Robot, Task.

Task, Robot.

The morally dubious exploitation
of the new slave race

Robot, Game.

Game, Robot.

Welcoming our creations
into the playful embrace of human culture

Why Tasks are Good

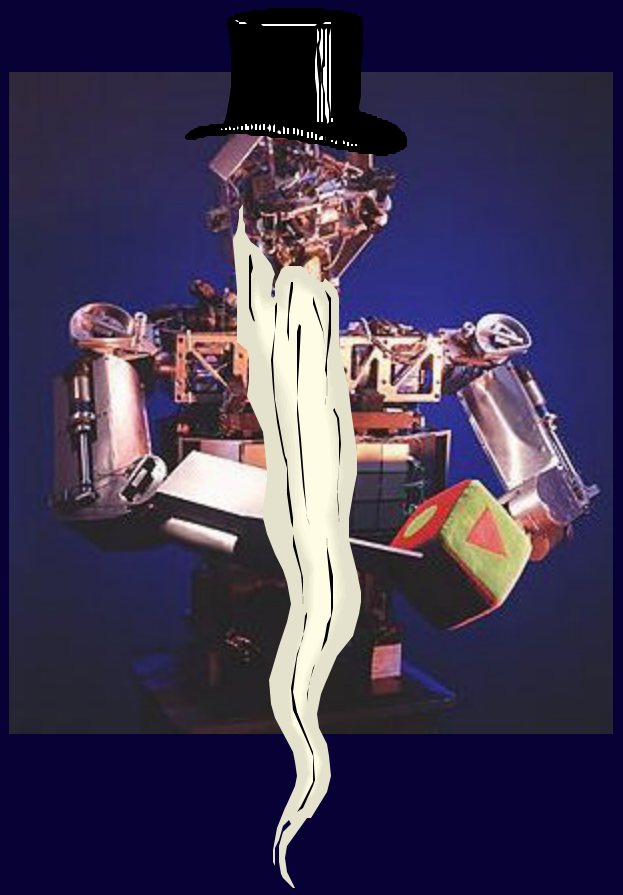
General-purpose perception, action = can of worms

Nasty, *icky*, **intractably wriggly** worms

Task-specific perception, action = tractable!

So generalize by parameterizing across tasks

Task-Parameterized Perception



Social-Pragmatic Approach

Tomasello – Language is how we invite others to experience the world in a particular way

My plan – to implement tasking this way

For each task, we communicate how to carve up world into actions, objects, properties

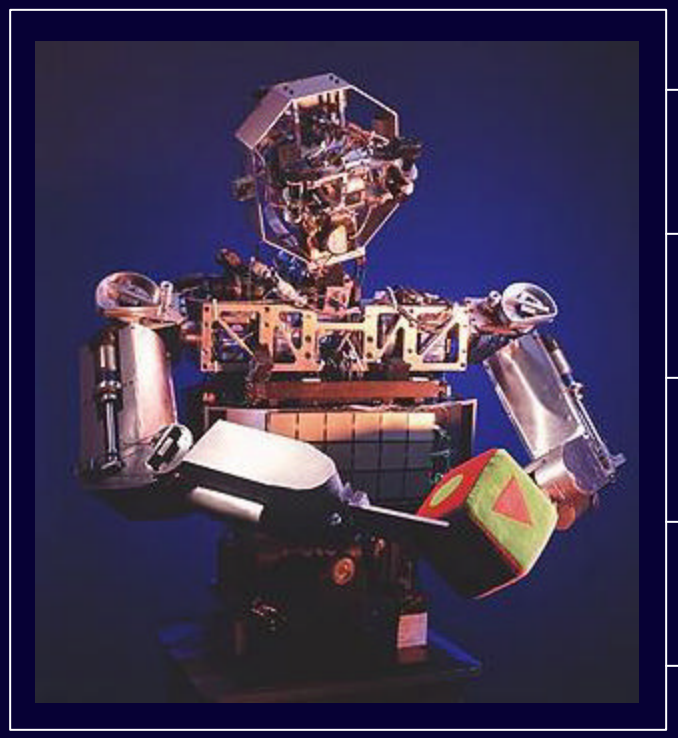
Given that, robot can perceive, act, decode references, leap tall buildings

Thrun's CES Language

- Leave "gaps" in control program
- Completed later from labeled training sets
  - Example – mapping sonar+odometry to angle
  - Example – recognizing left hand, right hand
- Process can iterate during code development
- My plan – leave larger gaps; scriptable interface

Scripting Analogy

- Expose interfaces for physical references, sequences



Robot exposes interfaces

Coder tailors to own nefarious purposes

Referential Indeterminacy

"GAVAGAI"

