Automated driving in urban areas: A conceptual framework based on the literature

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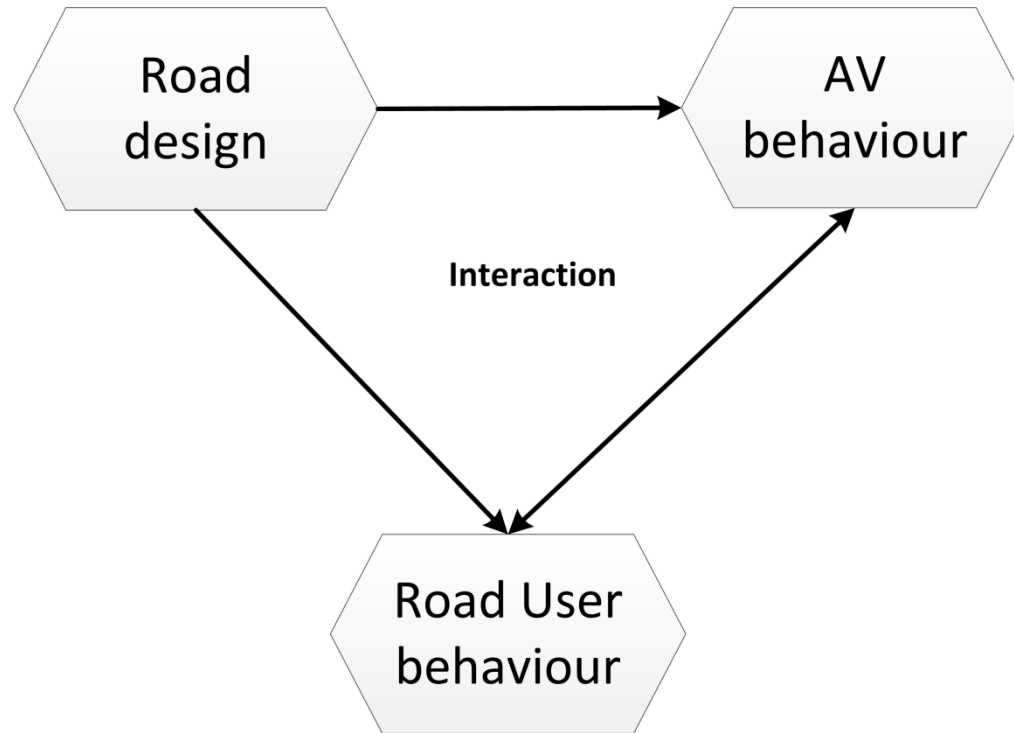
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Content

- Main Focus

- Background
  - Automated vehicles
  - Human Factors
  - Infrastructure

- Conceptual Framework

- Knowledge Gaps & Research Questions

Main Focus

Automated Vehicles

- What are AVs?

- How?

- Appearance

- Communication?

- Difference self-driving car?

Automation levels of AVs

	Human Driver Monitors Environment			System Monitors Environment		
	0 No Automation — The absence of any assistive features such as adaptive cruise control.	**1** Driver Assistance — Systems that help drivers maintain speed or stay in lane but leave the driver in control.	**2** Partial Automation — The combination of automatic speed and steering control—for example, cruise control and lane keeping.	**3** Conditional Automation — Automated systems that drive and monitor the environment but rely on a human driver for backup.	**4** High Automation — Automated systems that do everything—no human backup required—but only in limited circumstances.	**5** Full Automation — The true electronic chauffeur: retains full vehicle control, needs no human backup and drives in all conditions.
Who steers, accelerates and decelerates	Human driver	Human driver and system	System	System	System	System
Who monitors the driving environment	Human driver	Human driver	Human driver	System	System	System
Who takes control when something goes wrong	Human driver	Human driver	Human driver	Human driver	System	System
How much driving, overall, is assisted or automated	None	Some driving modes	Some driving modes	Some driving modes	Some driving modes	All driving modes

(Schladover, 2016)

Human Factors

Drivers of Automated Vehicles

- Adaptation (De Winter, Happee, Martens, & Stanton, 2014)

- Trust after take over situations (Gold, Körber, Hohenberger, Lechner, & Bengler, 2015)

Other Road Users

- Acceptance (Bazilinskyy, Kyriakidis, & de Winter, 2015)

