



PSYLINGXAV

A PSYCHOLINGUISTICS DESIGN FRAMEWORK FOR XAI IN AUTOMATED VEHICLES

ASHKAN Y. ZADEH, XIAOMENG LI, ANDRY RAKOTONIRAINY, RONALD SCHROETER, AND SEBASTIEN GLASER

CENTRE FOR ACCIDENT RESEARCH & ROAD SAFETY - QUEENSLAND (CARRS-Q), QUEENSLAND UNIVERSITY OF TECHNOLOGY, AUSTRALIA

TOPIC

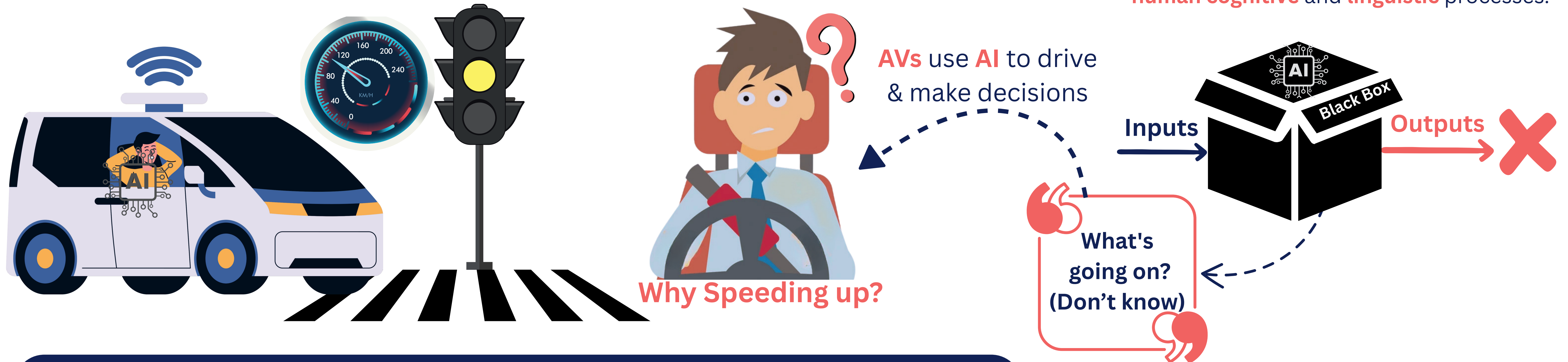
How should **Automated Vehicles (AVs)** explain their decisions?

AIM

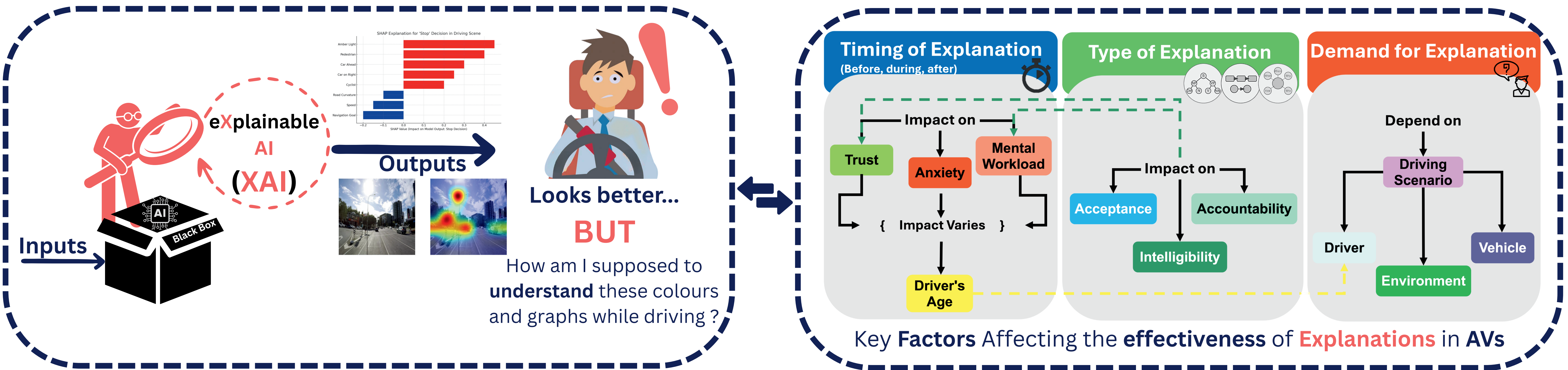
Leveraging **Psycholinguistic** principles to design **intuitive** and **human-centred** explanations in AVs.

