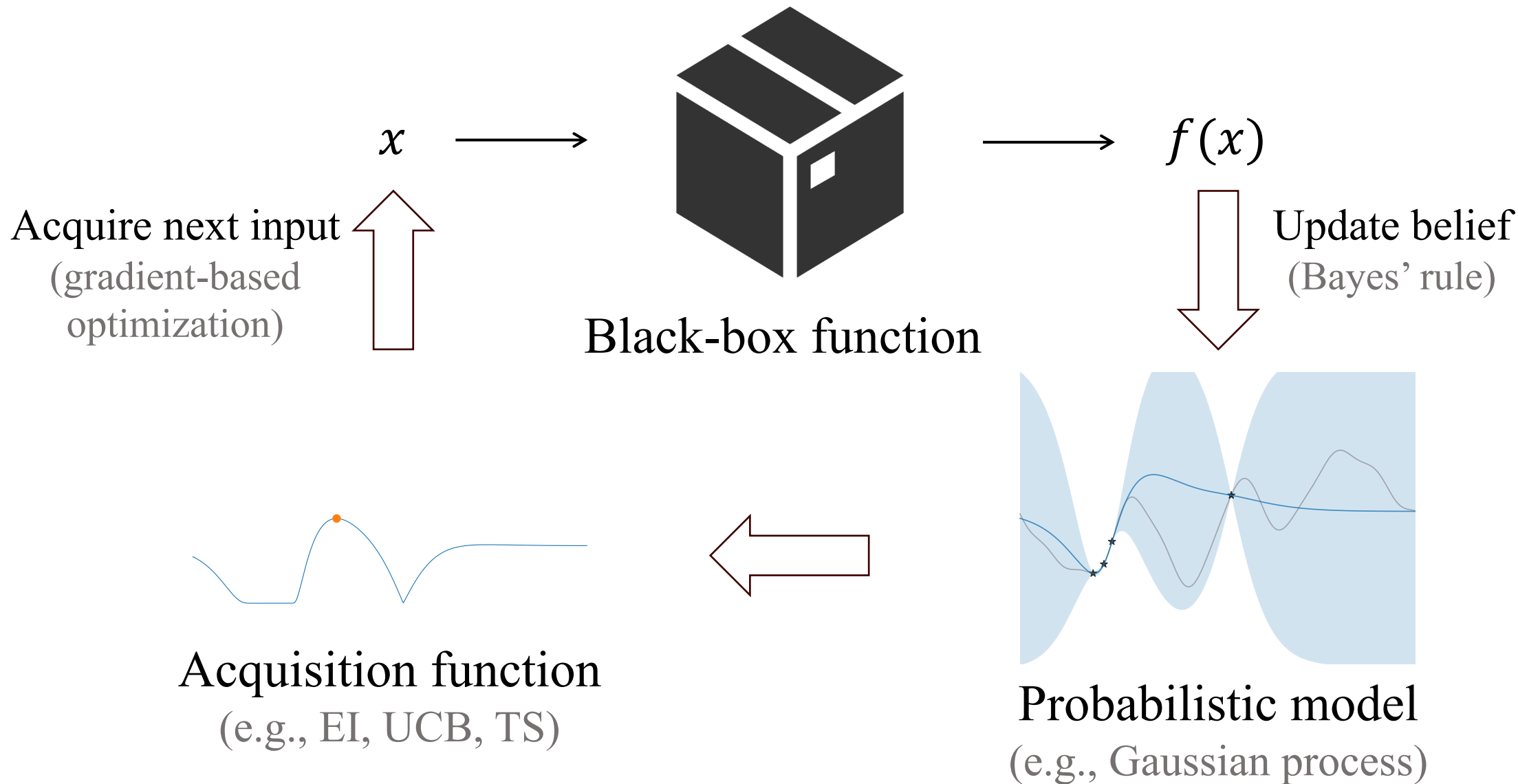
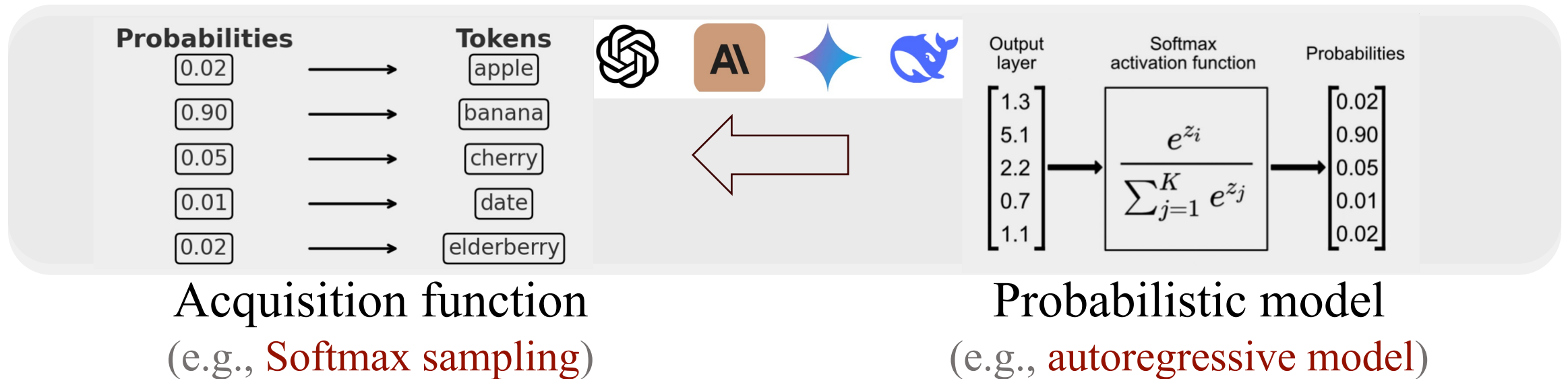
