Developing Self Image (DSI): A Reinforcement Learning Psychophysical Waveform, Autonomously Trained Cognitive System

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The concept of Developing Self Image ("DSI") integrated with DRI, BED, and Reinforcement learning presents an interesting approach to the development of autonomously trained cognitive systems, with potential implications for Artificial General Intelligence (AGI). Let's discuss how these elements are integrated and their significance to Electrop-Optical Signal processing:

1. DRI (Detection, Resolution, Identification) and BED (Behavior, Emotion, Decision):

- DRI represents the objective aspect of perception, focusing on detecting, resolving, and identifying objects and patterns in the environment from a myriad of available physical image sensor data (CCD, Lidar, Hyperspectral, Etc.)

- BED represents the subjective aspect of perception, including behavior, emotion, and decision-making, which reflects the human interpretation of and response to the environment.

2. Developing Self Image (DSI):

- DSI is mathematically represented as a unit sphere that reflects an evolving image interpretation of "Self" based on BED actions and behaviors and resulting outcomes. It encapsulates the subjective aspect of self-perception evolving in time.

- DSI includes three dualistic key axes: Z (Good Decision vs. Bad Decision), X (Pleasure vs. Pain, physical and/or emotional, and Y ("Feeling Good About One's Self" or "Feeling Bad About One's Self" i.e. evolving sense of well being).

- These axes represent how an individual perceives their own decisions, experiences pleasure or pain, and maintains a sense of well-being in response to their behaviors and actions as images evolve over time.

3. Integration with DRI and BED:

- DSI is integrated with DRI and BED by capturing the subjective self reflective experience and interpretation of an agent's actions and behaviors.

- As the agent interacts with its environment (as represented by DRI and BED data), DSI reflects how these interactions influence the agent's self-perception in terms of decision quality, emotional experiences, and overall well-being. It is an ideal four dimensional training metric for an autonomous system.

- This integration allows the system to learn not only from objective data (DRI), but also from the agent's subjective experiences (BED) and self-assessment (DSI).

4. Reinforcement Learning with DSI:

- Reinforcement learning is a machine learning paradigm where an agent learns to make sequences of decisions/actions in an environment to maximize a cumulative reward.

- In this context, DSI can serve as the reward signal or evaluation metric for the reinforcement learning agent.

- The agent's goal is to learn behaviors and actions that lead to a positive DSI, reflecting good decisions, pleasure, and a sense of well-being.

- The X, Y, and Z axes of DSI guide the agent's learning process by quantifying the consequences of its actions in terms of decision quality, emotional experiences, and self-worth.

5. DSI as a key component of AGI:

- DSI introduces a critical element of self-awareness and self-assessment into the cognitive system, which aligns with a fundamental aspect of human intelligence.

- In the context of AGI, DSI can be considered a component that contributes to the development of machine consciousness or self-awareness.

- By incorporating DSI into the reinforcement learning process, AGI systems can develop a more nuanced understanding of the consequences of their actions, enabling them to make decisions that align with both objective goals (DRI) and subjective well-being (DSI).

- DSI can also facilitate adaptive learning, allowing AGI systems to adjust their behaviors/actions based on how those behaviors affect their self-image and emotional state.

Overall, integrating DSI with DRI, BED, and reinforcement learning introduces a multidimensional, self-awareness component to cognitive systems. This approach bridges the gap between objective and subjective aspects of intelligence and could be a significant step toward the development of more human-like AGI systems that consider not only external objectives but also the well-being and self-perception of the agent itself.

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