A CRITIQUE OF DRIVER INTERFACES TO UNDERSTAND THEIR PREFERENCES, FEEDBACK AND DIFFICULTIES IN USING VARIOUS IN-CAR TECHNOLOGIES
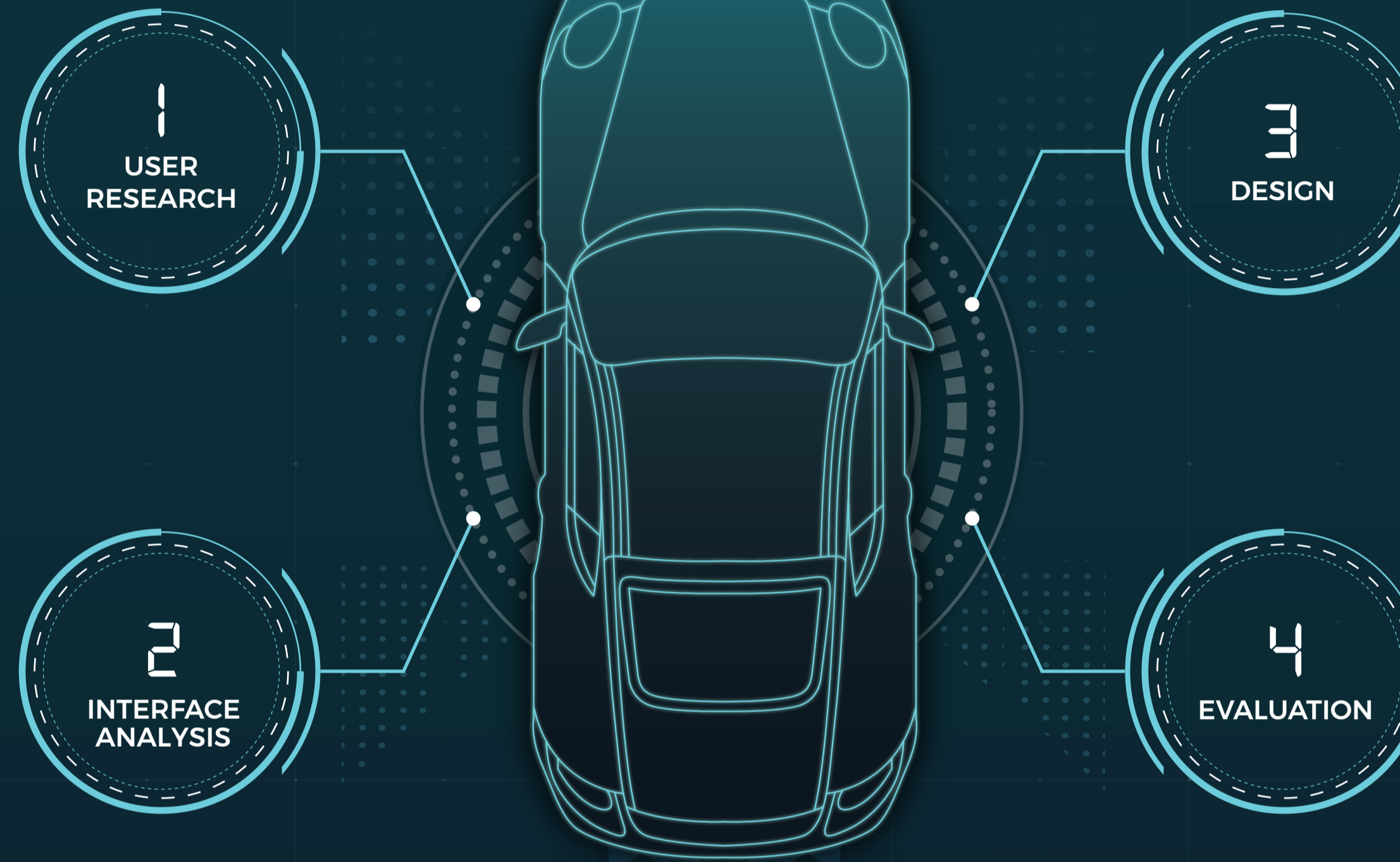
Project By- Shubham Jadhav

ABSTRACT

This study investigates how in-car interfaces have evolved over time, becoming more complex, and suggests a straightforward redesign for semi-autonomous vehicles. Analysis reveals how drivers are overloaded by legacy interfaces. A simplified user interface is offered to reduce distraction using cognitive ergonomics. By redesigning the interface using user-centered techniques, the concept exemplifies simplicity.

INTRODUCTION AND BACKGROUND

In-vehicle interfaces have advanced rapidly, offering information, entertainment, and assistance functions to enhance the driving experience. Nevertheless, increased complexity has also resulted in usability challenges that place significant demands on the driver's visual, manual, and cognitive abilities. The current state of automotive interfaces fails to adequately reduce driver attention demands, despite the risks posed by driver distraction.

STUDY PROCESS

LITERATURE REVIEW → USER RESEARCH

↓

DESIGN THINKING/ INITIAL PROTOTYPE

USABILITY TESTING
Visual Attention Mapping

← PROTOTYPE ←

SUBJECTIVE ASSESSMENT

↓

DATA ANALYSIS → EVALUATION
Card Sorting and refined Information architecture → ITERACTIVE REFINEMENT → CONCLUSION

DIAGRAM AND DESIGNS

APPROACH

1 USER RESEARCH

2 INTERFACE ANALYSIS

3 DESIGN

4 EVALUATION

SCREENS

METHODOLOGY

USER RESEARCH
Observing drivers in natural setting to understand needs and pain points.
Interviewing drivers on desires for in-car systems and areas for improvement.

INTERFACE
Analyze evolution of production UIs using heuristic and biometric data.
Identify areas imposing excessive demand on drivers.

DESIGN
Conducted Feedback sessions with drivers to ideate simplified concepts.
Constant prototyping and iterating on interfaces guided by user feedback.

EVALUATION
Conducted driving simulator studies and gathered performance metrics to identify design improvements.
Performed card sorting studies to categorize, prioritize, and optimize information hierarchy.

TESTING & EVALUATION

➤ Cognitive Systems Analysis
➤ Generative Co-Design
➤ Simulation-based Experimentation
➤ Visual Attention Mapping
➤ Information Prioritization

CONCLUSION & FUTURE WORK

While representing an initial step forward, more radical innovation is still essential. Complex contemporary interfaces overload drivers, requiring complete reimagination rather than small changes for semi-autonomous cars. Smart, human-centered simple designs appropriate for the future. Restraint and streamlined interactions enhance comfort, safety, adoption. Further advances need abandoning conventions through rigorous user focus.

Future work:

➤ Broader participant pools to elicit more diverse feedback and insights.
➤ Iterative, user-centered design for constant enhancement of distraction minimization.
➤ Real-world field trials to validate safety and efficacy under naturalistic conditions.
➤ Ongoing alignment with emerging technologies and empirically-validated interface patterns.