Why Investigate Autonomous Interior Design?

As the automotive industry advances through development of self-driving technology, it is important to retain focus on the end-user's experience. Following research, surveys, and current trends, a vehicle interior was developed to meet customers’ and manufacturers’ expectations of future designs.

Levels of Autonomy

The National Highway Traffic Safety Administration (NHTSA) has developed a scale defining vehicle autonomy.

- **Level 0**: No automation, driver required.
- **Level 5**: Full automation, potential for driver control.

Our interior design applies to a level 5 autonomous vehicle.

Autonomous Driving Considerations

Preliminary ideas for the interior design considered the following possibilities for autonomous vehicles:

- Short-distance travel
- Long-distance commutes
- Modular seating
- Ridesharing (Uber, Lyft, etc.)

Survey Results and Design Considerations

A survey of 59 participants aged from 18 to 65+ determined interior features they considered most important.

**Top responses**:
- Configurable seating
- Leather material
- Backseat storage
- Cup holders
- Gauge cluster
- Wireless charging
- 120V power

Preliminary Designs and Small-Scale Models

Hand sketches and small-scale models made of foam, clay, and cardboard were developed to get a hands-on approach to creating the car interior.

Manufacturing the Full-Scale Model

Fabrication involved:
- Wood working, welding, grinding, turning, milling, 3D printing, drilling, sanding.

Challenges encountered:
- Change center console to accommodate leg room, incorporate screens, and multiple runs on 3D printed parts.

Full-Scale Interactive Model

- Triple touch screen dashboard mockup
- Backseat touch screen control panels in armrests
- Multiple cupholders throughout
- Modular build with separable platform, moveable backseats/center console
- 360° front seat rotation, forward-backward translation, up-down height adjustment
- Productivity table and wireless charging
- Modular build with separable platform, moveable backseats/center console

Computer-Aided Design

To allow for design ideas to be efficiently tested, a full-model Computer-Aided Design (CAD) rendering was created. Using this model, designs could be executed both physically and digitally.

Feedback Clinic

Students at Floyd Hall interacted with the full-scale build to gather feedback. Participants saw room for improvement in the center console and rear seats, requesting that all passengers have equal vehicle control.

Recommendations

Autonomous vehicles’ interior designs must prioritize the user’s comfort and interaction with technology. Configurable seating should continue to be developed to create a versatile environment. Individual activities and social interaction should be accommodated in future designs.

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