MOTIVATION

XAI research in AVs often prioritises decision **transparency** over alignment with **human cognitive** and **linguistic** processes.



SOLUTION: EXPLAINABLE AI (XAI)



OUR APPROACH: XAI + PSYCHOLINGUISTICS

Example of Psycholinguistics usage in AVs explanation

Option A) Car approaching an intersection with a green light, continuing straight. The light turns amber just as we reach the stop line—it's safer to proceed than stop suddenly.

Option B) Amber light! car behind! speed up!

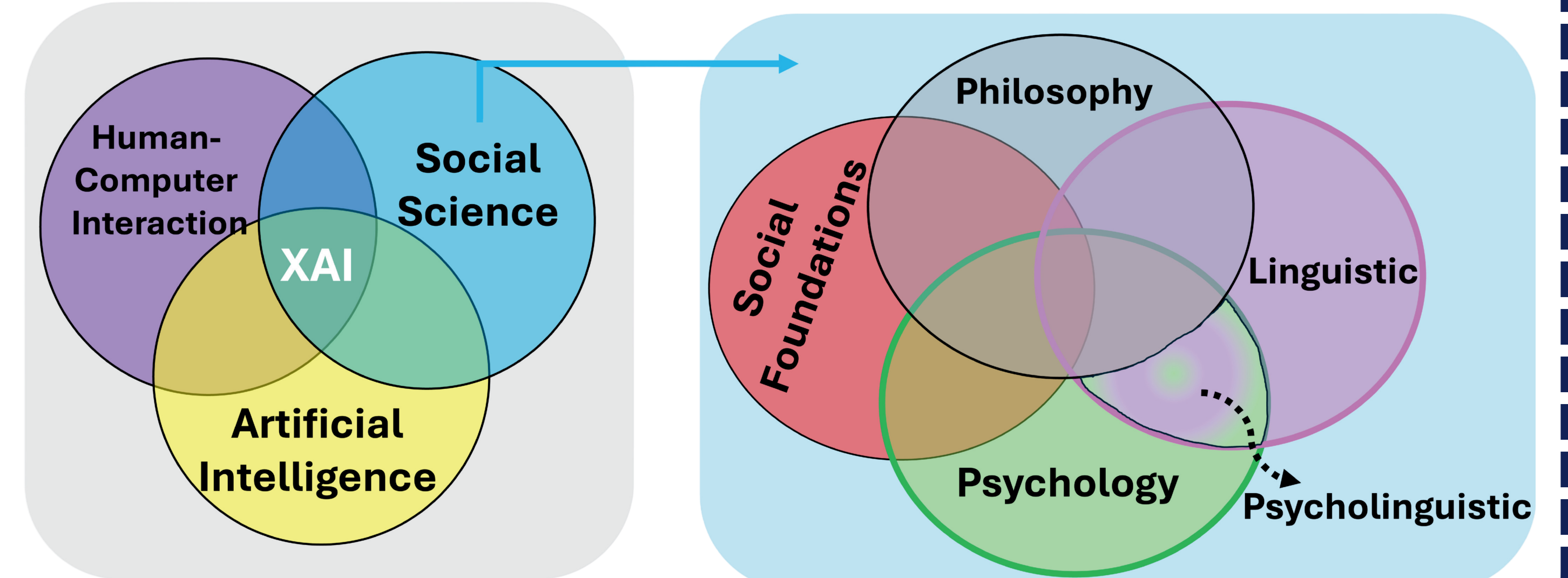
Option C) I'm too close to stop safely, and there's a car behind me, so I continue through.

