



Logic: A Motivation

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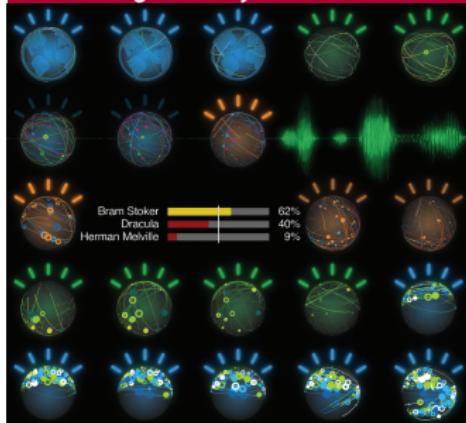
IBM Watson example

<https://www.youtube.com/watch?v=Dyw04zksfXw>

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IBM Journal of Research and Development

Including IBM Systems Journal

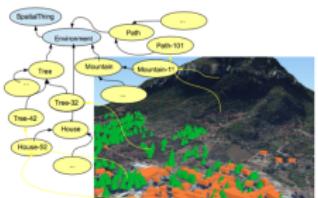


This Is Watson



Knowrob: Why is knowledge so important?

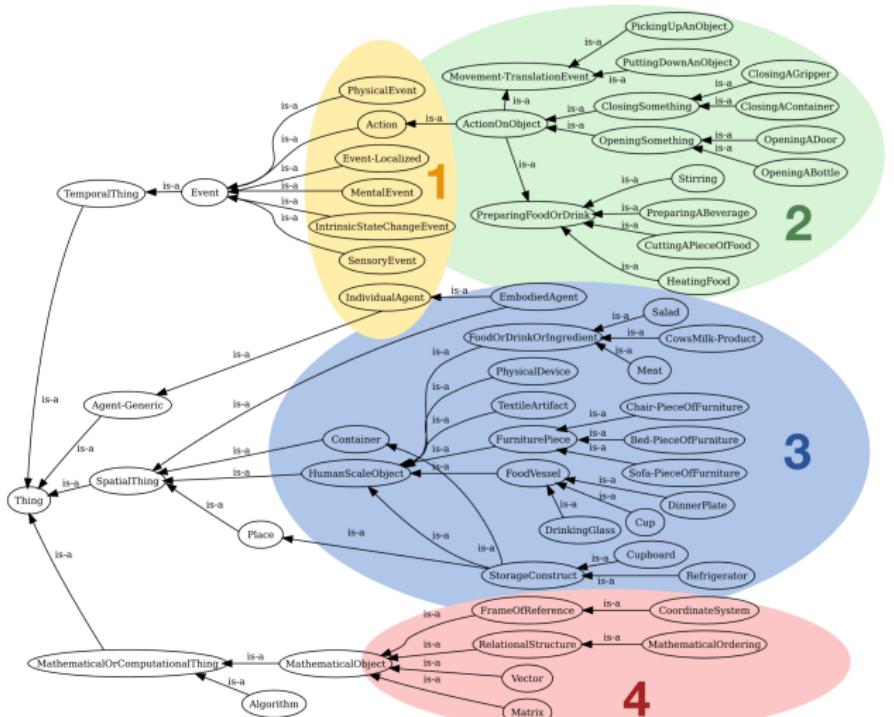
- if the robot does not know about the task, the environment, or the robot, then the programmer has to hardcode **everything**



- programming/instructing at an abstract/semantic level
 - put the bolt into the nut and fasten it
 - pour water into the glass
 - ...

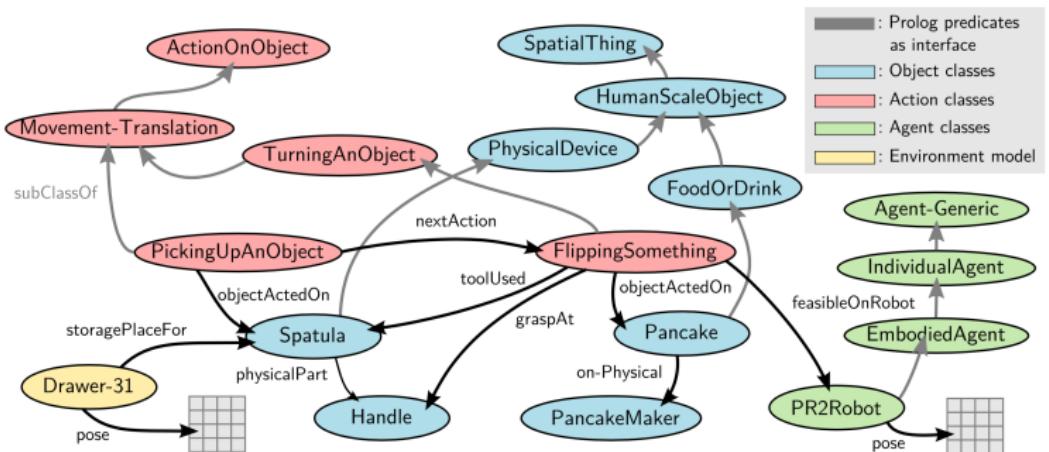


Knowrob: Ontology (knowrob.owl)



