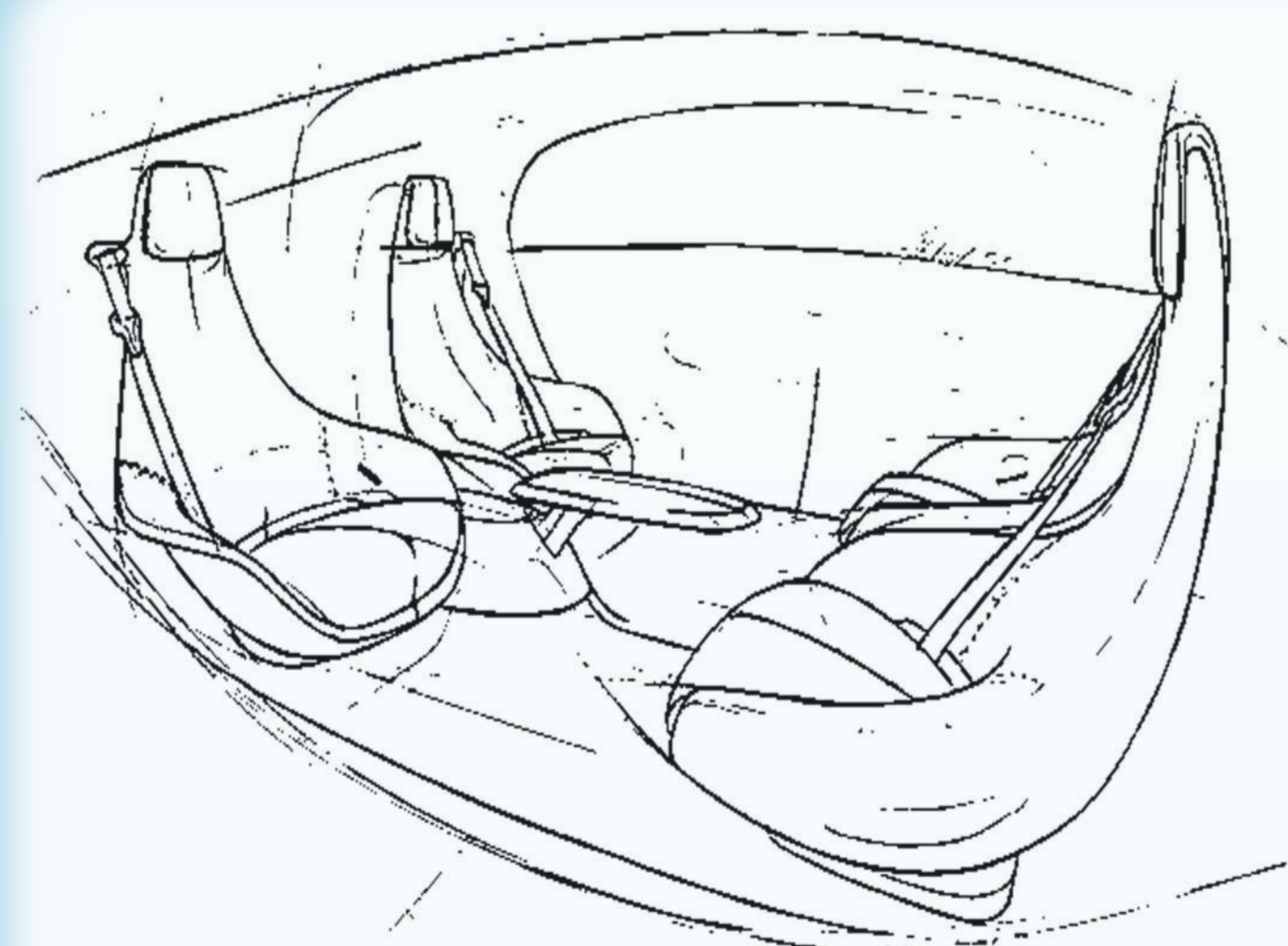
Methodology

Apply survey

An online survey will be applied to future autonomous car users in Portugal.

Collect anthropometric data

Collect anthropometric data for the best adjustment of the autonomous car interior parts.



Simulation

Simulation of the car interior and human interactions.

Validation of parts of autonomous car interior

Ergonomic principles use for the validation of car interior parts.

Definition of ergonomic criteria

Kinematics, physiological, and cognitive data that will be applied to a detailed ergonomics assessment.

Expected Results

- Understand the desires of the Portuguese users** for autonomous car interior, identifying new users' profiles and new needs.
- Redefine the car interior to fit the new requirements** that are expected in terms of customization, comfort, human-machine interface (HMI), adaptable interaction, and infotainment.
- Enough **physical ergonomics, comfort, and cognitive overload evaluations** considering the users.
- Define ergonomic criteria allows development of a framework** for the human-centered design of autonomous car interior.

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