

Why Did the Robot Do That?

Stephanie Rosenthal, PhD



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Why Did the Robot Do That?

Stephanie Rosenthal, PhD

Prof. Siddhartha Srinivasa (RI)

Prof. Manuela Veloso (ML)

Robot Complexity



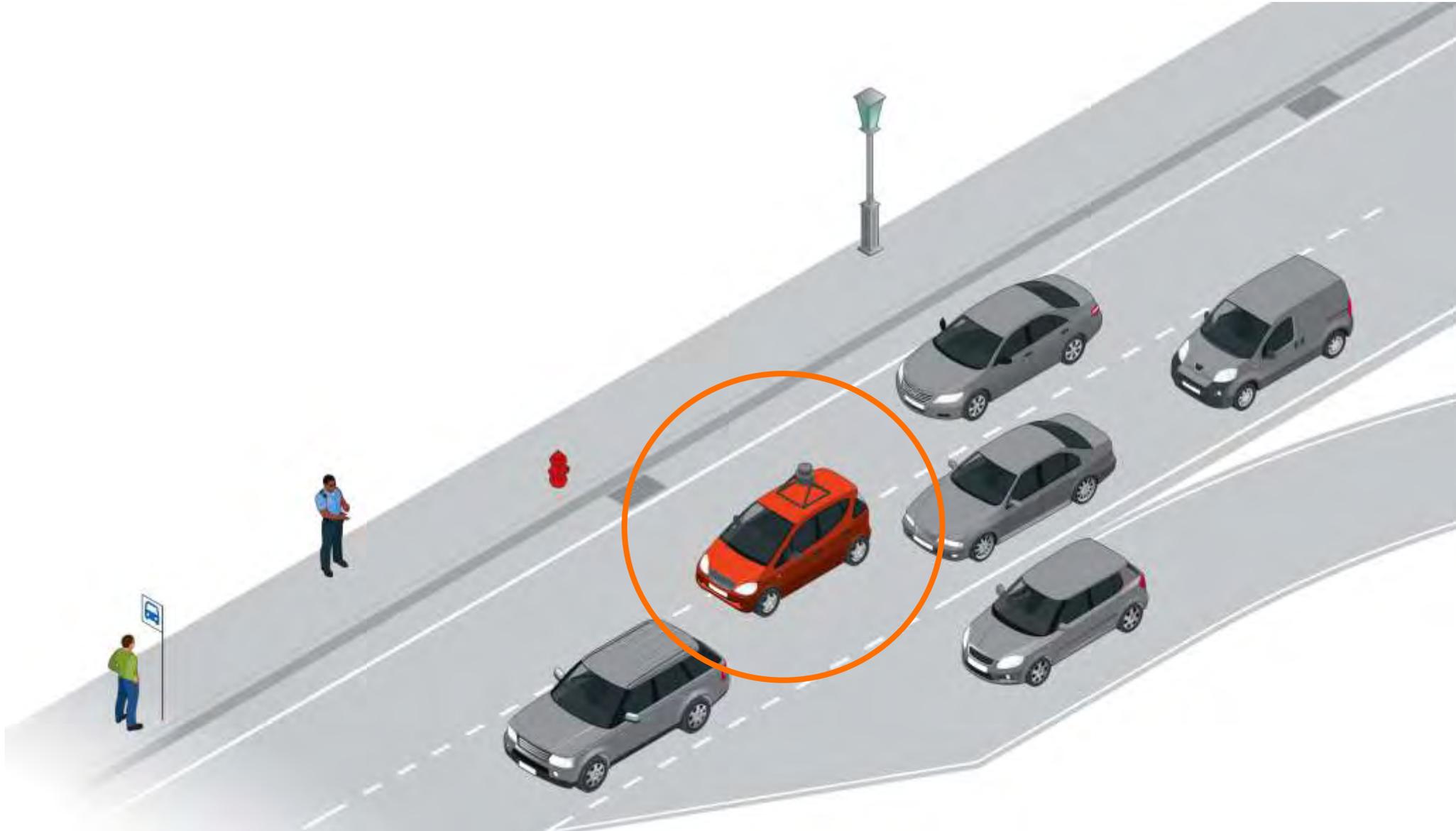
Photo Credit: <http://www.digitaltrends.com/cars/uber-pittsburgh-robo-taxi-experiment/>

