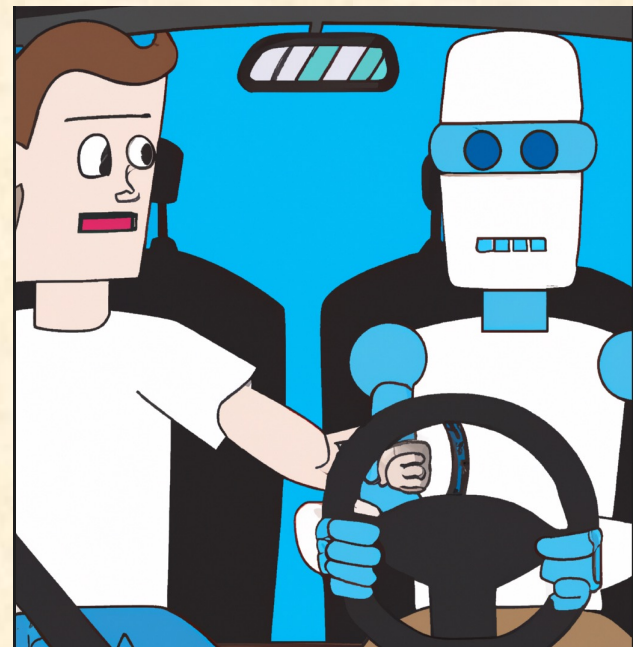


- **Statistical safety isn't enough**
 - Need more than Positive Risk Balance
- **Tort Law To the Rescue!**
 - (Really? Am I actually saying this???)
 - (Yes, really. I am. Seriously. Note: IANAL.)
- **Defining a legal “Computer Driver”**
 - Map “Computer Driver” onto “driver”
 - Then apply existing human driver rules
 - Similar idea to “electronic signature” → “signature”



[Dall-E]

■ “Positive Risk Balance”

- On average, no worse than a human driver

■ Sounds great, but what about:

- Redistribution of fatalities
 - What if more pedestrians, cyclists die?
- Known fatal software defects not fixed
 - Even if total fatalities decrease, is that OK?
- Fatalities due to breaking traffic rules
 - Humans break rules too. But they are held accountable via negligence.



■ Regulators struggling to evaluate safety outcomes in advance

- Product liability is what car makers say will provide “safety guard rails”

Product Liability Is Not Enough

■ Manufacturers are pushing for only product liability

- Manufacturing defect, design defect, etc.
- Product proven to present undue risk

■ Difficult and expensive to prove

- Source code analysis expensive + painful
- Class action requires commonality
 - With weekly neural network updates?
- Poor Machine learning explainability?

■ Does this make sense if the car ran a red light and crashed?

Mercedes To Accept Liability When Autonomous Drive Pilot Is Engaged

Drive Pilot is a Level 3 system, and Mercedes will be the first automaker to accept legal responsibility when such a system is active.



Tort Law To the Rescue!

■ Autonomous Vehicle regulation purgatory

- Equipment is still maturing
 - Equipment regulation lagging
- Industry screaming: “don’t stifle innovation!”
 - National competitiveness messaging, etc.
- 10+ years to robust equipment regulation

■ But we’re seeing human-driver-like crashes

- The ones promised to be impossible!

■ Tort law can bridge the gap

- Need “guard rails” on safety in the interim
- Traditional role of tort law: incentivize safer practices



■ Civil Tort Law

- Compensate a claimant who has suffered loss ... proximately caused by ... the negligence of another party.

■ Key idea: Duty of Care

- A human driver has Duty of Care to other road users
 - Breach of this duty of care → negligence
- Must act as a “reasonable person” would act
 - A theoretical competent, unimpaired person, according to a jury
 - Per incident – statistical safety does not avoid negligence



<https://bit.ly/3KO9Ppe>

Reasonable Computer Driver

■ “Computer Driver” approach:

- When a Computer Driver is driving, it owes a same Duty of Care as a Human Driver would in that situation.
- The manufacturer is responsible for any breach of Duty of Care.

■ Notes:

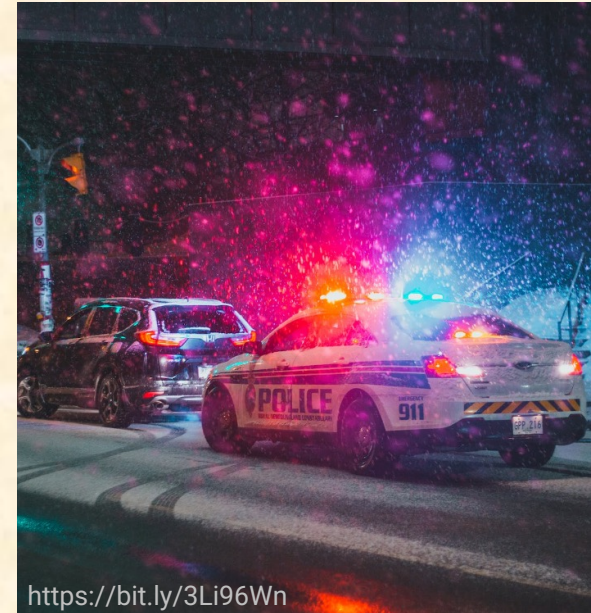
- “Computer Driver” – equipment that is driving
- “Driving” – sustained control of steering
 - Includes supervised automation features
- Manufacturer is in best position to fix dangerous behavior



[Dall-e]

Effects on Regulations

- **“Computer Driver” and US Congress:**
 - US Congress statute proposal:
Computer drivers owe duty of care...
... and manufacturer is responsible party.
 - Independent of equipment regulation
- **US States apply their existing tort law**
 - If law/regulation/etc. says “driver” ...
it also means “computer driver”
 - Violating a traffic rule is typically negligent
 - Barring special circumstances.
 - See “negligence per se” (breaking laws is negligent)



- **Most crashes can be handled by tort law**
 - Computer Driver that runs a red light ...
... held to same rules as if a Human Driver
 - Do we really need source code analysis for this?
 - Avoids overwhelming courts with product liability
 - Straightforward fix without rewriting existing law
 - Analogous to “electronic signatures” → signatures
- **Financial pressure for safe driving behavior**
 - Same rules for Computer & Human Driver behavior
 - Manufacturer bears costs from any unsafe driving
 - **Need more for acceptable safety at scale! But this is a start.**



<https://bit.ly/46oAYkn>

- Liability-based proposal for AV regulation & podcast
 - <https://safeautonomy.blogspot.com/2023/05/a-liability-approach-for-automated.html>
- Video lecture series on autonomous vehicle safety:
 - Keynote AV Safety overview video : https://youtu.be/oE_2rBxNrFc
 - Mini-course: <https://users.ece.cmu.edu/~koopman/lectures/index.html#av>
- “Safe Enough” book & talk video:
 - <https://safeautonomy.blogspot.com/2022/09/book-how-safe-is-safe-enough-measuring.html>