

Literature Review and Identify Problems

Although many car manufacturers have promoted that they have built L4 and even L5 level autonomous vehicles, these vehicles can only drive on fixed routes or specific cities. In view of achieving full autonomous driving, much investment is required to update infrastructure and train models. At the same time, many surveys and studies have shown that the accident rate per million kilometers of self-driving cars is higher than that of human-driven cars. At present, autonomous driving technology still has considerable shortcomings in terms of safety. I do not think fully autonomous driving will be achievable within the next few decades. Human-led driving will still dominate. Therefore, this topic still has practical significance

When humans are driving vehicles, the problem of information overload is particularly prominent in the development of intelligent transportation systems (ITS). Currently, vehicle-mounted intelligent systems are becoming more intelligent and convenient, which means that drivers can obtain various information by interacting with the vehicle-mounted system. For example, they can request the vehicle-mounted system to play specific music through voice control, and provide designated contacts to make phone calls, receive emails, and more.

However, if the in-vehicle system cannot accurately distinguish the current background, it may automatically activate some unrelated functions at inappropriate times, such as broadcasting incoming emails on the highway, news unrelated to road conditions, etc., which means that the driver may temporarily accept a large amount of irrelevant information in a brief period. Although the in-car system aims to provide a more efficient, convenient, and intelligent road experience, at the same time, drivers often face the challenge of information overload when interacting with these systems. Drivers need to process information from multiple sources, such as navigation instructions, traffic conditions, vehicle health status, entertainment options and communication with other drivers. Information overload can lead to distraction, delayed decision-making and even an increased risk of accidents, so steps need to be taken to improve the situation. Many researchers have focused on this phenomenon, as follows.

Researchers have observed that “Connected systems must be specifically optimized for the in-car experience and thoughtfully integrate eyes-free and hands-free voice and content capabilities from the perspective of the driver. To help minimize distraction, these systems need to adapt to the human behind the wheel versus forcing people to adapt to them in unnatural and unsafe ways” (Masterson. 2014 p. 9).

Drivers must shift their attention to processing multiple information sources, such as checking GPS navigation, answering calls, adjusting music, etc. This distraction can lead to inattention, increasing the risk of road accidents (Strayer et al., 2013).

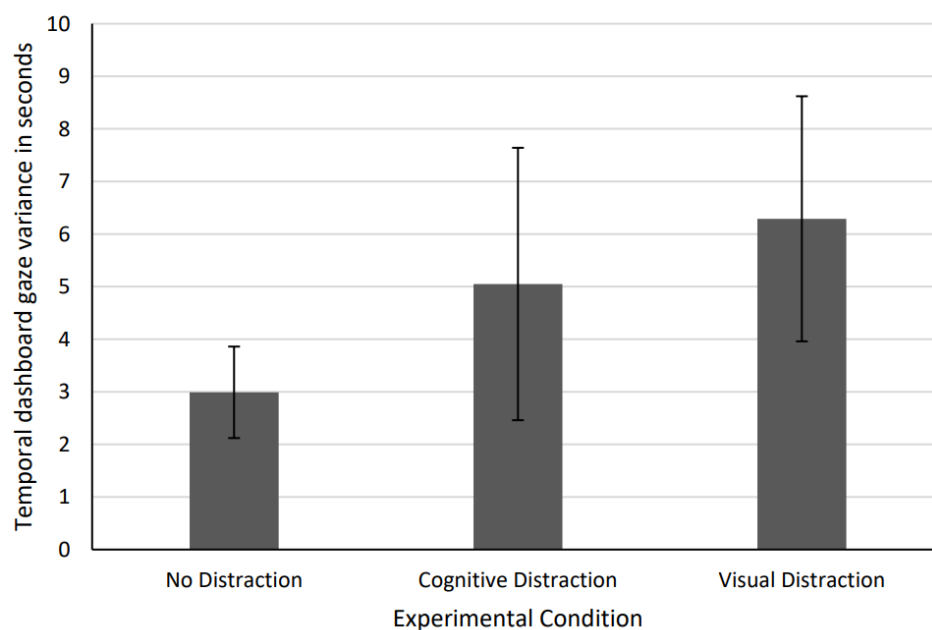


Figure 1. Average temporal dashboard gaze variance over all participants sorted by experimental segments (Marx et al., 2022).