NRI: FND: Semi-Supervised Deep Learning for Domain Adaptation in Robotic Language Acquisition

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Goals:
1. Robots learn to perform tasks in human environments from language and rich sensing.
2. This learned knowledge is transferred across heterogeneous platforms and tasks.

Key problems:
- Induce a joint model of language and multi-modal sensing for language understanding
- Capture "implicit prototypes" in learned grounded language representations
- Agent-to-agent transfer of learned models using interactive reinforcement learning

Scientific impact:
- Provides a framework for and demonstration of learning task-based domain adaptations
- Agent-to-agent transfer of sub-tasks in task hierarchy will lead to improved context-based multimodal learning and task-domain adaptation
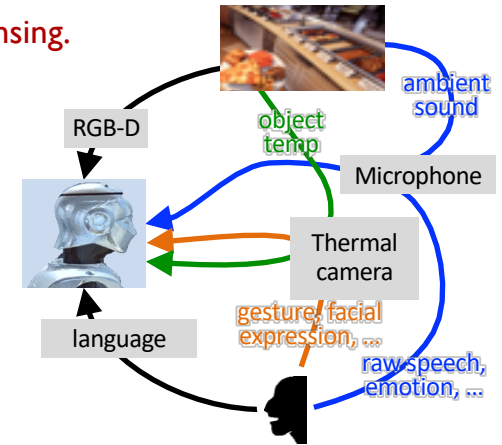

Impacts:
- Letting robots learn about the world from language allows deployment in human settings, such as homes or care facilities
- This flexibility will make robotic assistance more broadly available for non-specialist users
- Robots that learn from their current audience suffer less from data representation issues: e.g., items from non-Western homes
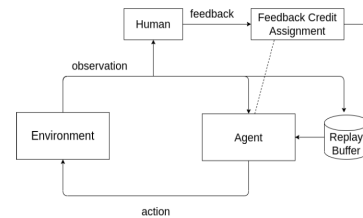
Technical advances and solutions:
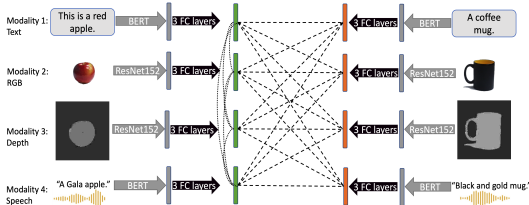
Contrastive learning for discovering shared embeddings across non-robust sensor modalities
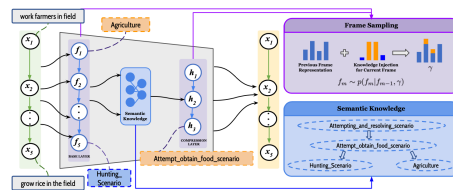
Use auxiliary semantic information to better predict what event comes next within a sequence

Reinforcement learning with human-provided feedback on individual tasks