Trust in Robot Performance

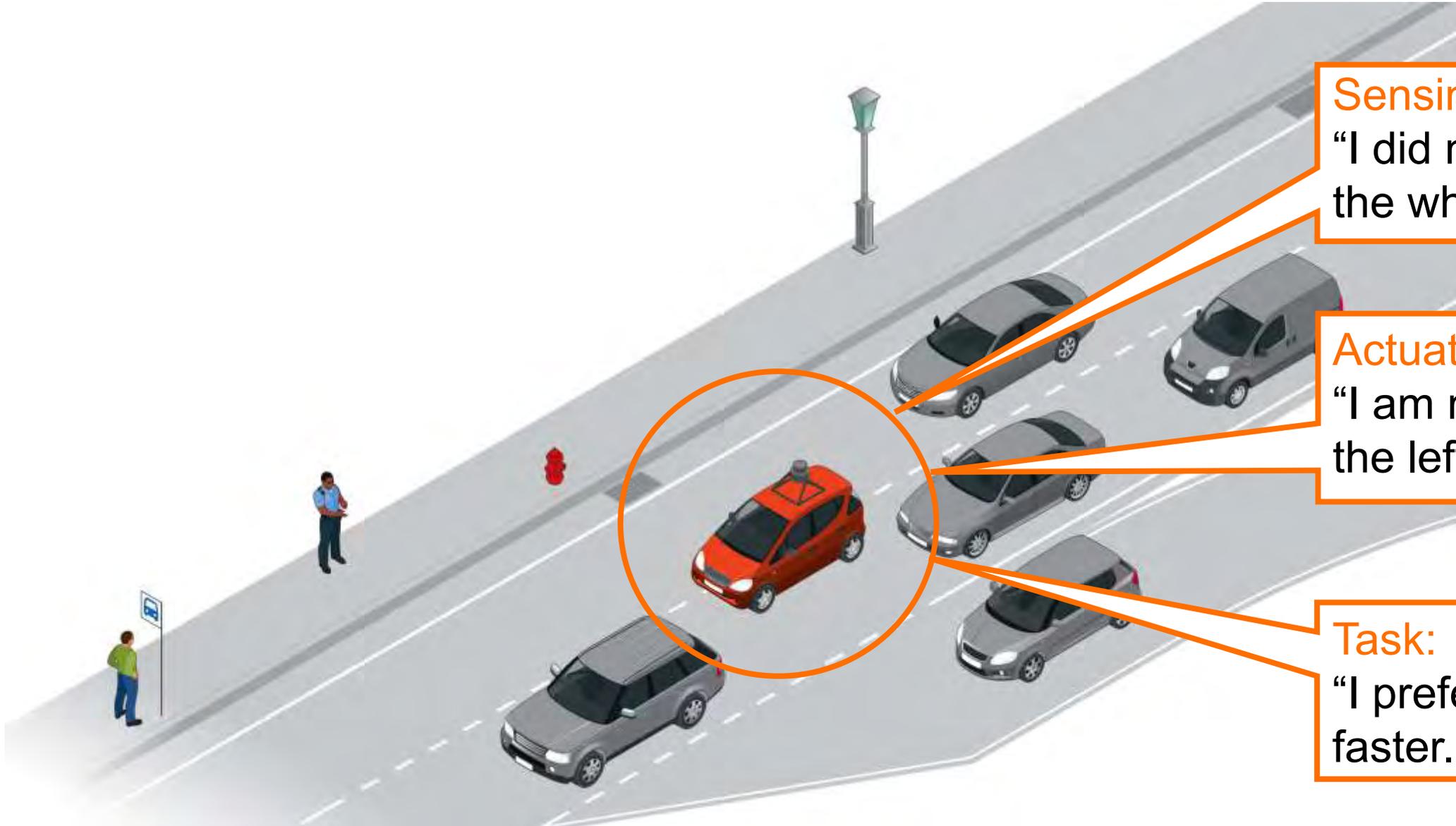


Photo Credit: AP

Why Did the Robot Do That?



Why Did the Robot Do That?



Sensing:
"I did not see the white line."

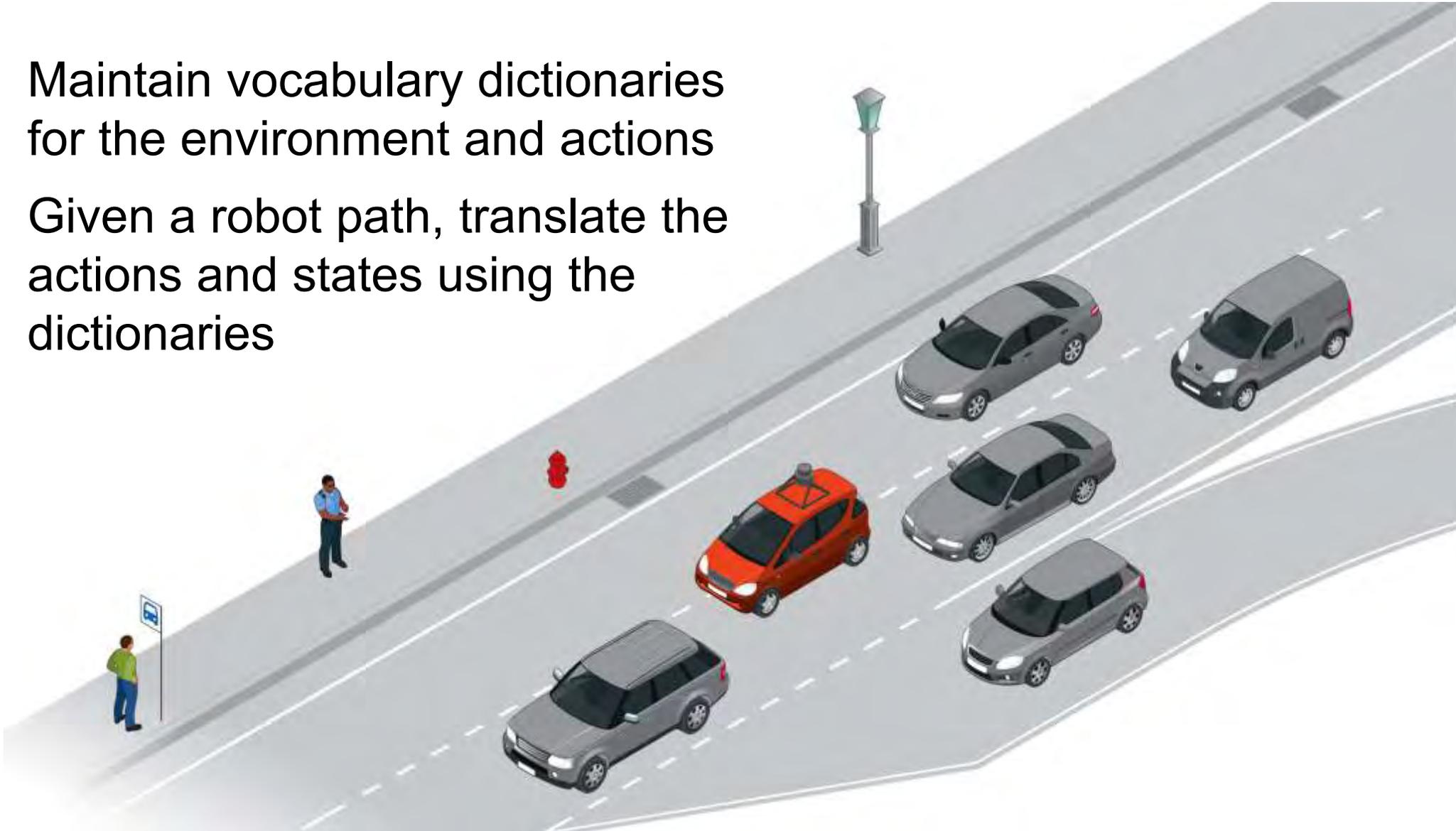
Actuation:
"I am merging to the left."

