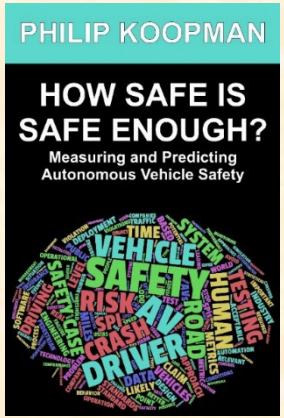
Autonomous Vehicle Policy Issues

Prof. Philip Koopman



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Are Robotaxis Safer?

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- Nobody knows when Autonomous Vehicles (AVs) will be safer than human drivers
  - Press releases overstate company study results
  - Reduced fatality rates are aspirational
- Proving safety will take 100+ Million miles
  - Currently about 5 million miles/company in S.F.
  - Current studies have significant assumptions
- Declaring safety "victory" at this point is like getting a medal…
  … after the first mile or so in a marathon

Robotaxis Also Make Driving Mistakes

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- There is more to safety than lots of sensors

- Before deployment
  - "Lidar, cameras, radar, mean a robotaxi would never rear-end a city bus"

- After deployment
  - Robotaxis have software defects… including rear-ending a city bus
  - Safety is about bad days, not good ones
    - One bad day cancels a lot of good days

Quick List of Overstated Claims

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- "Humans are terrible drivers" / "94% Human Error"
  - Humans are imperfect, but good at avoiding the worst crashes
  - Computers lack common sense; they make mistakes too
- "We have 5 MILLION miles of testing"
  - Proof of saving lives requires 100+ million miles
- "We follow best practices"
  - Companies do not conform to their own industry safety standards
- "Future net risk improvement justifies taking chances"
  - Policies should emphasize a "do no harm" deployment strategy

Regulation for Computer Driver Safety

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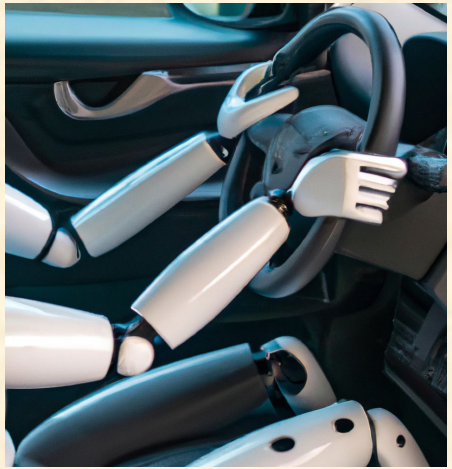
- NHTSA uses a "non-regulatory" approach
  - No rules, no safety tests for automated driving
    - Federal self-certification does not address this area
  - Recalls only after field reports of problems



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- State driver license with no proficiency test
  - Computer drivers should be accountable – just as human drivers are
    - Tort law should apply to crashes, not just product liability
    - Manufacture responsible for computer driver duty of care

Societal Benefit

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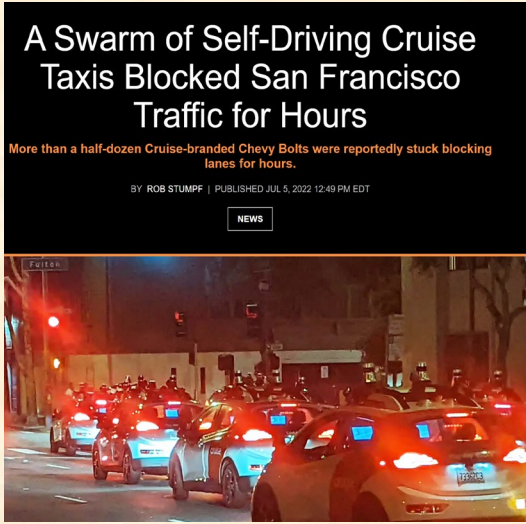
- Benefits accrue only after AVs are safe, reliable, and trusted
  - A lot more work needed to establish those properties
  - Near term, “safe” might mean lower reliability



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- Ask the hard questions
  - Will stated benefits actually occur?
    - Does PUC require accessibility, equity?
  - What public costs will there be right now?
    - Ride hail & delivery driver displacement
    - Congestion and blocked emergency responders
    - Risk of harm from still-under-development software on public roads

Recommendations To Cities

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- **Require outcome-based metrics**
  - Should be no fatality at all for several years
  - Report injuries, crashes, road rule violations
  - Report emergency response disruption
  - ➢ Need to be able to audit self-reports
  - ➢ Includes deployment, not just initial testing

Two Waymo Cars Block San Francisco Traffic Again As Robotaxi Stalling Incidents Rise 300 Percent

The self-driving cars were left motionless by heavy San Francisco traffic due to the Pride Parade and Giants game on Sunday.

By **Adam Ismail**

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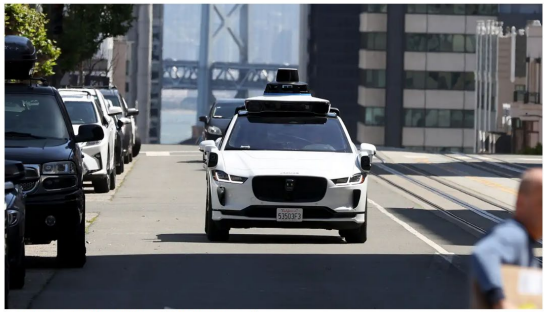

Photo: Justin Sullivan (Getty Images)

- **Safety & Trust come from transparency**
  - Technology will not succeed without public trust
  - Trust must be earned on a continual basis