

REDUCING DRIVER DISTRACTION WITH EFFICIENT UX DESIGN LEVERAGING HAPTIC FEEDBACK

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CHALLENGES OF TOUCH SCREENS IN AUTOMOTIVE USE

- In-car controls are migrating from physical elements into touch screens
- Sense of touch and spatial learning are both lost in this transition
- This results in increased distraction of two kinds:
 - **Visual distraction** in finding out controls and verifying that actions succeed
 - Causing lateral control problems (1)
 - **Cognitive distraction** in interpreting the information architecture and current state
 - Causing change blindness (2) and speed fluctuation (1)
- Speech recognition has been employed to help with the visual distraction
 - Has its uses, but does not help the problems on cognitive side (3)
 - Orienting response (4) means visual distraction is still an issue
- All of this causes increased complexity and distraction compared to physical controls, decreasing driver safety and comfort significantly

SOLUTION PROPOSAL – COMBINING THE FOLLOWING METHODS

1) Simplifying the information architecture

- Concentrate on what is really needed by the driver while driving
- Beware of cutting too much functionality as users may revert to using their phones

2) Using simple and intuitive gestures

- Mobile UIs have used these to great effect, car touch design is not yet as mature
- Getting rid of location specific controls reduces the need for glancing
- Using digital gestures where possible decreases the needed precision (5)

3) Separating control area from visual screen

- Prevents user's hand covering visual data during activity
- Visual data can reside closer to field of view in instrumentation/HUD/AR device
- Control screen visuals kept to a minimum, further reducing the need for glancing

4) Combining the screens mentally with multi-sensory feedback

- Visual, audio and haptic feedback used together make a convincing experience (6)
- Haptic feedback is the fastest sensory channel for positive and negative feedback
 - Works sub-consciously, increasing both confidence of use and learnability
 - Haptics are the glue, making the use of multi-screen systems effortless

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