Wubble World
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Goal:

Learn the meaning of words through interaction with a human
a cube
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cube?

no, a ball
Player says: "Pick up the green ball"
Robot says: "What is the green ball?"
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Player points to the green ball
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Key Abilities

- Parse input from user
- Perceive objects
- Take action
- Ask for help
- Learn meanings of words
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Perceiving Objects

Sub-Abilities
- Differentiate between foreground, background
- Identify "blobs" in picture
- Map blobs to objects
- Determine boundaries between objects (segmentation)
- Determine object properties
  - Size
  - Shape
  - Color
  - Exact position
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Perceiving Objects

Possible Simplifications
- Brightly or uniquely colored objects
- No shape perception
- No touching objects
- Hard-coded knowledge of key properties
- "Magic" knowledge of all objects in the room

Likely Implementation
- Overhead camera detects blobs
- Laser rangefinder for object position
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Taking Action

Sub-Abilities
- Navigate in room
- Avoid obstacles
- Search behind obstructions
- Grasp/Pick up objects
- Drop/Stack Objects
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Interaction & Learning

Sub-Abilities
- Ask for help
- Determine what user is pointing at
- Recall previously learned words
- Learn new words, update learned meaning of words
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Other Thoughts

What motivates the robot? (Emotions, etc.)
How to generalize control?

How to generalize learning?
  - Easy to generalize wubble learning to new types of adjectives.
  - How to learn verbs?
  - How to learn non-verbal things?
Software

- **nltk** for parsing english text

  ```python
  grammar = nltk.parse_cfg(" ... ")
  parse_tree = parser(grammar).nbest_parse(sentence)
  ```

- java speech api (**jsapi**)

- **opencv** for extracting visual features
  train the wubble to identify the features (online training?)
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http://www.youtube.com/watch?v=tbHWvPWhVh8
http://ros-engagement.sourceforge.net/