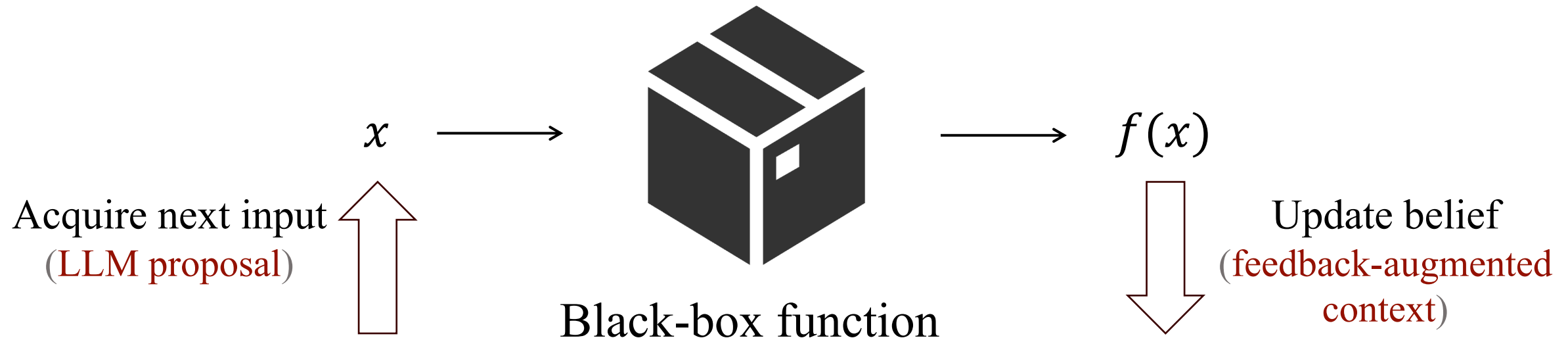


