The Neuro-Symbolic Concept Learner

Overview of Visual Reasoning Methods

Overview of Curriculum Methods

Curriculum Learning

Lesson 1: Object-based questions
Q: What is the shape of the red object?
A: Sphere.

Lesson 2: Relational questions
Q: Is the green cube left to the red sphere?
A: Yes.

Lesson 3: Complex scenes, complex questions
Q: What is the shape of the red object?
A: Sphere.

Q: Does the big matte object behind the big sphere have the same color as the small brown object?
A: Yes.

Q: Is the green cube left to the red sphere?
A: Yes.

Q: What is the shape of the big yellow thing?
A: Horse.

Q: What color is the fire hydrant for the big zebra?
A: Yellow.

Q: How many zebras are there?
A: 3.

Concepts for Instance Retrieval:

Horse: Person On a Skateboard

Results on the CLEVR Dataset

Table of results for the CLEVR dataset, including model performance metrics such as accuracy, recall, and precision.

Results on the VQS Dataset

Table of results for the VQS dataset, including model performance metrics such as accuracy, recall, and precision.

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-principle 1: Explicit visual grounding of concepts with neuro-symbolic reasoning.

-principle 2: Joint learning of concepts and language with developmental curriculum.

Conceptual Embeddings for Shape Query

Visual-Semantic Representations for Shape Query

Combinatorial Generalization

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