
# Nuance Reasoning Framework

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# Introduction

- Principal Research Engineer at Nuance Research Lab in Sunnyvale, CA, USA
- Part of group working on knowledge representation and reasoning
- Lab does applied and foundational research in the area of AI & NLP
- ~ 15 researchers and engineers with diverse backgrounds KR, Semantic Web, NLP and Dialog.

# Motivation

- Imagine an automotive assistant embedded in your car which can assist you with finding parking.

- You are driving on a rainy day and have to find parking near downtown until 5pm.

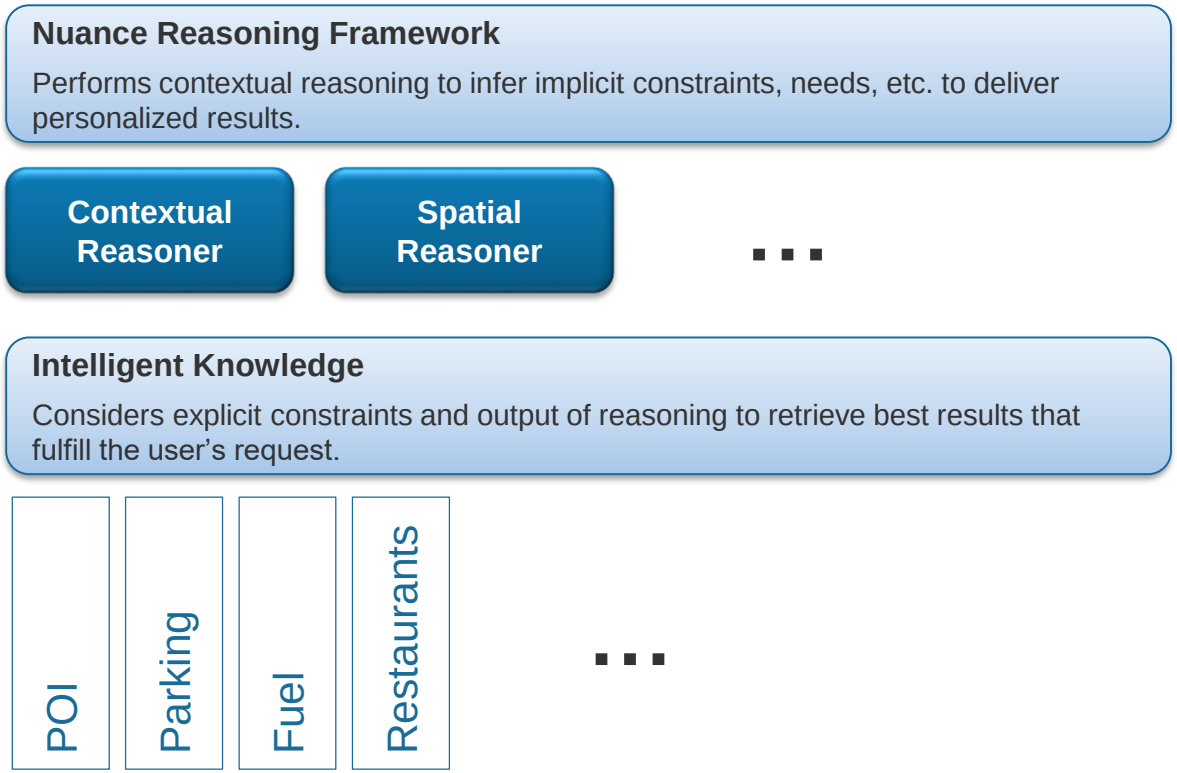
- To complete this request, the automotive assistant must consider many implicit factors – time, location, preferences

# Motivation

- A specialized reasoning module is necessary to reason over the implicit factors – time, location, preferences

- Need for a framework which allows
  - Plugging in specialized reasoners
  - Identify which reasoners to invoke
  - Combine response from different reasoners