Task:
"I prefer to drive faster."

Actuation Verbalization

Maintain vocabulary dictionaries for the environment and actions

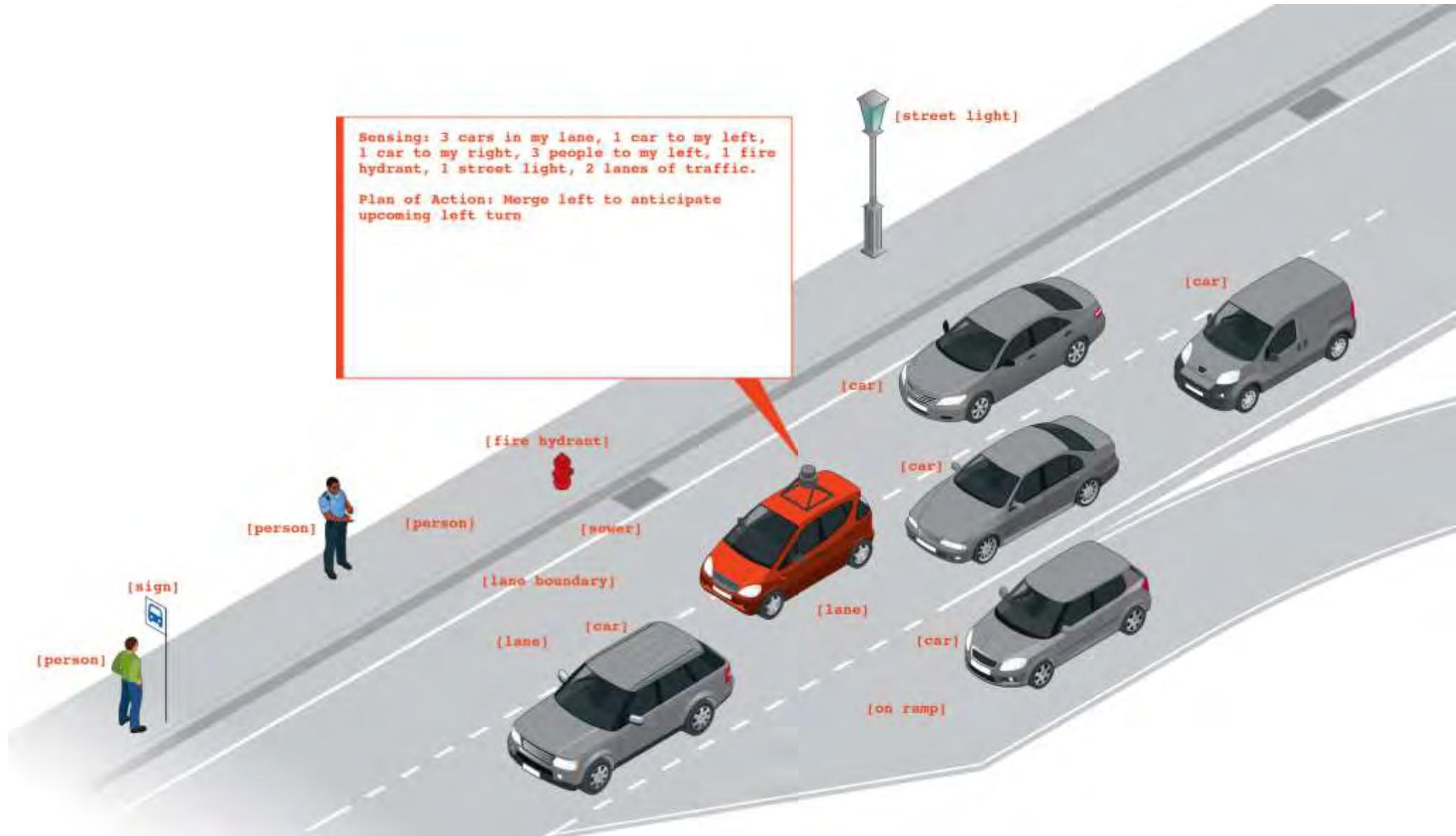
Given a robot path, translate the actions and states using the dictionaries



Actuation Verbalization

Sensing: 3 cars in my lane, 1 car to my left,
1 car to my right, 3 people to my left, 1 fire
hydrant, 1 street light, 2 lanes of traffic.

