

Cognitive Architecture Challenge Problems

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Example Challenge Problems

1. Create a system that can pass the Turing Test
2. Create a program that can beat the human world chess champion.
3. Create a vehicle that can travel 70 miles off road without human assistance.
4. Create a vehicle that can safely travel through an urban environment without human assistance.
5. Create humanoid robots that can beat the World Cup champion soccer team.

Why a Cognitive Architecture Challenge Problem?

- Increase depth of research in cognitive architecture
 - Marshal resources for complete cognitive architectures
 - Application will “pull” research
- Increase breadth of research in cognitive architecture.
 - More researchers trying out more ideas
 - More students interested in cognitive architecture research.
 - Increase government and industrial funding.
 - Increase public awareness of cognitive architecture.
- If we don't come up with one, someone else might.
 - And we might not like it.

Criteria for Challenge Problems

1. Compelling

- Easy to understand the problem
 - One sentence
- Easy to understand why the problem is important
 - Will someday save huge \$\$'s
 - Will someday improve or save many lives

2. Something that can be achieved in 5 years

- Not an incredibly difficult research problem ($P = NP$)
- Mostly engineering

Criteria for Cognitive Architecture Challenge Problems

- Requires a diverse set of cognitive capabilities
 - Sensing, action, reactivity, decision making, planning, language, interaction...
- Requires many different forms of learning
 - Instruction, experience, ...

Brainstorm

1. ??