# AI Contextual Reasoning Framework Overview

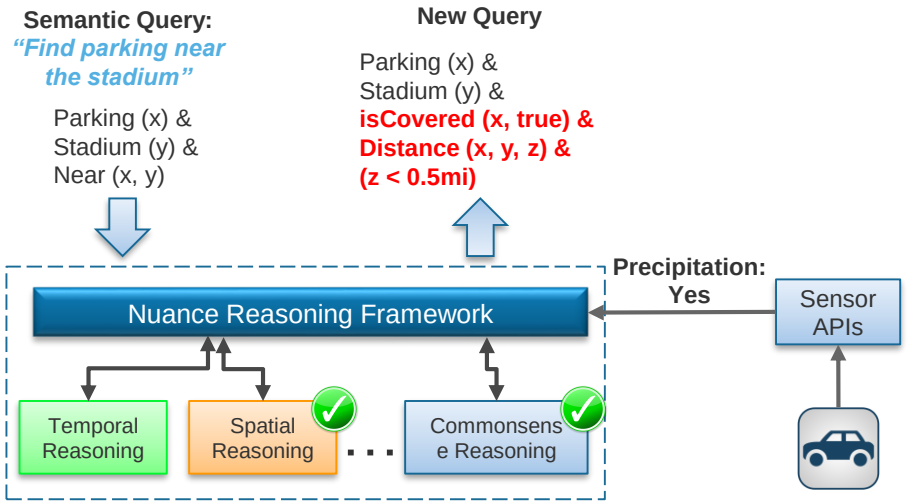


# Nuance Reasoning Framework

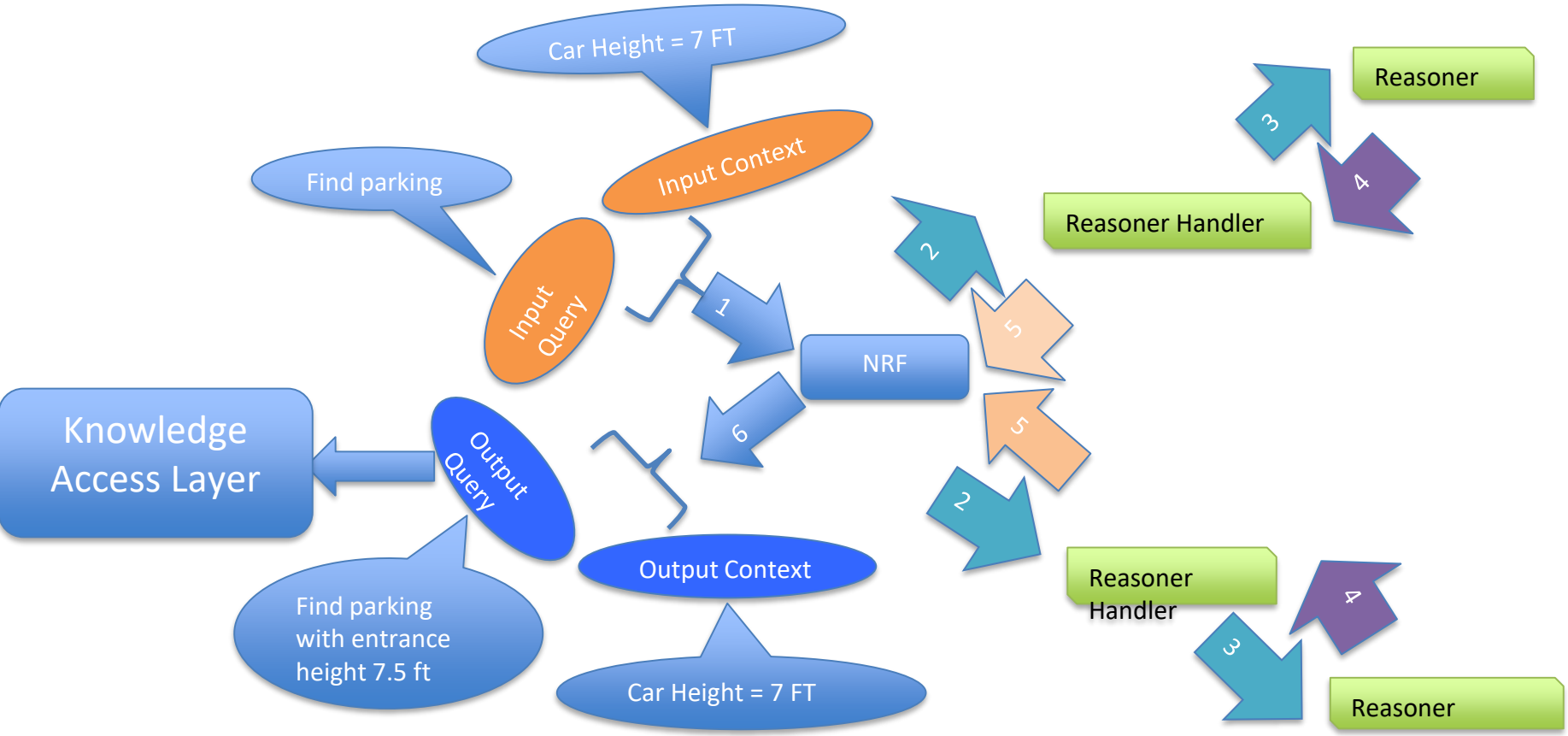
**Performs reasoning over explicit and contextual information to personalize and deliver high quality results**

## Key Features

- **Flexible Framework:** Allows a wide range of reasoning techniques to be easily integrated and accessed via a unified interface.
- **Reasoner Arbitration:** Automatically decides which reasoners to use.
- **Consistency Checker:** Merges inferences from multiple reasoners into a consistent conclusion.
- **Pre-Built Reasoning Engines:** Provides pre-built reasoning engines to support frequently occurring reasoning requirements such as:
  - Spatial Reasoning
  - Temporal Reasoning
  - Contextual Reasoning



# NRF High-Level Processing Flow



# Future Direction

- Ongoing development of additional reasoners
- Machine learning based arbitration/mediation strategies
- Richer representation of contextual information