- Drivers of others cars → adaptation (Gouy, Wiedemann, Stevens, Brunett, & Reed, 2014)

Theory of Planned Behaviour

(Ajzen, 1991)
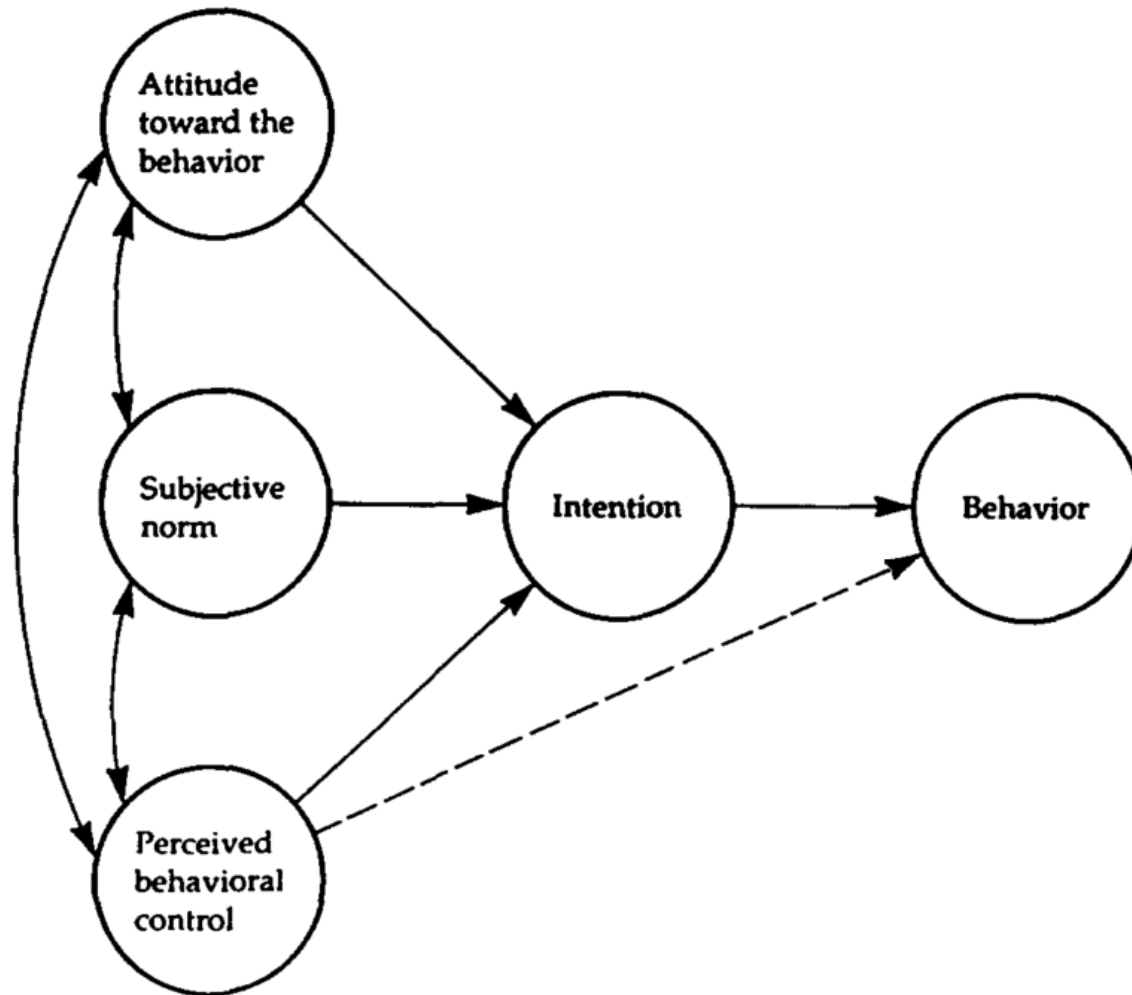
Infrastructure

Automated vehicles (for example)
- Fleet of vehicles ↓
- Traffic flow ↑
- Needed parking space ↓

- Adaptation of road users to infrastructure
- Self-explaining roads (Theeuwes & Godthelp, 1995)