Plan of Action: Merge left to anticipate
upcoming left turn



Verbalization in Practice



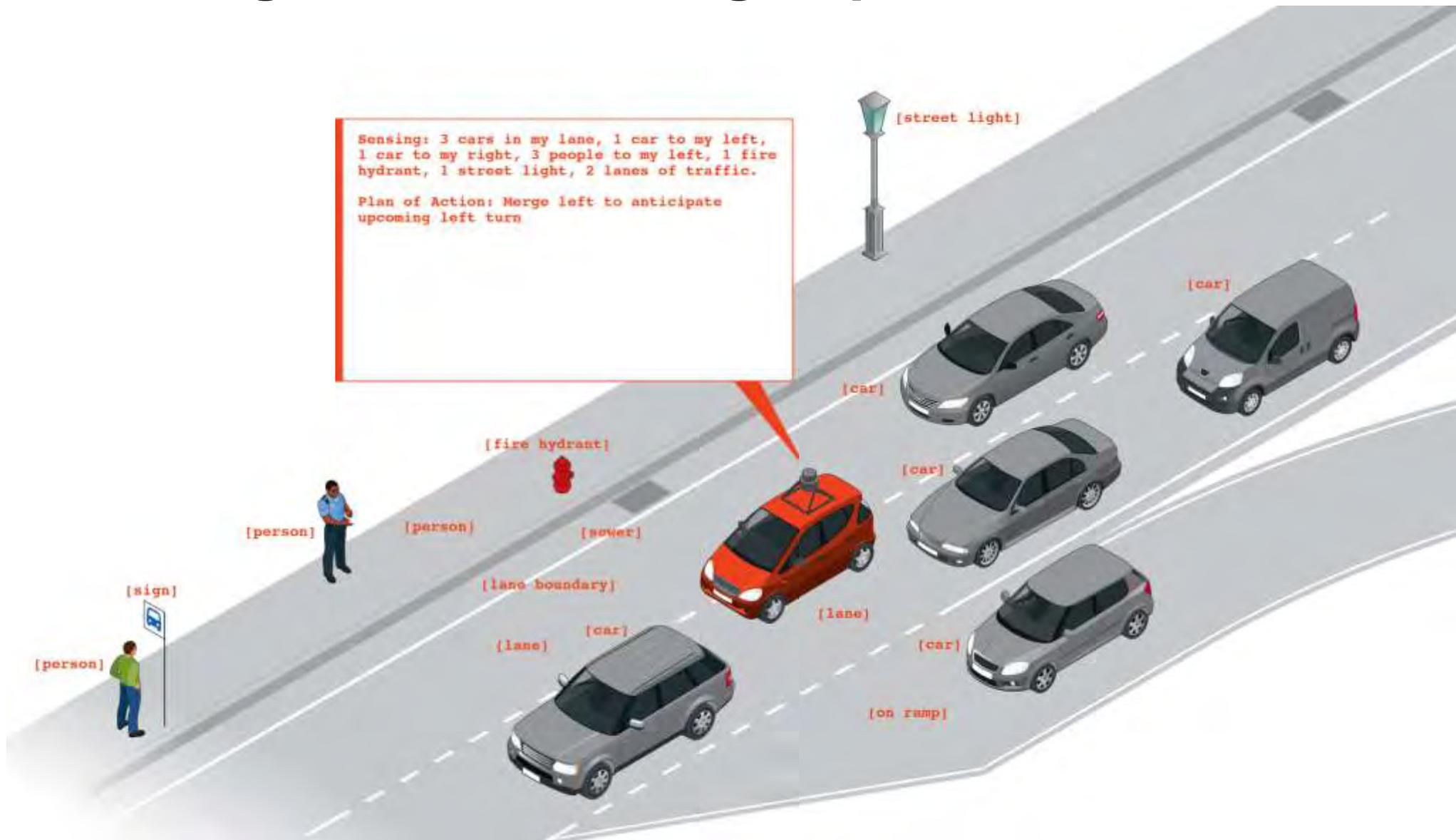
Why Did the Robot Do That? Trust and Small Unmanned Surface Vehicles