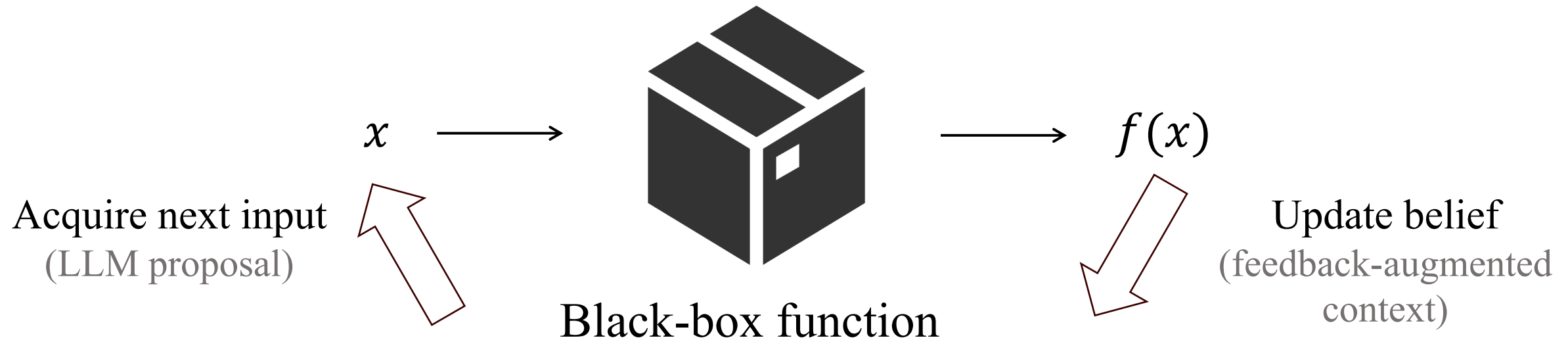
Recap: Bayesian Optimization



Ongoing: LLM-Driven Black-Box Optimization

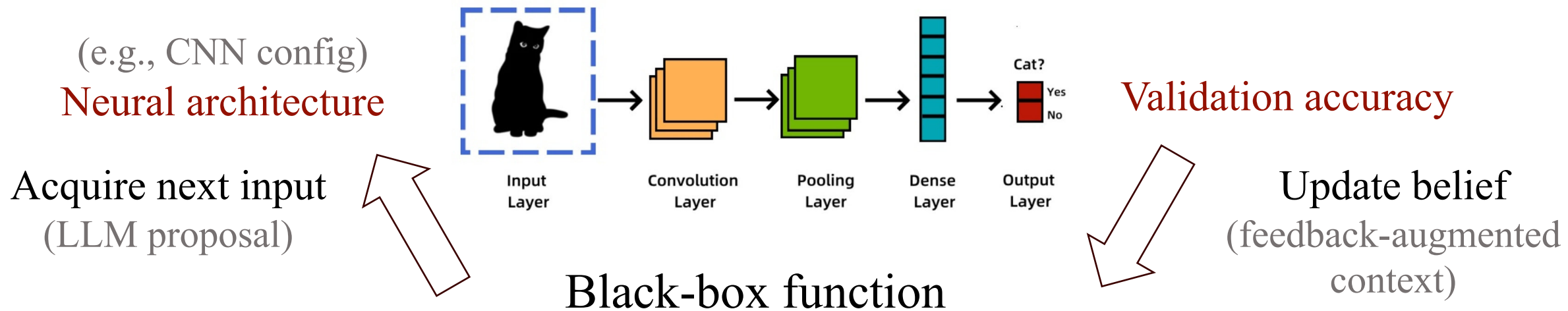


Ongoing: LLM-Driven Black-Box Optimization



Large language model

Existing LLM-Driven Method: GENIUS

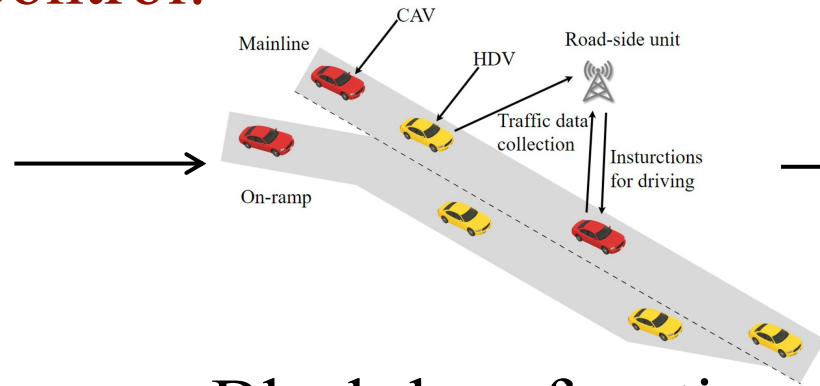


Large language model

Challenge: Diverse Data Sources in RL

Mixed-autonomy traffic control:

Neural architecture
(RL state representation)



Average speed

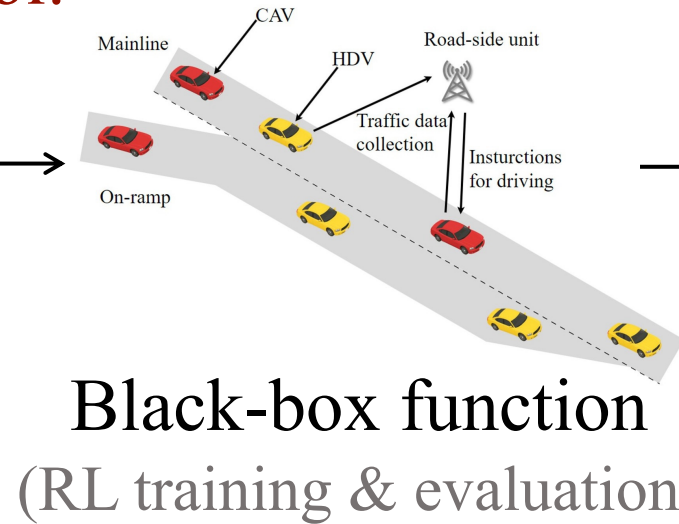
Black-box function
(RL training & evaluation)

