assignment2
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Experimental Plan: Future Urban Transportation and Autonomous Vehicles

The future of urban transport will see self-driving vehicles flooding the streets and organising themselves flexibly and efficiently according to demand, with us digitally ordering and paying for public transport according to our lifestyles rather than owning our own cars

Research Question:

How does the integration of self-driving vehicles with digital on-demand public transport affect the overall efficiency, accessibility and user experience of urban commuting, compared to traditional private car ownership?

Methods:

A mixed methods approach was used, combining quantitative data analysis and qualitative user feedback.

Device:

Automated vehicles equipped with sensors and cameras for navigation.
Digital on-demand public transport platforms.
Survey and interview tools for data collection.

Condition:

Control condition: Participants who own a private car.
Experimental condition: Participants who rely on Automated vehicles and digital on-demand public transport.

Measurement:

Quantitative Measurement:

Comparison of travel time between private cars and Automated vehicles.
Cost of ownership versus cost of on-demand transport analysed.
User satisfaction survey of overall commuting experience.

Qualitative Measurement:

In-depth interviews to gather user perceptions, concerns, and preferences about the overall commuting experience.
Qualitative analysis of open-ended survey responses.

Procedure:

Recruitment:

Participants were recruited through an online platform, targeting urban residents aged 25-55.
Demographic data such as age, gender, occupation and current transport habits were collected.

Experimental execution:

Control condition: participants maintained regular private car use.

Experimental condition: participants used Automated vehicles and digital on-demand public transport for commuting.

Data Collection:

Quantitative data was collected through sensors on the Automated vehicles and digital platforms.

Participants provided feedback through surveys and interviews.

Analyses:

Quantitative data analyses were conducted using t-tests for travel time and cost comparisons.

Thematic analysis of qualitative data was conducted to identify user perceptions.

Results:

Hypothesis:

H1: Travel times using Automated vehicles and on-demand transport will be significantly less than private car ownership.

H2: The overall cost of on-demand transport will be more economical than private car ownership.

H3: The level of user satisfaction with Automated vehicles and on-demand transport will be higher than private car ownership.

Statistical Tests:

Paired t-tests for time and cost comparisons.

Chi-Square test for categorical data from user satisfaction surveys.

Discussion:

Confounding Variables and Experimental Errors:

Traffic conditions, weather and personal preferences may affect user experience.

Technical failures from Automated vehicles or digitisation platforms may lead to errors.

Internal and external validity:

Internal validity was ensured through a control condition for direct comparison.

External validity was enhanced by recruiting participants from different demographic backgrounds and considering a variety of urban settings.

Ethical Considerations:

With the continuous development of AI theory and technology, as well as the rapid increase in computer arithmetic power, AI systems have become more and more "intelligent". More and more human activities and decisions are assisted or even completely replaced by AI, which makes the boundary between AI and human beings in the ethical and legal levels gradually blurred. However, there is often no standard and definitive answer to the question of AI ethics. The ethical issues faced by each specific application area may be very different.

Cars centred alongside bicycles and trucks pose a higher risk to cyclists when

travelling close to bicycles and a higher risk to autonomous vehicles and their occupants when travelling close to trucks. Unfortunately, minimising the risk to occupants of self-driving vehicles comes at the expense of other, more vulnerable road users.

According to the research, most drivers believe that self-driving cars that maximise the benefits to society are the most ethical, but at the same time they will have a personal preference for the self-driving car they ride in: they will do whatever it takes to protect themselves. For self-driving vehicles, self-driving software will make decisions instead of humans.

Automakers, as well as self-driving software developers, are more inclined to develop vehicles that do their best to minimise risk to passengers. Mercedes-Benz, for example, has announced that it has programmed its self-driving cars to prioritise the safety of occupants over pedestrians. Although from an ethical perspective, these decisions at the expense of vulnerable road users are immoral. But how many people would be willing to buy a car from a car manufacturer if they announced that their vehicles would prioritise the interests of others over the occupants?