The Role of People in Increasingly Autonomous Truck Systems

John D. Lee



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 Automation does not eliminate people (or errors), but changes their roles (and errors)

Beyond interface design:

A systems perspective to supporting workers

Trucks as a network, not independent units

Automation does not eliminate people, but changes their roles

- Not all driving is the same
- Truck drivers do more than drive
- Automation eliminates tasks,

but also generates tasks (and errors)

Not all driving is the same



Truck drivers do more than drive



Automation introduces new tasks and new errors









Human and automation errors

Automation-related Fatalities?

37,461 Fatalities (2016) 94% Human error

- Alcohol
- Speeding
- Distraction
- Drowsiness

Human and automation errors: Automation may be more safe, but feel less safe

- Dread risk—Risks that are uncontrollable and unobservable
- Dread risk ~1000XActual Risk



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Khalil Sehnaoui 🔗 @sehnaoui · May 26 💊 Vhen the elevator button falls off and you realize "Door Close" was always a lie.



Trust in automation depends on stories not statistics

- Overconfidence leads to harshly judging automation errors and not appreciating automation successes
- Availability heuristic makes truck crashes seem common
 - 1 crash with 100 deaths
 ≠
 100 crashes with 1 death each

Opaque automation fosters distrust



Roomba:

The "autonomous" cleaner

- Rude to bystanders
- Requires infrastructure adjustments
- Unintended reconfigurations
 cause problems
- Dutifully attempts the impossible

Changes my role in cleaning, but does not replace



Lee, J. D., Wickens, C. D., Liu, Y., & Boyle, L. N. (2017). Designing for People: An introduction to human factors engineering. Charleston, SC: CreateSpace.

Beyond the interface: A systems perspective to supporting workers Job Design



Lee, J. D., Wickens, C. D., Liu, Y., & Boyle, L. N. (2017). Designing for People: An introduction to human factors engineering. Charleston, SC: CreateSpace.

Trucks as networks



Trucks as networks: Driving as social interactions with others



(a) Trucks as networks: Congestion as network disruptions





Chen, D., Ahn, S.*, Laval, J., Zheng, Z., 2014. On the periodicity of traffic oscillations and capacity drop: the role of driver characteristics. Transportation Research Part B 59, 117-136.

Trucks as networks: Market "glitches" as an explanation



Trucks as networks: Networks within the vehicle

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