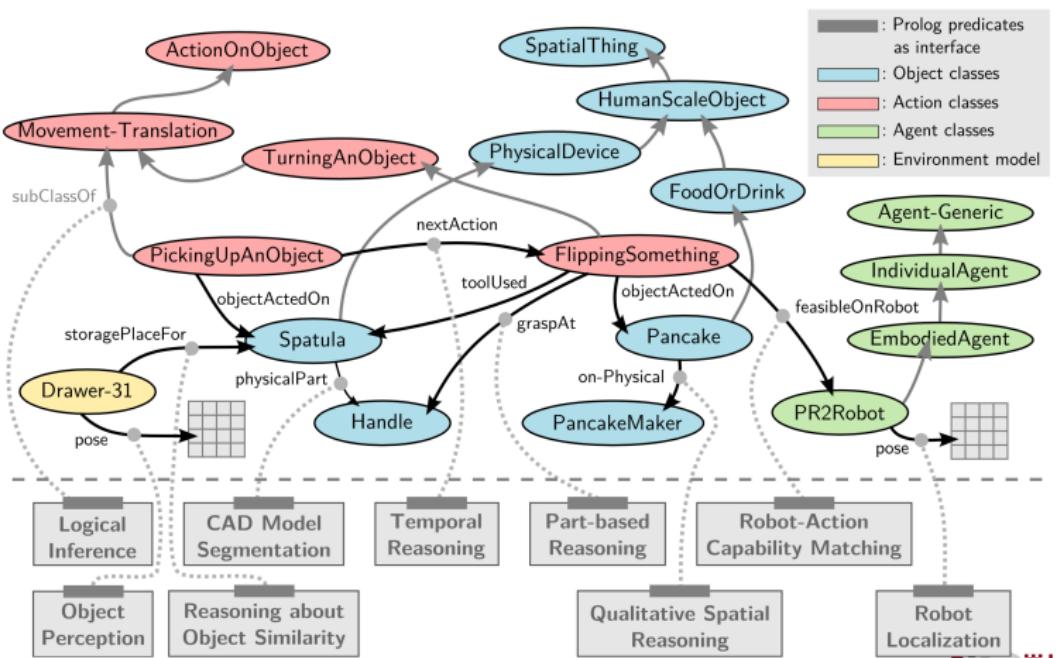


Knowrob: A task ontology



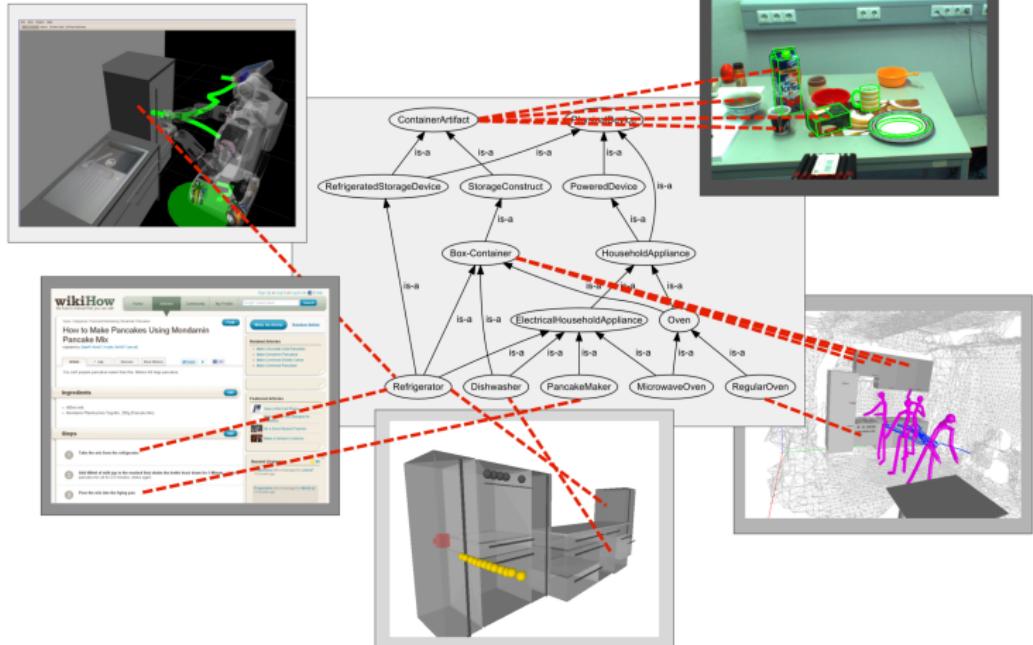


Knowrob: A task ontology



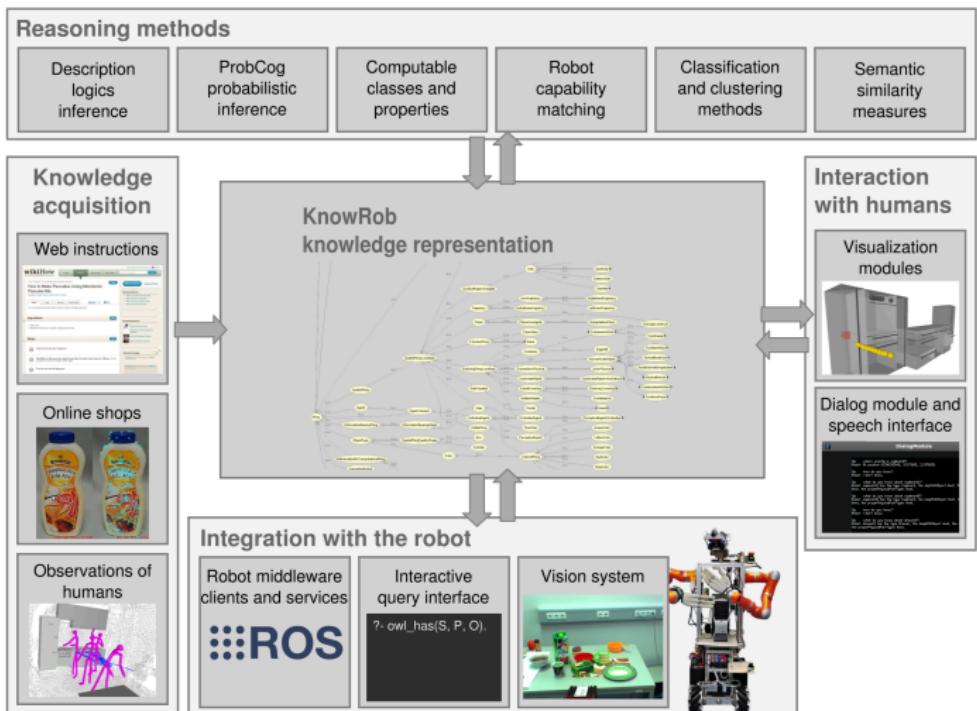


Knowrob: Knowledge types





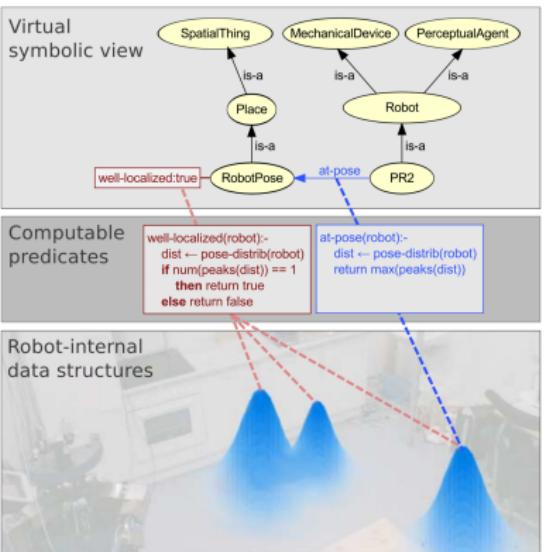
KnowRob Components





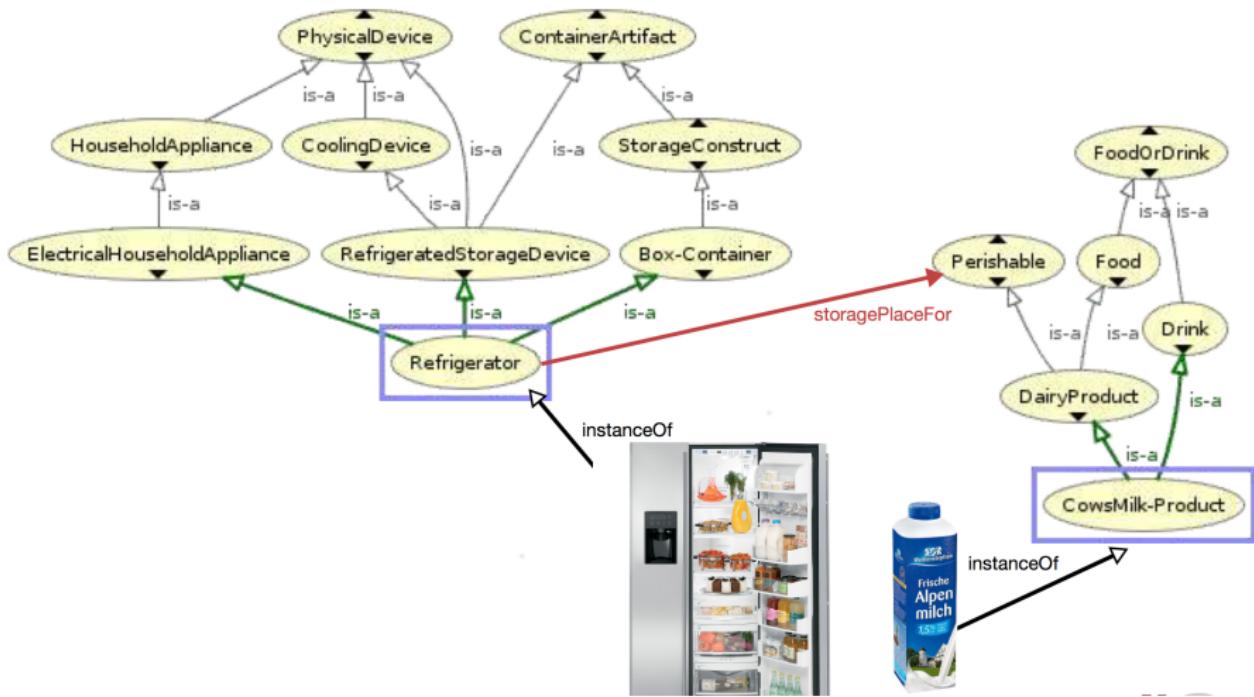