Challenge: Diverse Data Sources in RL

Mixed-autonomy traffic control:

Composite neural architecture
(FFN & Transformer config)

for vector &
time-series data



Average speed

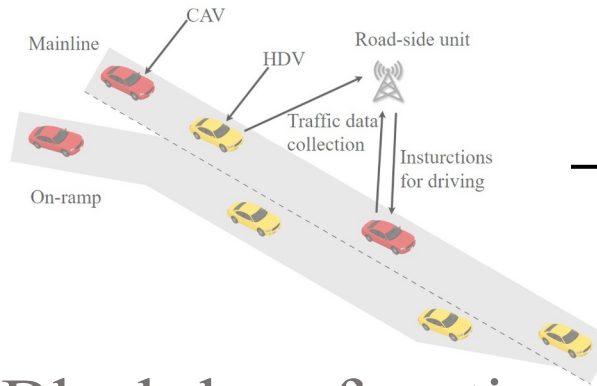
- Current traffic state
 - Temporal traffic evolution
 - Vehicle sequence history
- Vector
- Time-series

Challenge: Diverse Data Sources in RL

Mixed-autonomy traffic control:

Composite neural architecture
(FFN & Transformer config)

for vector &
time-series data



Average speed

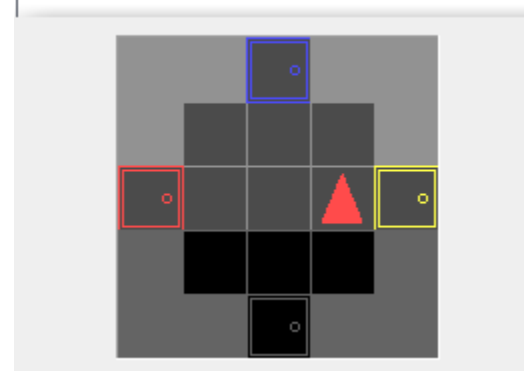
Black-box function
(RL training & evaluation)

