## Socially Assistive Robots using Hierarchical Deep Visual Learning

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**DeepRobo** aims to build a semantic framework that support cognitive robotics

- Real-time Deep Learning for prediction and activation for real-time situations for smart home applications such as baby care, elderly care, pet care [1-2]
- Knowledge Graphs with Deep Learning for cognitive robots – natural language/question answering interface [1-2]

## Hypothesis of Objects of Socio-Assistive Robot

- Learning of visual objects by robots using incremental and reinforcement learning strategies to increase the learning curve
- Learning of visual objects by robots through collective and distributed learning for more scalable and effective approach.
- Learning of visual objects in context to make meaningful sense of the situation
- Learning to communicate in human-understandable, meaningful and effective language







Concept Expansion of Object and Knowledge Graph Generation





**RoboBrain**: Large-Scale Knowledge Engine for Robots [3]

- formulating robotic tasks as queries to the knowledge engine
- grounding natural language, perception, and planning.

**DeepRobo** extended RoboBrain and for question answering for **knowledge graphs** dynamically generated with **Deep Learning** for

- Face recognition
- Activity recognition
- Object recognition
- Speech recognition





Figure shows the complete architecture of Hierarchical Deep Learning Architecture . The interaction between the robot and the surrounding is based on reinforcement learning.



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