Whole object assumption

Taxonomic assumption

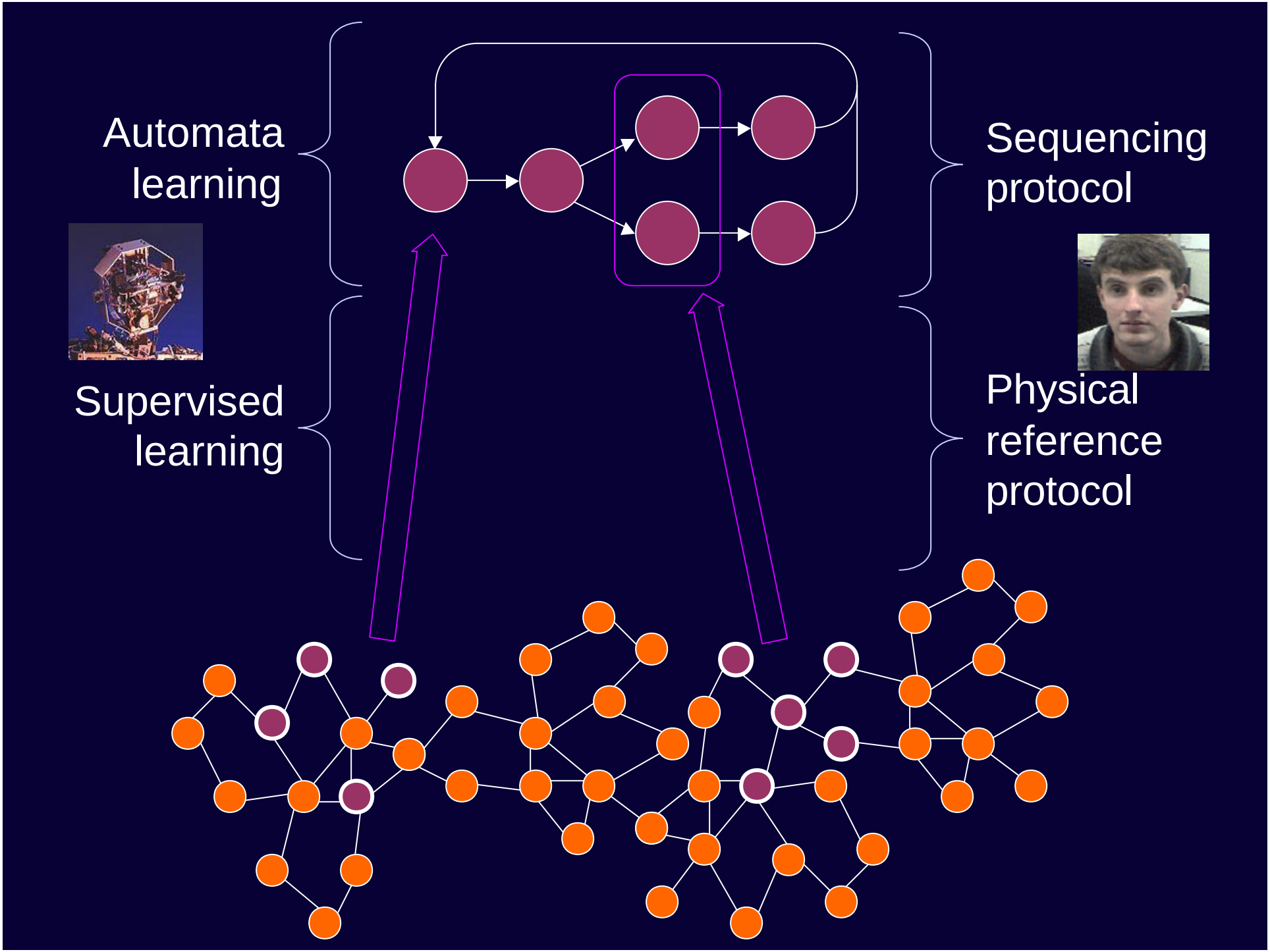
Mutual exclusivity

Gaze direction

(Quine: Word and Object, 1960)

“Let’s go find the toma!”

