Foundational 3D Perception
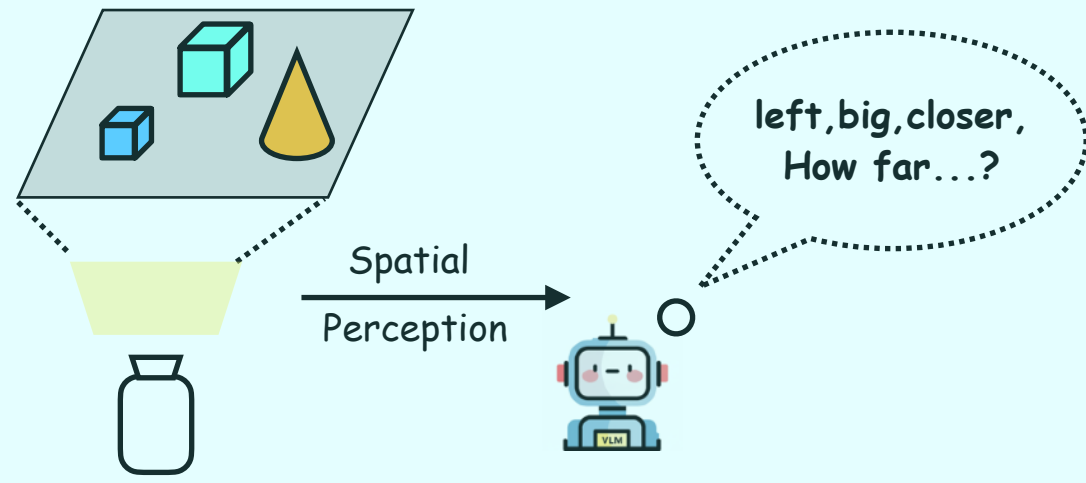

Distance Measurement

🧑: Calculate the straight-line distance from **the black metal bicycle** to **the silver sedan car** (answer in meter).

🤖: 1.68 meter

Spatial Relationship

🧑: Which best describes the position of **the metal cabinet beside the table** relative to **the woodel Chair**? A. right of B. left of C. behind D. in front of

🤖: C

Size Estimation

🧑: What is the ground-plane 2D footprint area of **the white ceramic bathtub** (answer in m^2)?

🤖: $1.34 m^2$

Dimension Comparison

🧑: Is **the medium black cyclist** taller than **the pedestrian in blue polo shirt**?

🤖: NO

Indoor
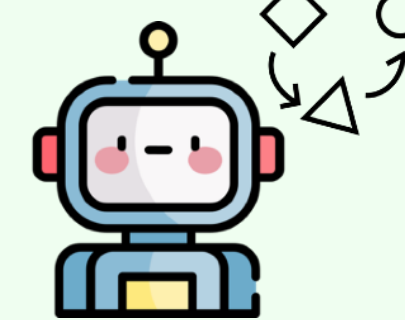

Outdoor

Object-centric

230K+ Monocular Images
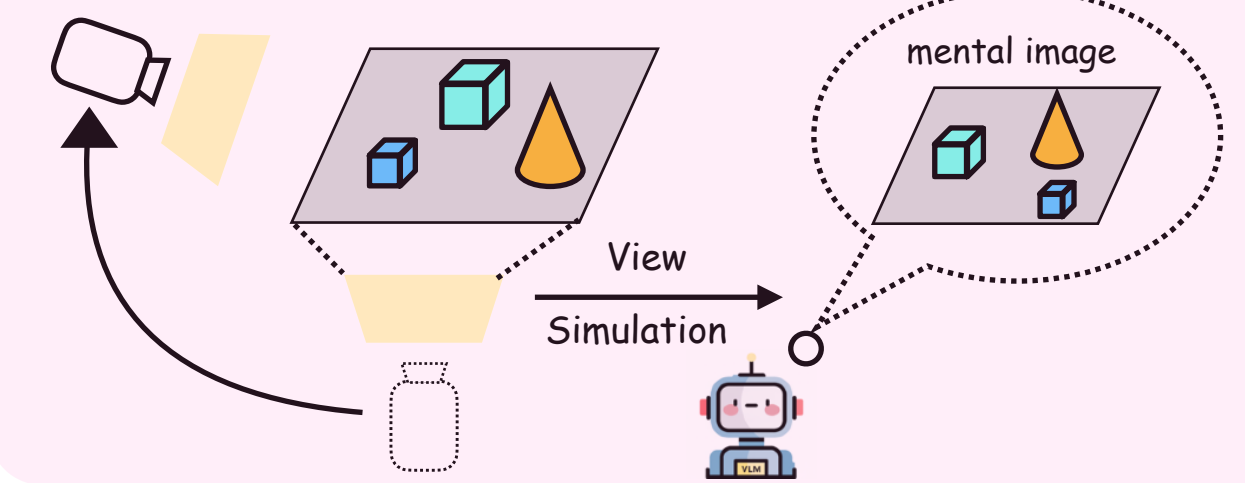**98** Categories

8 Spatial Tasks
3 Hierarchy Levels

1M+ VQAs

VLMs

Perspective-Aware Imagination

Object Grounding

🧑: From **the large white mirror** toward **the white rectangular ceramic sink**, identify **the small white lamp** and choose its 3DBBox. A[x1,y1,z1,...x8,y8,z8],B...,C...,D...

🤖: B

Perspective-aware Relationship

🧑: At **the gray rectangular pillow** facing **the brown textured nightstand**, **the large black television** is below **the black shelves**?
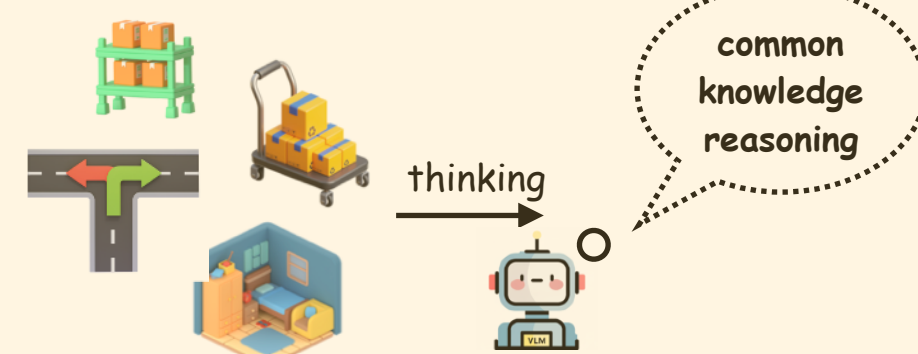
🤖: Yes

Occlusion Judgment

🧑: If you're standing **the small blue plastic shelves**, with gaze aligned to **the white desk**, is **the yellow glass lamp** A. clearly visible, B. partially visible, or C. unvisible

🤖: B

Situational Reasoning

Situation-Injection

🧑: As part of safety review, to confirm clearance inside this interior space, does the height of the small black television under the table exceed that of the small brown table near the chair? (in meters)

🤖: No. <thinking>Step 1: To check the fit... Step 2: We extract the required... Step 3: We compare...

Situation-Injection

🧑: Consider the spatial relationship between the black leather sofa and the green fabric chair on the right. If someone drops a small object near chair and it slides 1 meter directly towards the sofa, is it guaranteed to hit the anchor chair?

🤖: Yes. It is guaranteed to hit. <thinking>Step 1: The