Understanding Automation Surprise in Non-Critical Highly Automated Driving: An Initial On-Road Probing Study

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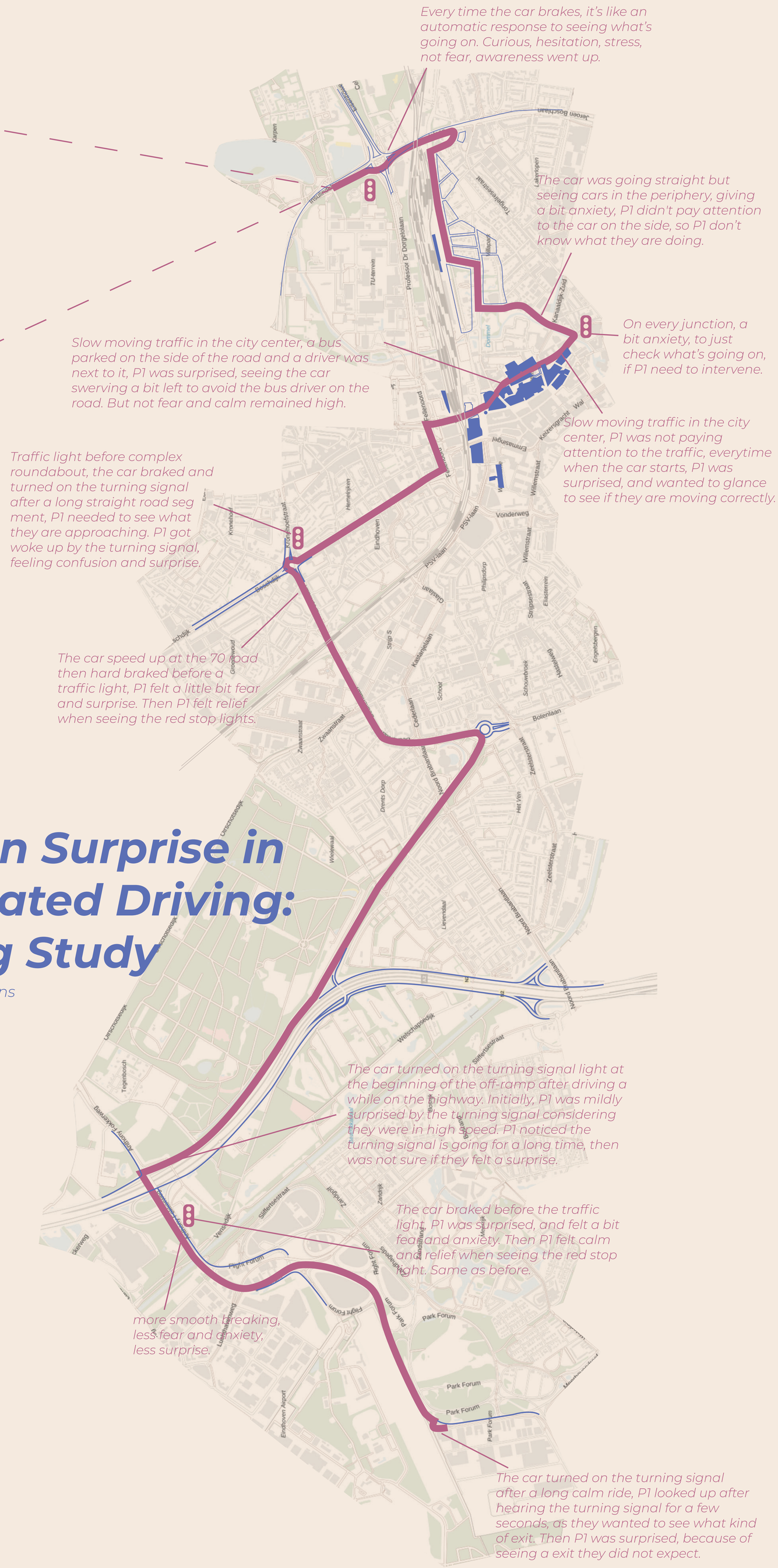
// Introduction

Automation Surprise (AS) occurs when a user fails to anticipate or understand the automated vehicle's behaviours. While often studied in critical safety situations, this study explores AS in non-critical automated driving conditions where users engage in non-driving-related activities (NDRAs). We aim to refine the understanding of AS in the context of AVs, expanding it beyond safety and operational aspects to encompass a comprehensive user experience perspective, addressing the nuances of daily scenarios.

// Methodology

On-road probing study using a Wizard of Oz setup, with the think-aloud method (with participants verbalize their experiences. Data were collected on a predefined route around Eindhoven, Netherlands. Audio transcripts were annotated to capture moments of AS, emotional reactions, and contextual factors.



// Initial Findings

- *Participants experienced surprise due to unexpected car movements, both at high and low speeds, especially after periods of steady driving.*
- *Changes in road conditions and sudden use of turn signals added to this surprise, heightened by prolonged focus on non-driving activities.*
- *Participants wanted more information to understand the car's actions, which helped reduce stress and anxiety.*
- *Familiarity with scenarios reduced surprise over time.*
- *Even in slow traffic, participants were caught off guard when not fully attentive, despite alternating between observing their surroundings and NDRAs.*

// Next Step

Our next step is to leverage insights from this initiative and proceed to a full-scale study involving larger and more diverse participant samples. This will enable us to validate and refine our understanding of AS, facilitating the development of comprehensive AS mitigation strategies in future designs that are rooted in user experience insights.

▲ annotated portfolio