Design Guidelines for a Minimalist Car Interface for Novice Drivers
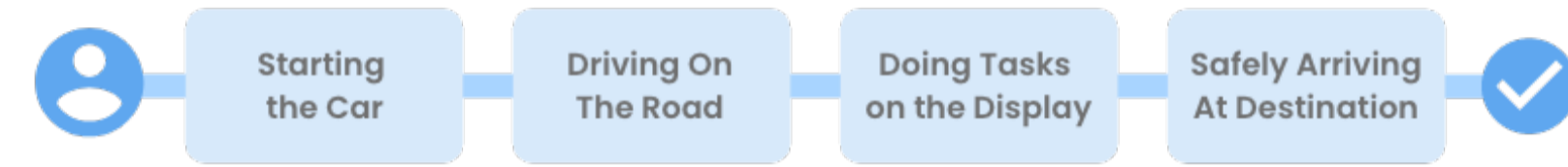
Urjosee Biswas

Abstract

This research explores adaptable car interfaces for novice drivers. It delves into industry norms, research findings, and involves a driving simulation study with 10 participants. The study utilises eye-tracking and biosensor data to create a design framework. This framework establishes guidelines for a simple interface backed by HCI and user-centred design principles. This guide aids designers and researchers in seamlessly integrating human factors and technology, enabling novice drivers to access information and controls effortlessly and allowing them to focus primarily on driving.
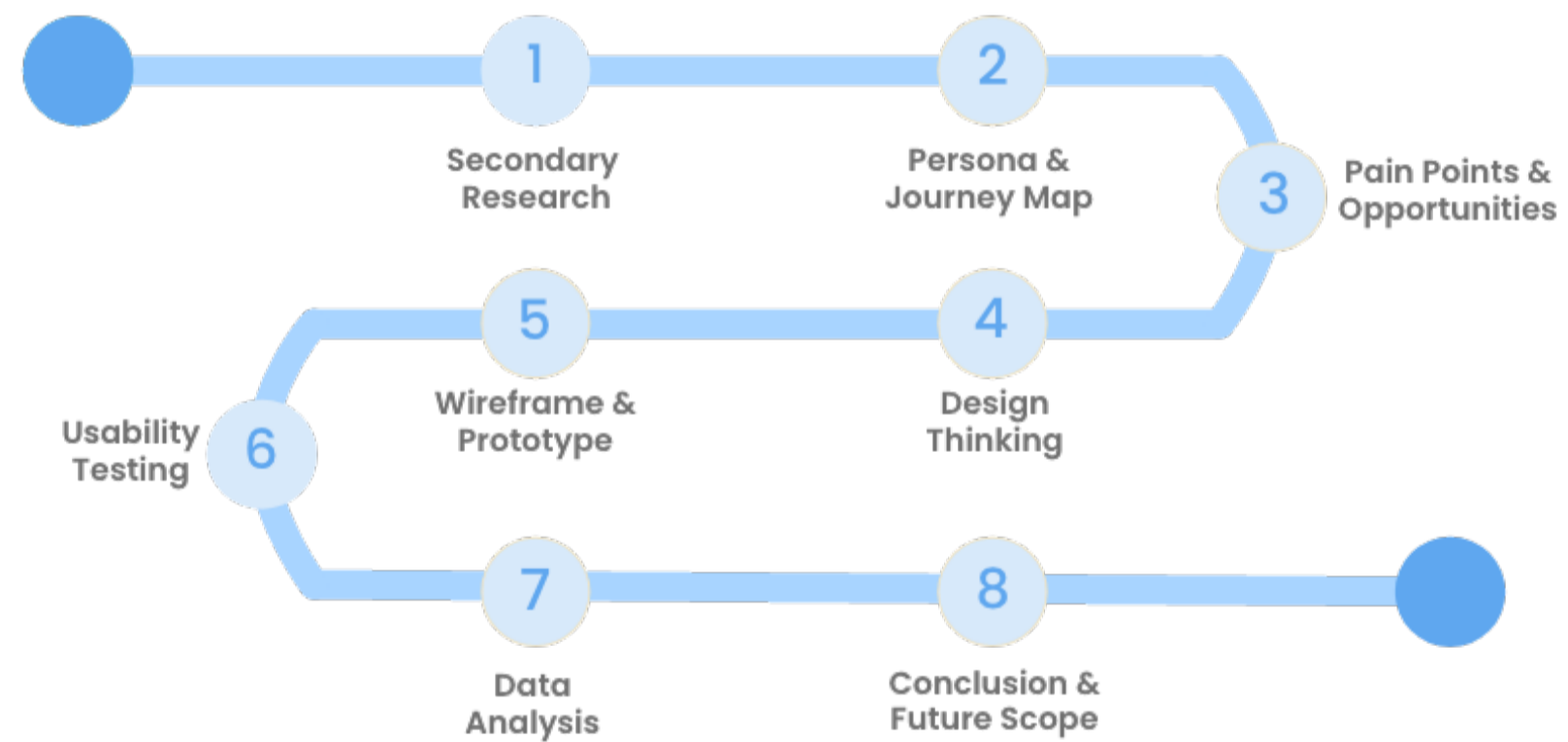
Introduction & Background

Starting the Car → Driving On The Road → Doing Tasks on the Display → Safely Arriving At Destination

Novice drivers have a narrower spread of vision as compared to experienced ones. Unlike experienced drivers, novices struggle with multitasking, which can lead to distractions and reduced attention to driving. Road injuries are a top cause of death for people aged 15 to 29, with a death rate of 25% globally (WHO, 2018). Without user-friendly interfaces, infotainment systems can become dangerous distractions. A minimalist interface helps novice drivers confidently operate vehicles without compromising safety.

Study Methodology

This study aims to evaluate the usability of a minimalist car interface through a combination of eye tracking glasses and biosensors, including electrocardiography (ECG) and electromyography (EMG) to frame guidelines and recommendations.

1. Secondary Research
2. Persona & Journey Map
3. Pain Points & Opportunities
4. Design Thinking
5. Wireframe & Prototype
6. Usability Testing
7. Data Analysis
8. Conclusion & Future Scope

Testing & Evaluation

Usability Test with Biosensors (ECG & EMG) and Eye Tracker Glasses, with a Post-Study Survey.

Research Results

- Novice drivers cannot handle information overload and complex tasks like experienced drivers.
- While universal design principles remain constant, custom approaches are crucial.
- System training should be conducted using innovative on-screen instructions.
- Final result is the formation of a novice-friendly guide for infotainment systems based on the two broad categories of "Design" and "Interaction".

Conlusion & Future Scope

- A novice-friendly infotainment system **guide enhances usability and safety.**
- For future research, a more **diverse range of participants** should be recruited to test and **compare different designs** along with **longer observations** and **wider variations of tasks.**
- Multiple **design iterations** should be conducted based on **user feedback.**
- As technology advances, future studies could involve **gesture** implementation, use of **AI,** and **advanced data analysis** methods.

Screens and Features