Too long!

Too short!



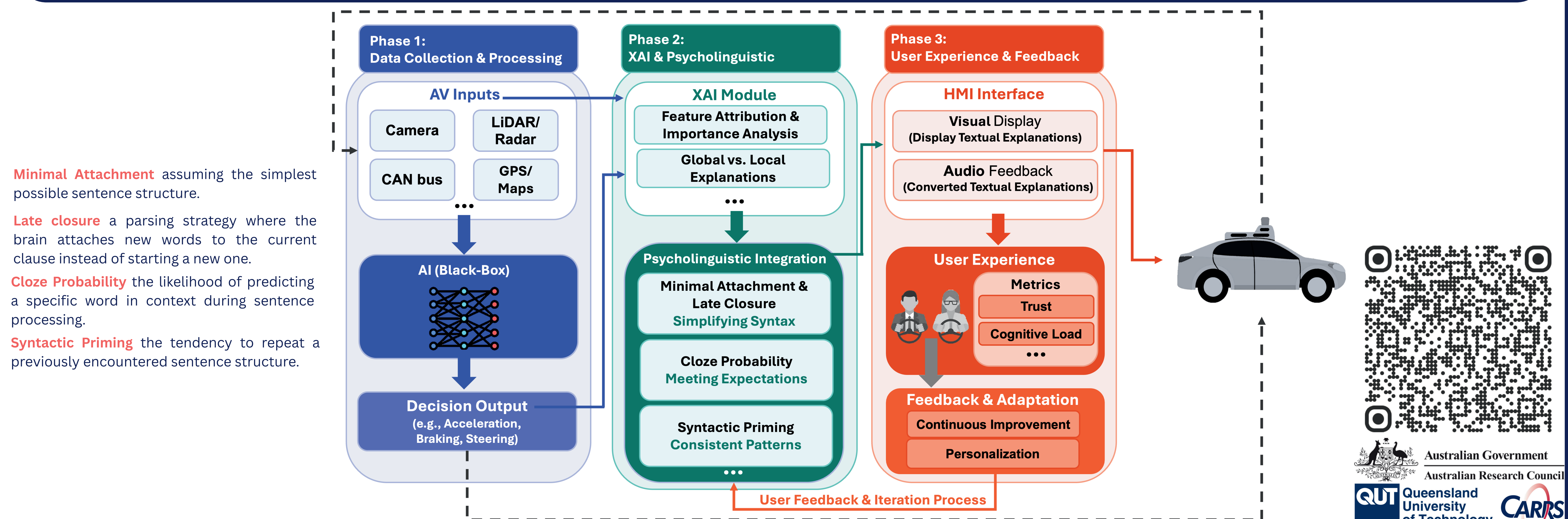
Psycholinguistics is a field that brings together psychology and linguistics to better understand human language, focusing on processes such as perception, memory, attention, learning, and problem-solving [1].



Scope of XAI [2] highlighting the position of Psycholinguistics

[1] MacWhinney, B. J. (2001). Psycholinguistics: Overview. International encyclopedia of the social & behavioural sciences, 18, 12343-12349.
[2] Miller, T., 2019. Explanation in artificial intelligence: Insights from the social sciences. Artificial intelligence, 267, pp.1-38.

PSYLINGXAV DESIGN FRAMEWORK



Minimal Attachment assuming the simplest possible sentence structure.

Late closure a parsing strategy where the brain attaches new words to the current clause instead of starting a new one.

Cloze Probability the likelihood of predicting a specific word in context during sentence processing.

Syntactic Priming the tendency to repeat a previously encountered sentence structure.