Conceptual Framework
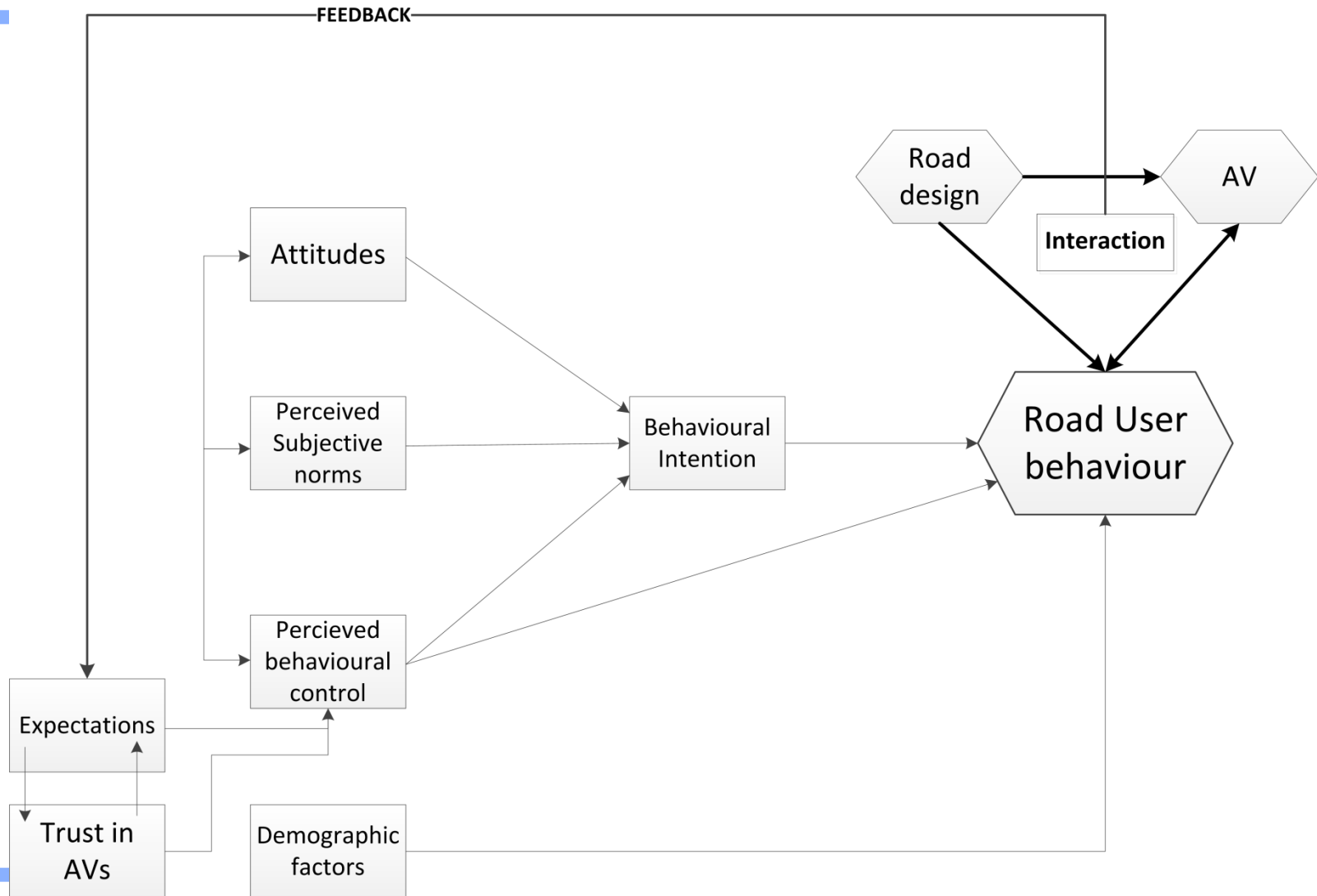
Knowledge Gaps

(Vulnerable) road users
- Will they adapt? How?
- What do they expect of automated vehicles?
- Trust in automated vehicles?

Infrastructure
- Does it need to change based on what we know about road users? How?

Interactions
- How will the interactions (road user – automated vehicle – infrastructure) look like?

Research Questions

How will the interactions between automated vehicles and other road users look like?

How can the interactions be improved by altering the road design?

Thank you.

Spatial and Transport Impacts of Automated Driving

Are you going? Or should I go?

You go first.

What if I point a lot and flail my arms around?

This is confusing.

Wait, maybe you should go.

Let's just sit here and reflect.

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