Course: Common Sense Reasoning

6. Building Common Sense Knowledge Bases
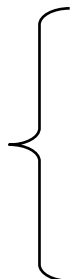
Martin Molina

There are two main challenges in building common sense knowledge bases

1. How to represent common sense knowledge

   – Appropriate representations for objects, actions, time, space, beliefs, etc.

2. How to acquire common sense knowledge

   – Collect knowledge such as "people fly in planes", "the water is wet", etc.

Why is it difficult?

- Large amount of knowledge
  - Reasoning about the world requires a large amount of knowledge [Mueller, 2006]

- Implicit knowledge
  - Common sense knowledge is difficult to acquire because it is not explicit [Minsky, 2000]
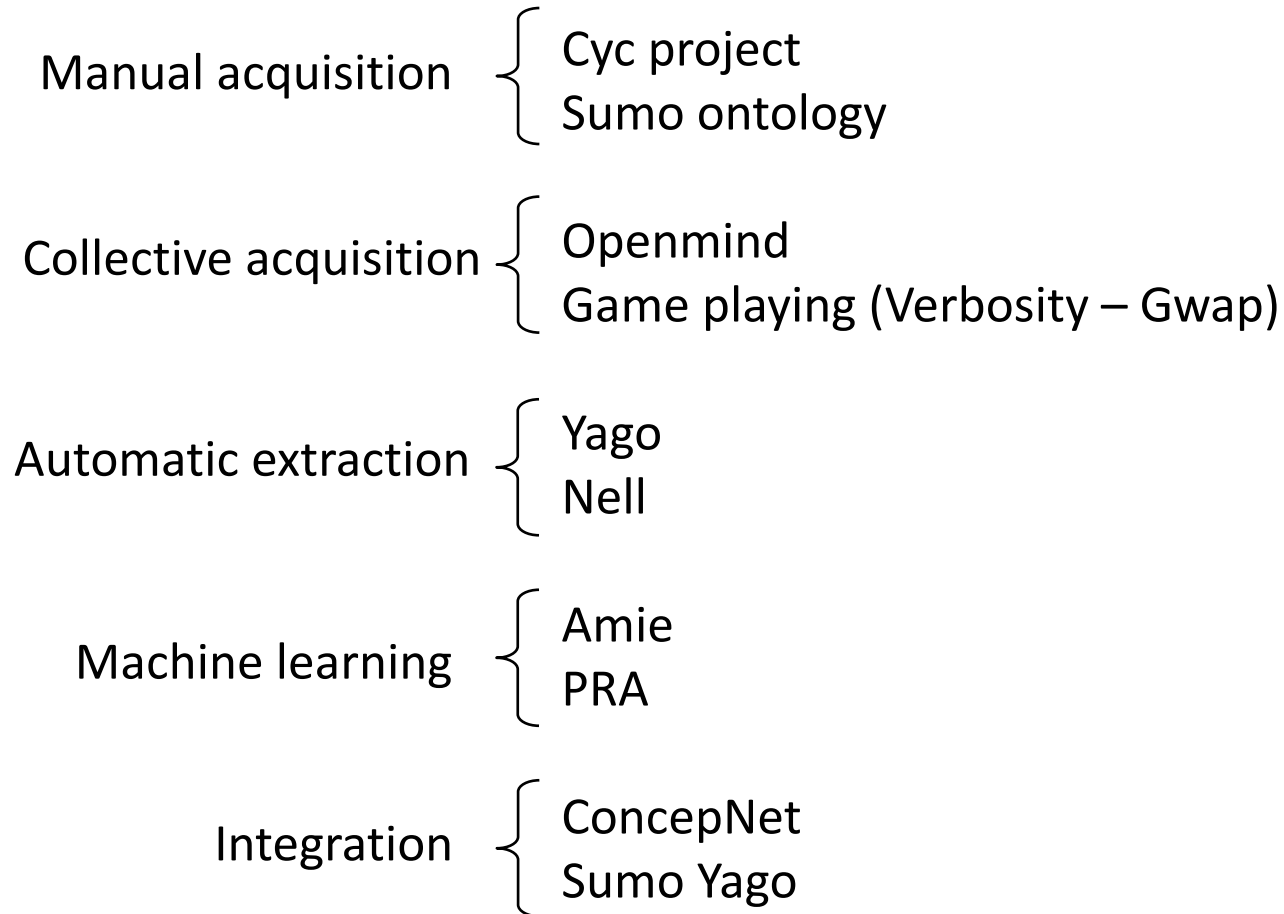
A first solution to store common sense knowledge is building large scale data bases

- Examples:
  - DBPedia
  - Wikidata
  - Freebase
  - …

- Store large amounts of facts (millions)

- Cover a broad spectrum (different domains)
  - Persons, organizations, cities, species, diseases,
  - Music albums, films, videogames, etc.

- Have explicit semantics using ontologies

Large scale data bases have limitations to represent common sense knowledge

- Use simple representations
  - E.g, triples or graphs instead of more expressive representations such as first order logic or probabilistic reasoning
- Store mainly facts
  - E.g., facts like "Madrid is the capital of Spain" instead of universals like "people fly in planes"
- Have limited inference
  - E.g., searching facts instead of generating new facts

There are multiple approaches for building common sense knowledge bases

Manual acquisition
{
Cyc project
Sumo ontology

Collective acquisition
{
Openmind
Game playing (Verbosity – Gwap)

Automatic extraction
{
Yago
Nell

Machine learning
{
Amie
PRA

Integration
{
ConcepNet
Sumo Yago

Course "Common sense reasoning".
© 2019 Martin Molina

Work citation in APA style:

Molina, M. (2019). Common sense reasoning [Lecture slides]. OpenCourseWare, Universidad Politécnica de Madrid. Retrieved from http://ocw.upm.es/course