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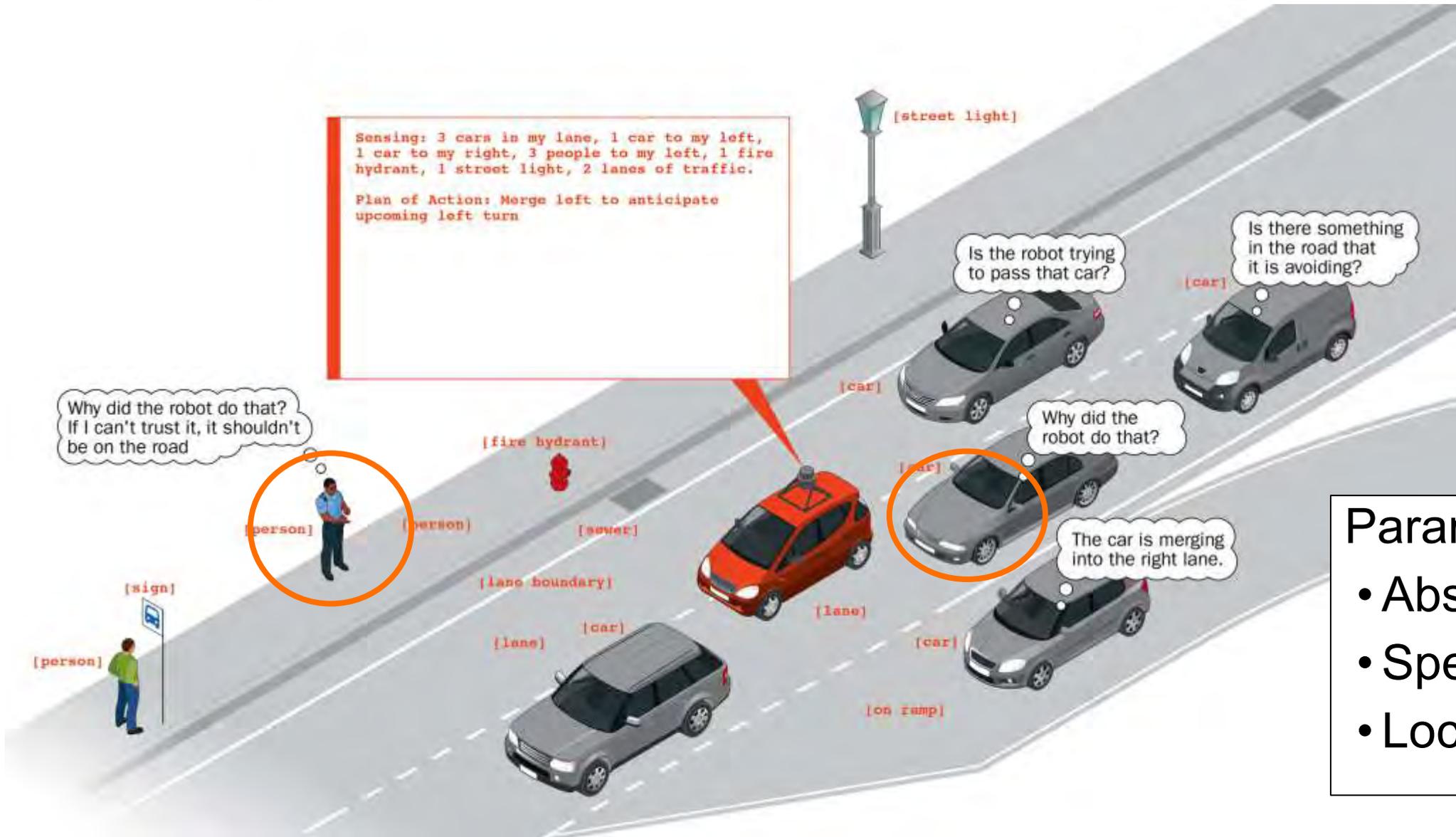
Joshua Peschel, Ph.D.
SENFORMATICS
Sensing • Informatics • Innovation