(Tomasello: Pragmatics of Word Learning, 1997)

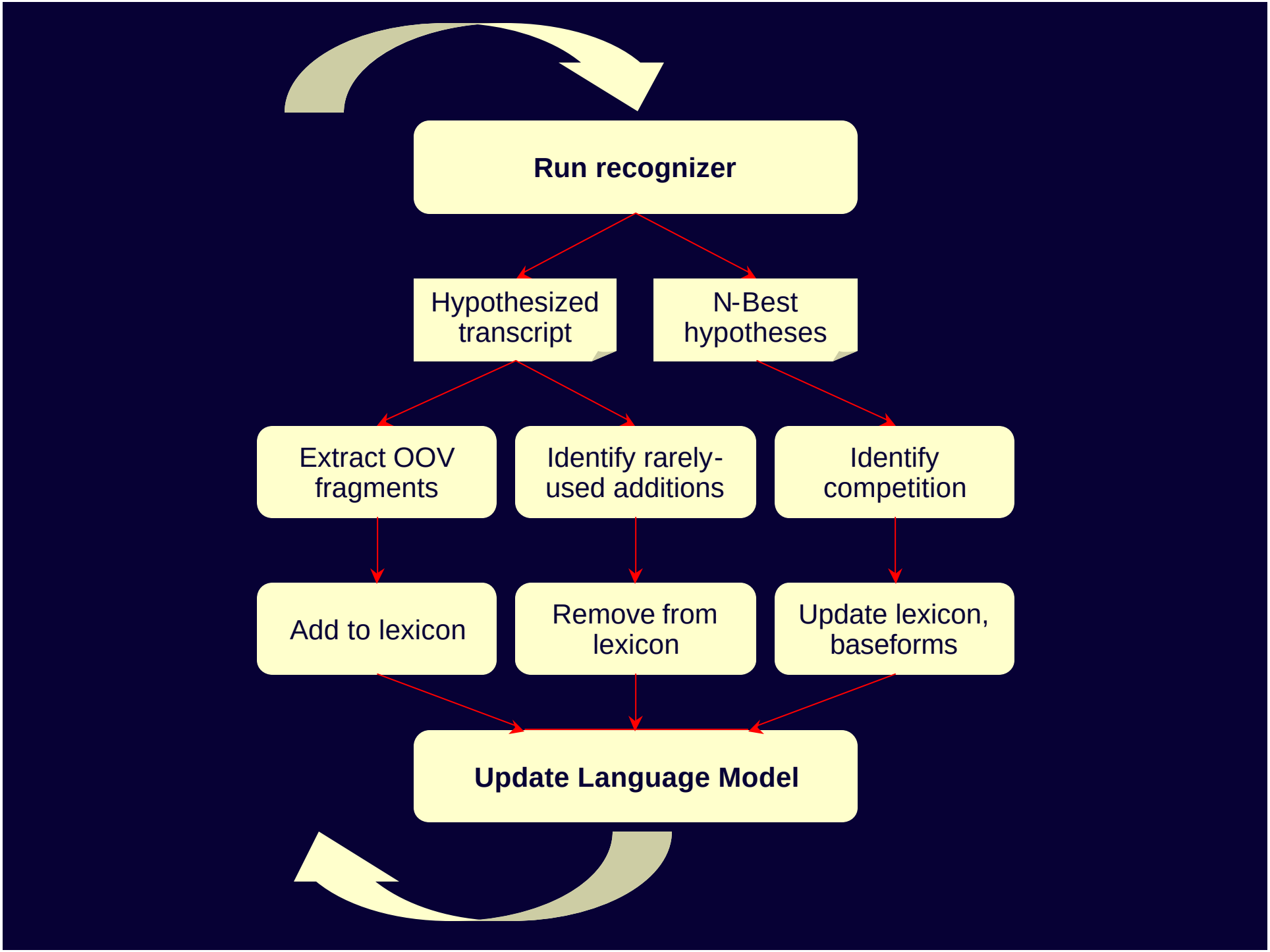

Automata learning
Sequencing protocol
Supervised learning
Physical reference protocol

Physical Reference Protocol

- Refer to features by manipulating them
- Show extremes, alternate, synchronize
- Lies on continuum with sequencing protocol
- Cache features by associating labels

Sequencing Protocol

- Verbal
- Fast vocabulary extension
- Offline discovery of filler, language model
- Small hardwired grammar
- Hardwired error correcting protocol


Run recognizer
Hypothesized transcript
N-Best hypotheses
Extract OOV fragments
Identify rarely-used additions
Identify competition
Add to lexicon
Remove from lexicon
Update lexicon, baseforms
Update Language Model

Basic Object Competence

- Visual segmentation is major source of confusion

Use the “Confuse THIS!” strategy :-

Active Segmentation

- Unsure where the boundaries of an object lie?
  - Poke it gently
  - Thump it savagely
  - Try to put your flipper beside it
  - Try to put your flipper behind it
  - Displace your head
  - Get human to present it

Conclusions

- Target demonstrations
  - Can’t do porter, so do sorter
  - Incremental role transfer
  - Comprehension of search
  - Component technologies
- Functional autonomy?