~~Context Modeling~~
[Lessons Learned from] AI

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Context = Knowledge?

- Context representation = knowledge rep?
  - Different levels
    - Raw sensor data = facts / assertions
    - Current context = working memory
  - Dynamic vs. static
    - Context is inherently dynamic
    - Many AI systems use static knowledge / facts
      - Exception: Robotics (Autonomous Land Vehicles)

Success vs. Failure
(Narrow vs. Broad)

- **Successful AI systems:**
  - Narrow domain focus, specific applications
    - Speech recognition (Radiology, law, …)
    - Information Extraction (news stories on terrorism)
- **Unsuccessful AI systems:**
  - CYC
    - Capture all common-sense knowledge
    - Enable all AI applications
    - 10+ years, little to show

Levels

Raw sensor data · · · · Full context

Raw facts / assertions · · · · Full knowledge

It may be possible to define interfaces between different levels of abstraction.

Everything gets much harder as you move to the right, *unless* the task / application is narrowly defined.

Hearsay

- **Speech Recognition (CMU): 1970s**
  - Blackboard architecture
  - Well-defined levels
    - Subphones, phones, syllables, words, sentences
  - Knowledge sources
    - Look at data on one level, post results on another

Example 1

- Brake assistance
  - Fully engage brakes when driver "wants to"
    - Ineffective use of ABS
  - Context: time between gas pedal release and brake pedal press
  - Low-level context, well-defined problem ➔ success

Example 2

- Beach preparation
  - Remind me of what I need to bring
    - Sunglasses, sunblock, towels, balls, etc.
  - High level context
    - How does system know your intent/plan?
    - What accuracy threshold is needed
      - E.g., false remindings
      - What if assistant knows 100s or 1000s of event types?

AI vs. UbiComp
(potential breakout theme?)

- Both seek to model the world
- Goal(s) of AI
  - Strong AI: replace humans
  - Weak AI: assist humans
- Goal(s) of UbiComp?
  - [Another] potential breakout theme?