Goal-oriented tasks:

Composite neural architecture
(CNN & GRU config)

for image & text data

Mission: go to the red door



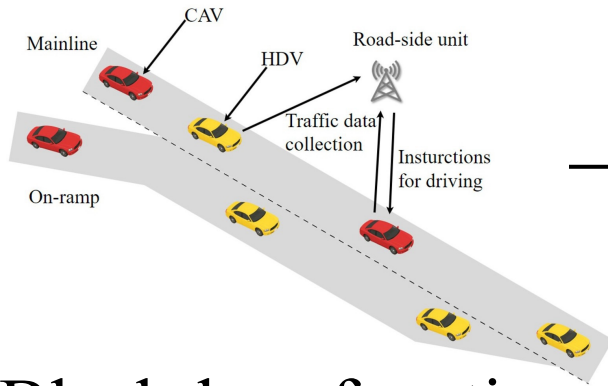
Average reward

- Image observation
- Textual instruction

Composite Neural Architecture Search

Mixed-autonomy traffic control:

Composite neural architecture



Average speed

Acquire next input
(LLM proposal)

Black-box function
(RL training & evaluation)

Update belief
(feedback-augmented context)

Can side info help?



ChatGPT



Gemini



deepseek



Claude

Large language model

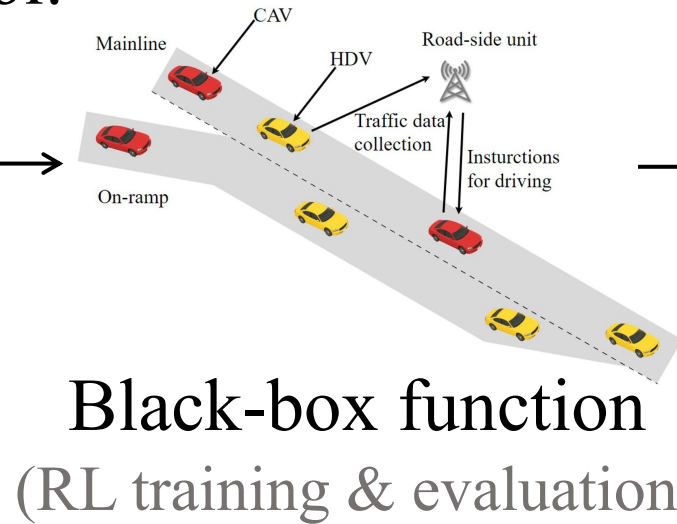
Side Info: Representation Quality

Mixed-autonomy traffic control:

Joint work with Yu Yu and Li Jin (SJTU)

Composite neural architecture
(FFN & Transformer config)

representation
quality?