Knowrob: Procedural attachments

- Compute symbolic knowledge **on demand** from data structures that already exist on the robot by attaching procedures to semantic classes and properties
- Re-use existing information and make sure abstract knowledge is grounded





Knowrob: Inferring storage location





Knowrob: Summary

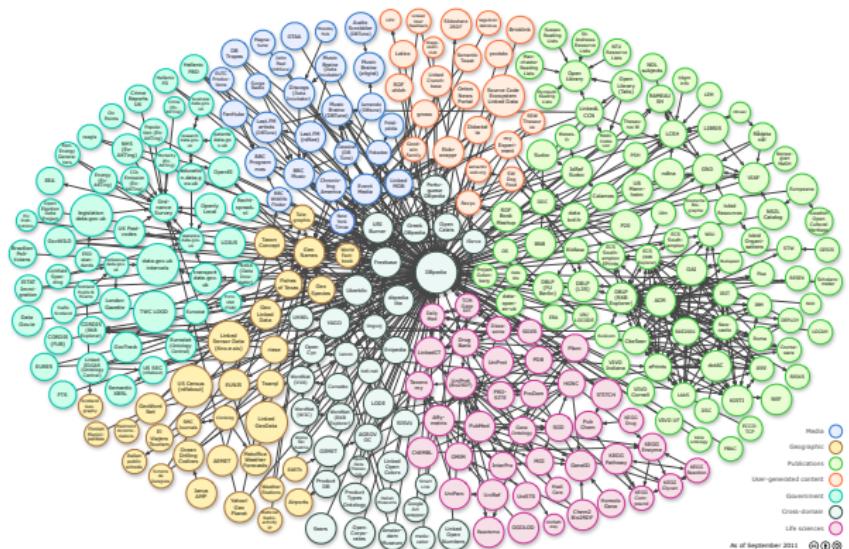
- declarative knowledge: ontologies
- procedural attachment
- logical inference
- multi-modal representation

Video (13 mins):

<https://www.youtube.com/watch?v=4usoE981e7I>



Semantic Web



Linking Open Data cloud diagram, by Richard Cyganiak and Anja Jentzsch. <http://lod-cloud.net/>