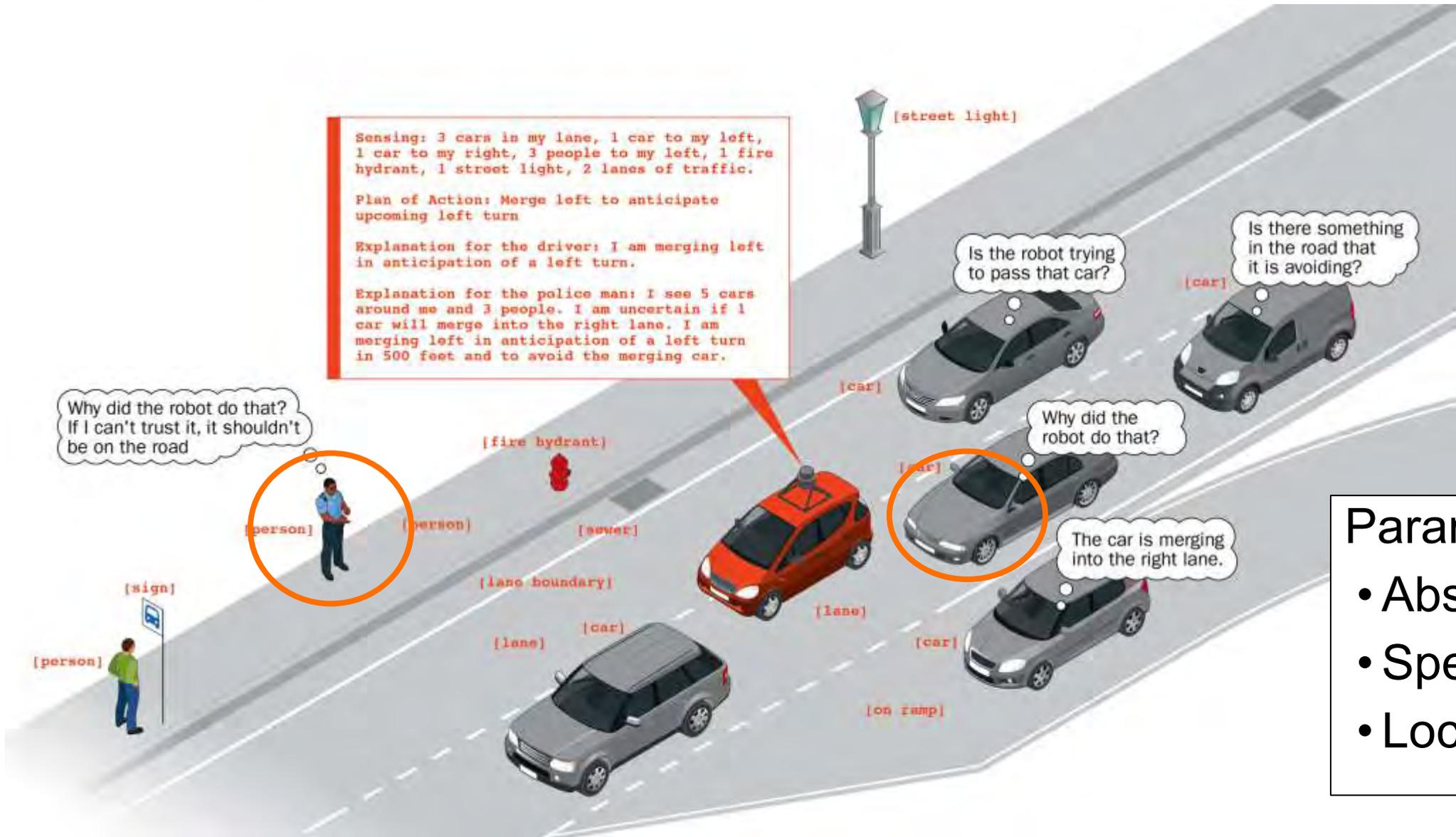
Challenges in Generating Explanations



Challenge: Different Preferences and Perspectives



Challenge: Different Preferences and Perspectives



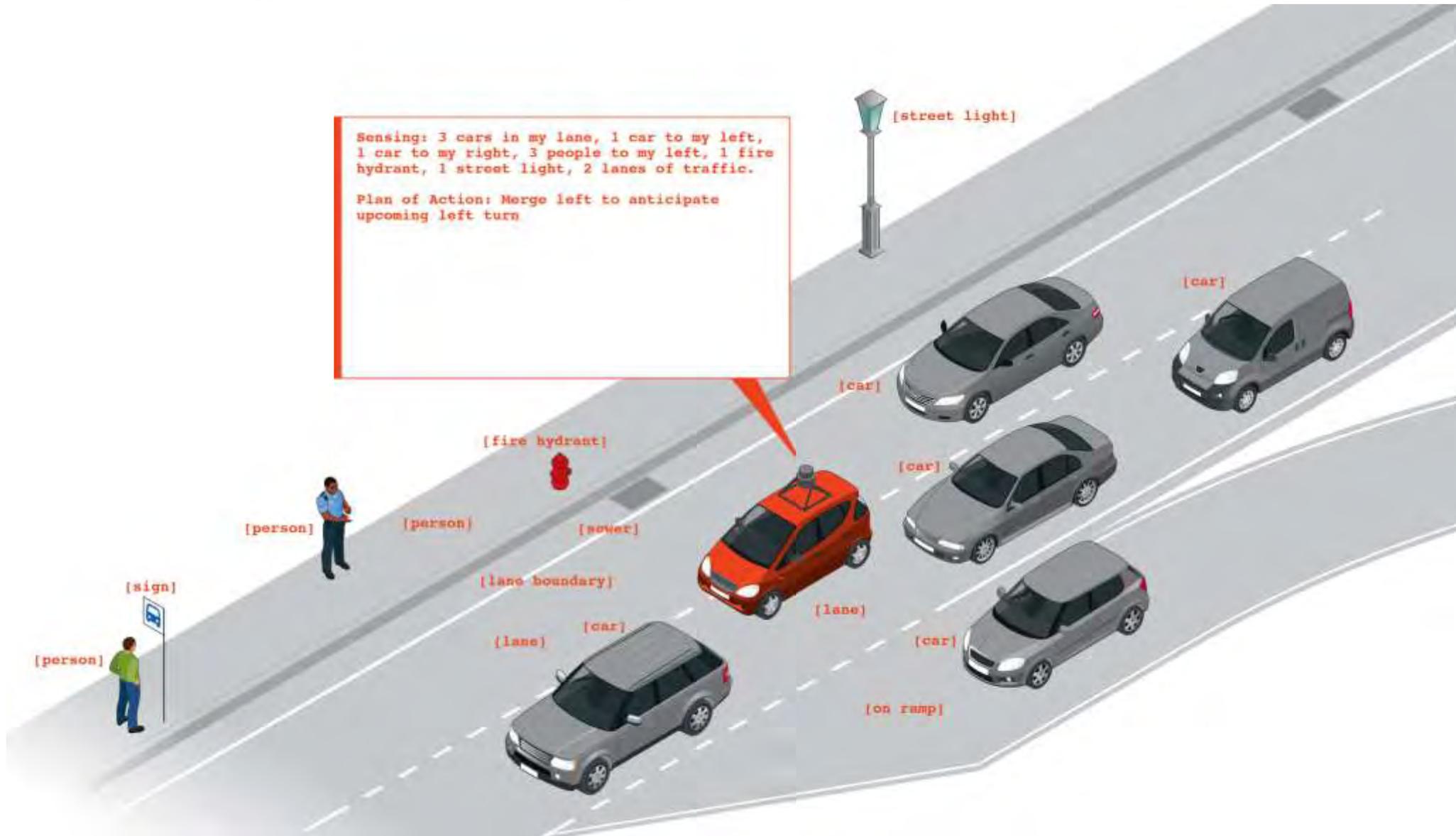
Parameters

- Abstraction