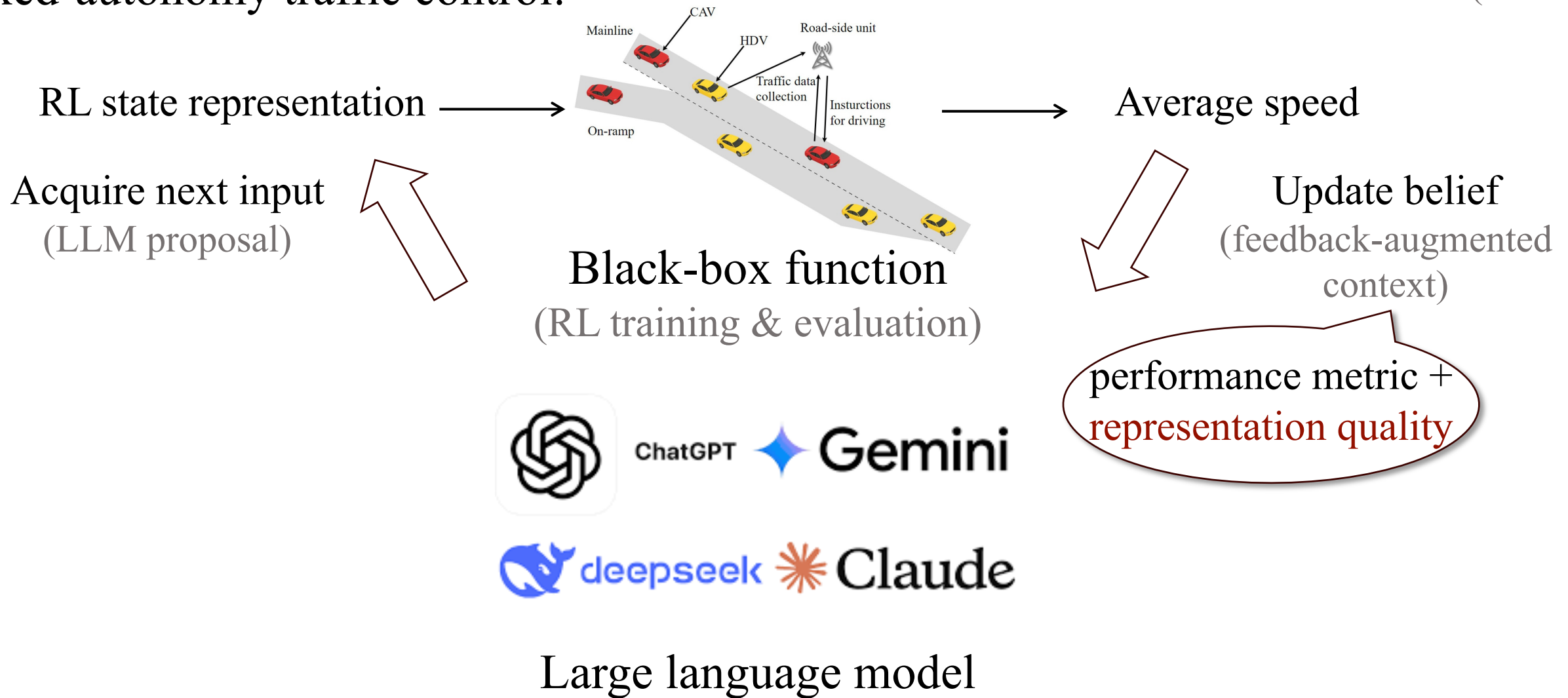
Average speed

- Current traffic state
 - Temporal traffic evolution
 - Vehicle sequence history
- Vector
- Time-series

Our LLM-Driven Method: Incorporate Side Info

Mixed-autonomy traffic control:

Joint work with Yu Yu and Li Jin (SJTU)

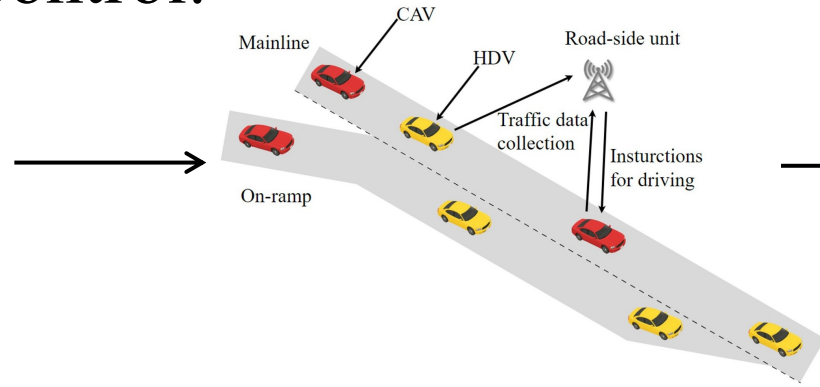


Our LLM-Driven Method (LACER) vs Baselines

Mixed-autonomy traffic control:

Joint work with Yu Yu and Li Jin (SJTU)

RL state representation



Average speed

