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course	🤖 AI
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Date	@February 22, 2024
Status	Not started
Resource	☐

Notes

1. Agent and Environment

Definition: Agents interact with environments through sensors and actuators.

- Agents perceive environments through sensors.
- Agents act on environments through actuators.
- Every agent perceives its actions but not always their effects.
- Agents encompass humans, robots, and software entities.
- Applications include medical diagnosis, vacuum cleaning, autonomous driving, information search.

2. Agent Terminology

Definition: Essential terms defining agent functionality.

- **Performance Measure**: Criteria for agent success.
- **Percept**: Agent's current perceptual inputs.
- **Percept Sequence**: History of agent perceptions.
- **Agent Function**: Maps percepts to actions.
- **Agent Program**: Implements agent function.

- **Rationality**: Expected actions based on perception. Reason behind something

3. Structure of Intelligent Agents

Definition: Framework guiding agent behavior and decision-making.

- Rational agents maximize performance.
- PEAS framework guides problem-solving: Performance, Environment, Actuators, Sensors.
- Ideal rational agents optimize performance through actions.

4. Categories of Agents

Definition: Categorization based on environmental interaction.

- **Discrete vs. Continuous**: Distinct vs. continuous states.
- **Fully Observable vs. Partially Observable**: Complete vs. incomplete state information.
- **Single Agent vs. Multiagent**: Sole or multiple agents.
- **Static vs. Dynamic**: Stability of environment during action.
- **Accessible vs. Inaccessible**: Accessibility of complete state.
- **Deterministic vs. Stochastic**: Predictability of environment.
- **Episodic vs. Sequential**: Independence or dependency of episodes.

5. Types of Intelligent Agents

5.1 Most Basic Intelligent Agents

- Perform actions based on current percept.
- Built on Condition-Action Rule.
- Examples: smart light bulb, home thermostat, chess.
- Environment completely observable.

5.2 Simple Reflex Agents

- Make decisions based solely on current percept.
- Limited intelligence; no knowledge beyond perception.
- Environment changes necessitate rule updates.

5.3 Model-Based Reflex Agents

- Utilize internal models to understand percept history and action effects.
- Effective in partially observable environments.
- Maintain internal state representing unobserved aspects.
- Example: self-driving car reacting to traffic lights.

5.4 Goal-Based Agents

- Optimize outcomes based on preference/utility for each state.
- Seek optimal solutions beyond achieving goals.
- Examples: price comparison shopping, bidding in auctions.

5.5 Learning Agents

- Improve performance through learning from previous experiences.
- Elements: learning, critic, performance, problem generator.
- Example: self-driving car adapting to road conditions.

6. Practical Applications of Intelligent Agents

Definition: Real-world scenarios demonstrating agent functionality.

- **Navigating**: Reflex agent avoids obstacles.
- **Gathering**: Reflex agent collects groceries based on percepts.
- **Menu-planning**: Goal-based agent generates shopping list, adapts to unavailability.
- **Choosing among brands**: Utility-based agent considers quality-price trade-offs.