### Deeper Understanding of Americans’ Autonomous Vehicle Preferences: Questions on Long-distance Travel, Ride-sharing, Privacy, & Crash Ethics

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**Background**

- Public perceptions of autonomous vehicles (AVs) are evolving quickly.
- Past surveys show public acceptance growing, rising from 45% in 2011 to 60% in 2014 (Vujanic & Unkefer, 2011 and Schoettle & Sivak, 2014).
- Ride-hailing with Transportation Network Companies (TNCs) has surpassed conventional Taxi services (Bayle et al., 2016).
- AVs are predicted to work well as shared AVs (SAVs) with dynamic ride-sharing (DRS) (Agatz et al., 2010 & Bischoff, 2016).
- Privacy & security questions are of strong interest, with major software companies working on this emerging technology.
- AVs also predicted to alter long-distance travel choices (LaMondia et al., 2016), but public opinions are lacking.
- This new survey seeks to cover all topics.

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**Survey Design & Data Collection**

- 70-question survey investigates Americans’ preference to AVs vs. SAVs.
- 6 survey sections:
  - Current AV perceptions.
  - Ride-sharing preferences.
  - Privacy & security concerns.
  - Ethical implications.
  - Long-distance travel & Future purchase & travel choices.
- Survey Sampling International’s (SSI) panel of Americans was used to access respondents across U.S., with 50% of large sample coming from Texas.

![Survey respondent location in the U.S.](image)

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**Data Processing**

- n = 3,000 Americans’ responses were collected & processed.
- Responses screened for inconsistencies & data cleaned for anomalies & recoded as needed.
- Final sample resulted in n = 2,902 Americans, with 1,417 from Texas & 1,485 from other U.S. states.

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**Weighting**

- Respondents weighted using U.S. Census Bureau’s Public Use Microdata Sample.
- Weighting achieved based on different categories of age, gender, marital status, household size, household income & their cross-tabulations using MATLAB code.
- MATLAB code iteratively assigns a weight so all sample categories reflect U.S. population.
- Deviation of only 0.01% between sample & U.S. population demographics achieved.

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**Analysis & Results**

- Ride-sharing Preferences
  - Only 3% TNC users have shared their ride with a stranger, via, e.g., UberPool.
  - 58% not comfortable sharing rides with strangers when SAVs operate without a human driver/attendant.
  - Passengers willing to pay (WTP) $75/mile on average for shared rides even if 30 minutes of travel time is added to their trip.
  - WTP falls to $35/mile when the shared ride imposes 1 hour of additional travel time.
  - Only 25% of those willing to share a ride during the day are comfortable sharing a ride in the night.
  - People prefer restrictions on SAV use by those without a prior criminal record over using additional information prior to the trip for a night trip and are WTP 90 SAV/mile.
  - Median maximum ride-share travel times was 25 minutes in the middle of the day as opposed to 30 minutes in the night.
  - More people are likely to share rides if the location is constantly broadcasted.

<table>
<thead>
<tr>
<th>AV crashing with...</th>
<th>Order of most chosen ethical outcome (+ decreasing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>...a pedestrian</td>
<td>1. AVs should not be allowed to swerve</td>
</tr>
<tr>
<td>...another car</td>
<td>2. Crash must occur with-out discrimination</td>
</tr>
<tr>
<td></td>
<td>3. AVs should not be allowed to swerve</td>
</tr>
<tr>
<td></td>
<td>4. Protect external people</td>
</tr>
<tr>
<td></td>
<td>5. AVs should not be allowed to swerve</td>
</tr>
</tbody>
</table>

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**Analysis & Results (continued)**

- Ethical implications
  - Crash responsibility: 60% of the population think auto-manufacturers must be held responsible.
  - Privacy concerns
    - More than 60% of the population is reasonably concerned about privacy issues, with 40% being very concerned.
    - Most Americans (over 55%) are willing to pay $1/trip on average for privacy.

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