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)
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 :-)

Ow!
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?