- Specificity
- Locality

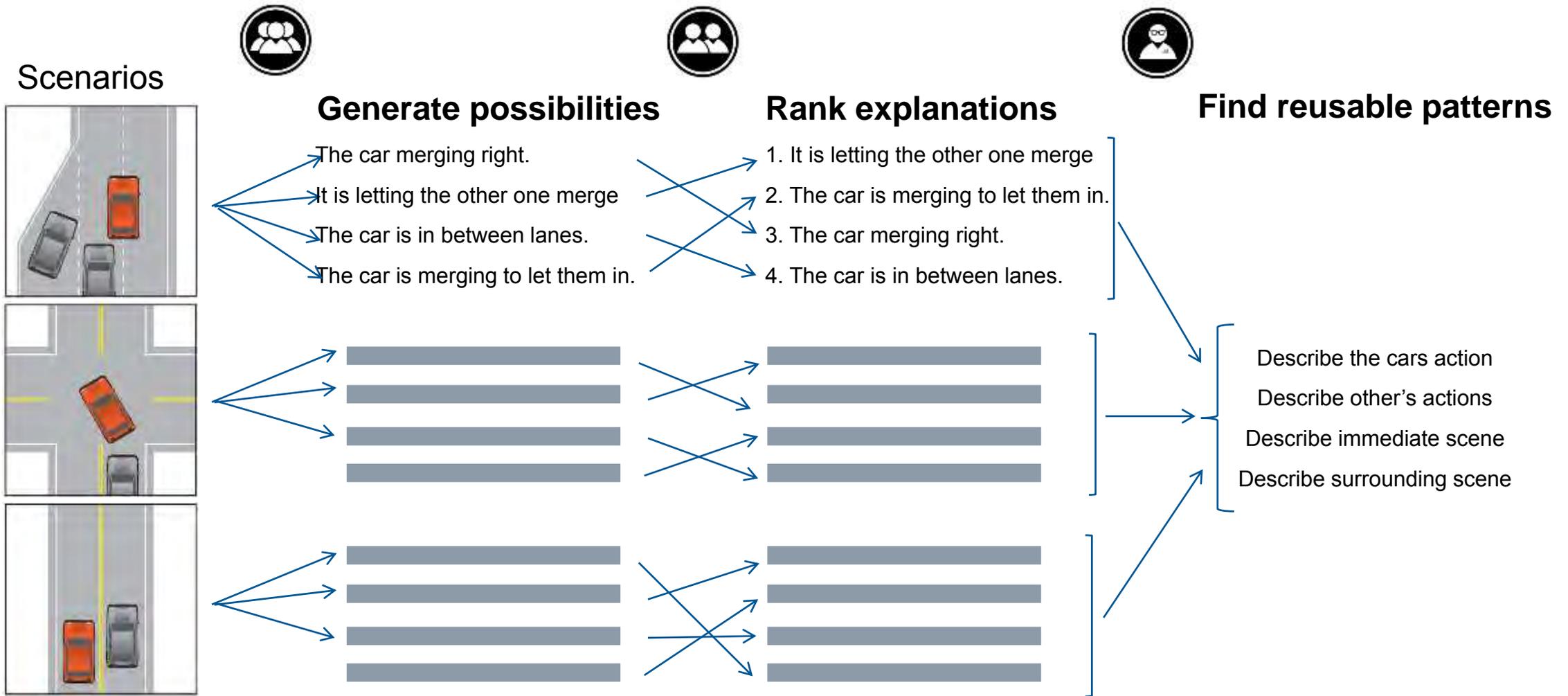
Challenge: Scalability of Dictionaries

Sensing: 3 cars in my lane, 1 car to my left,
1 car to my right, 3 people to my left, 1 fire
hydrant, 1 street light, 2 lanes of traffic.

Plan of Action: Merge left to anticipate
upcoming left turn



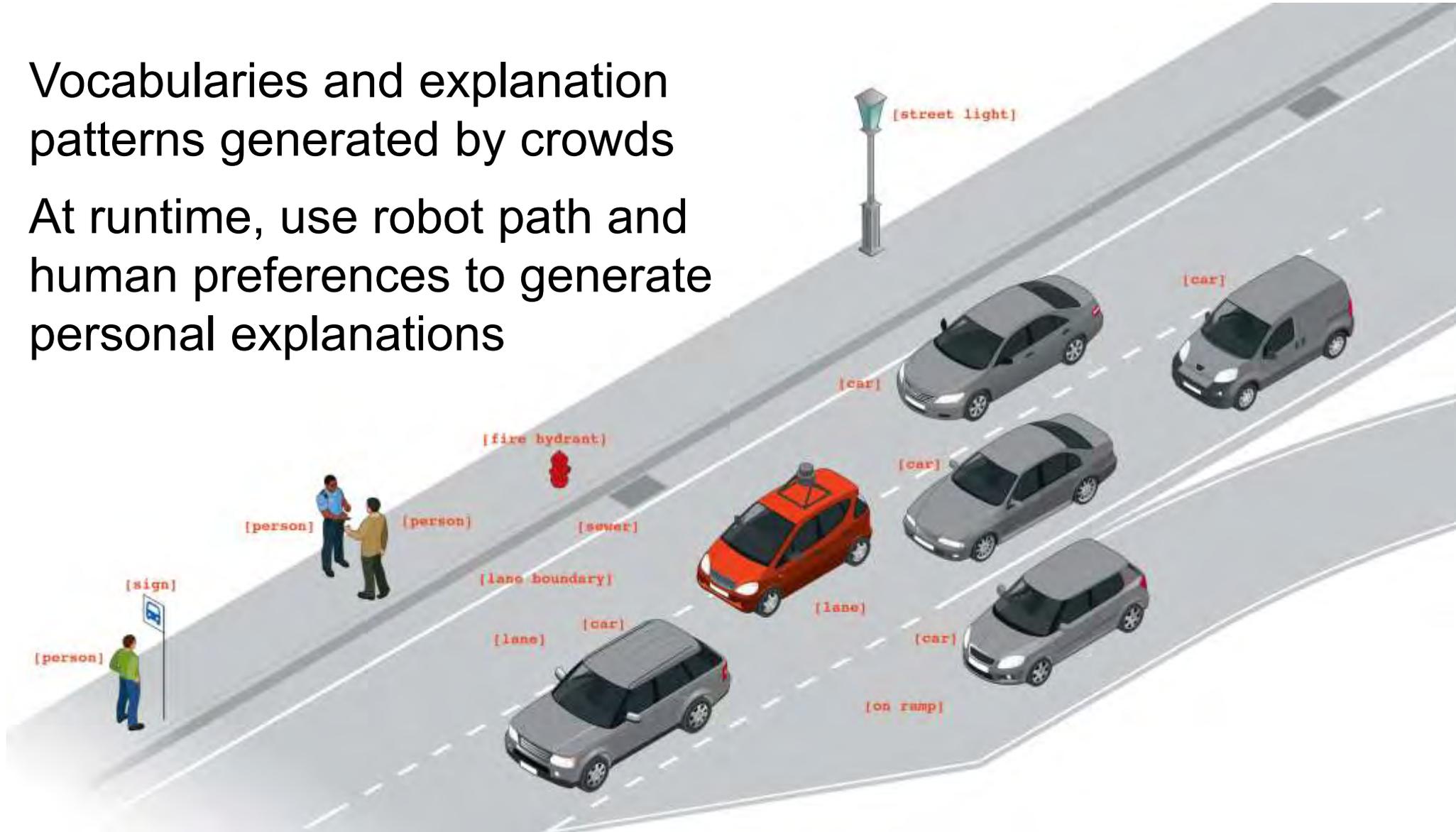
Crowdsourcing Explanation Generation



Putting it Together

Vocabularies and explanation patterns generated by crowds

At runtime, use robot path and human preferences to generate personal explanations



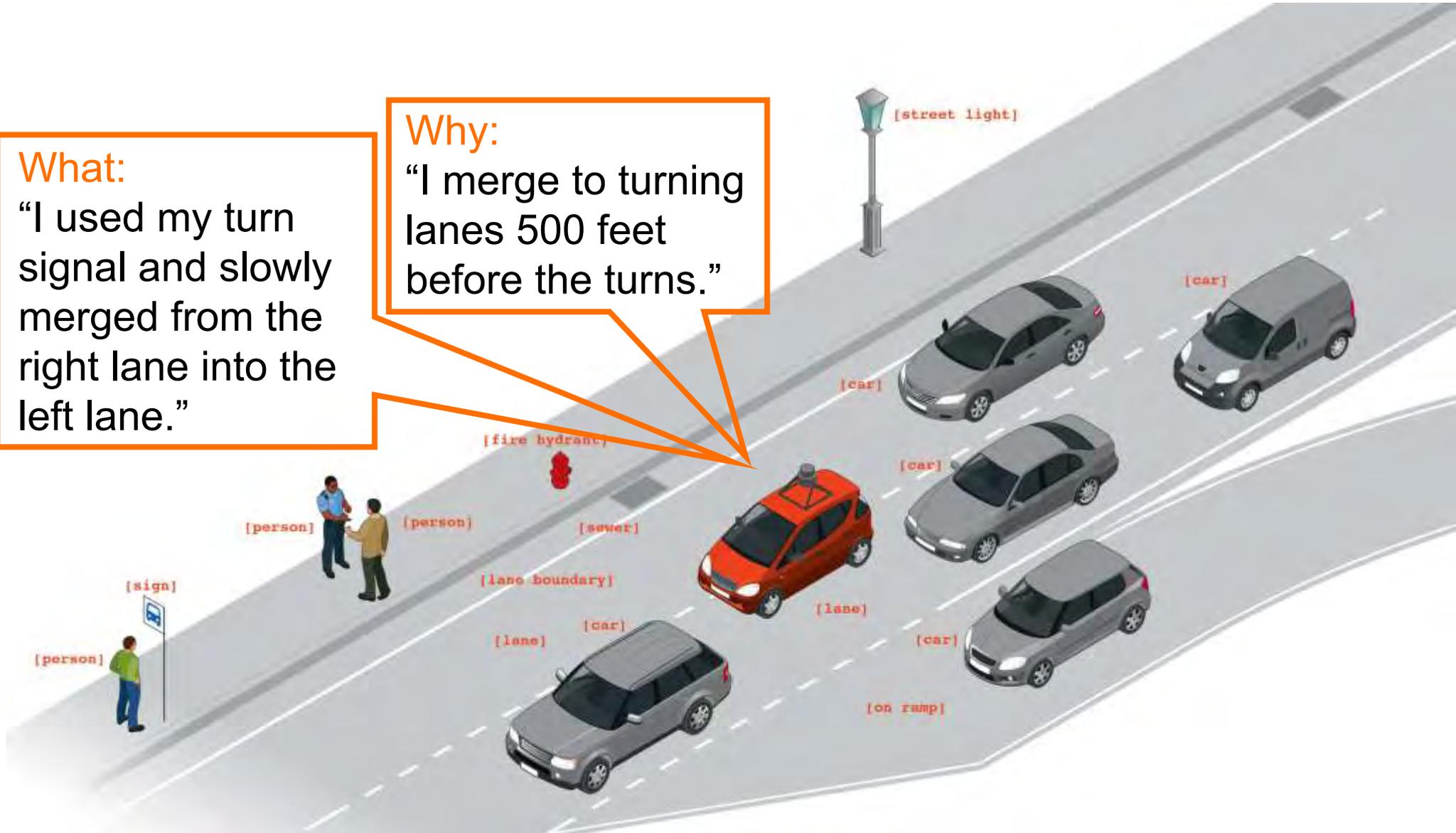
Ongoing Work: What Action vs. Why?

What:

"I used my turn signal and slowly merged from the right lane into the left lane."

Why:

"I merge to turning lanes 500 feet before the turns."



Next Steps: What Will the Robot Do Next?



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