

CSCI561 FALL 2017

WEEK 1 DISCUSSION

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ABOUT US...

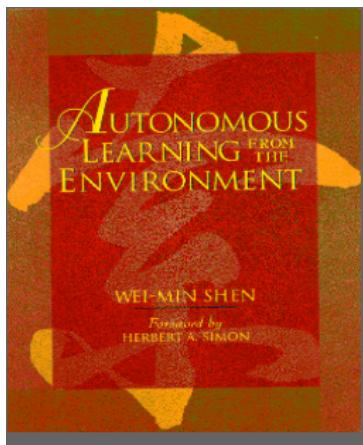
Prof Sheila Tejada (stejada@usc.edu)

- Office: SAL 316
- Office Hours: Thursday, Friday 1-2pm and by appointment (use email heading “CS561-appt”)
- Skype: sheilatejada
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Prof Wei-Min Shen (next slide)

Prof Ning Wang

PROF WEI-MIN SHEN (WWW.ISI.EDU/ROBOTS)



Welcome



Projects

We conduct research in **adaptive, self-reconfigurable, autonomous robots and systems**, including **StarCell**, modular, multifunctional and self-reconfigurable **SuperBot**, Hormone-controlled **Centauri**, **Onager**, **Reactive Robots**, **SPIDER**, **SPIDER**

CS561: ARTIFICIAL INTELLIGENCE

Course overview: foundations of symbolic intelligent systems. Agents, search, problem solving, logic, representation, reasoning, symbolic programming, and robotics.

Prerequisites: Good programming and algorithm analysis skills. Basic probability theory desirable.

Textbook:

Russell & Norvig, *Artificial Intelligence: A Modern Approach 3rd Edition*
(Optional) Shen, *Autonomous Learning from the Environment*, 1994

Lectures

5:00pm – 6:20pm on MW in SGM 123
6:40pm – 9:20pm on Tuesday in SGM 123

Discussions (must sign up for one)

<http://www-scf.usc.edu/~csci561a/calendar.htm>

CS561: ARTIFICIAL INTELLIGENCE

Discussion Sections

- Provide more details, discussion and new material to augment lectures
- Run algorithms on more complex examples than during lectures
- Relate lecture concepts to latest research topics
- Showcase cool demos of recent A.I. achievements

NOTE:

- You will be responsible for material presented in lecture *and* discussion sections.

AI SUCCESS: DEEP BLUE

In 1997 Deep Blue became the first machine to win a match against a reigning world chess champion
(by 3.5-2.5)



DEEP BLUE COMBINED

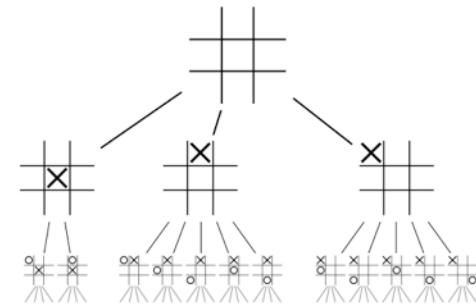
Parallel and special purpose hardware



- A 30-node IBM RS/6000, enhanced with 480 special purpose VLSI chess chips

A heuristic game-tree search algorithm

- Capable of searching 200M positions/sec
- Searched 6-12 moves deep on average, sometimes to 40



Chess knowledge

- An opening book of 4K positions and 700K GM games
- An endgame database for when only 5-6 pieces left
- A positional evaluation function with 8K parts and many parameters that were tuned by learning over thousands of Master games

FIRST ROBOCUP (1997)



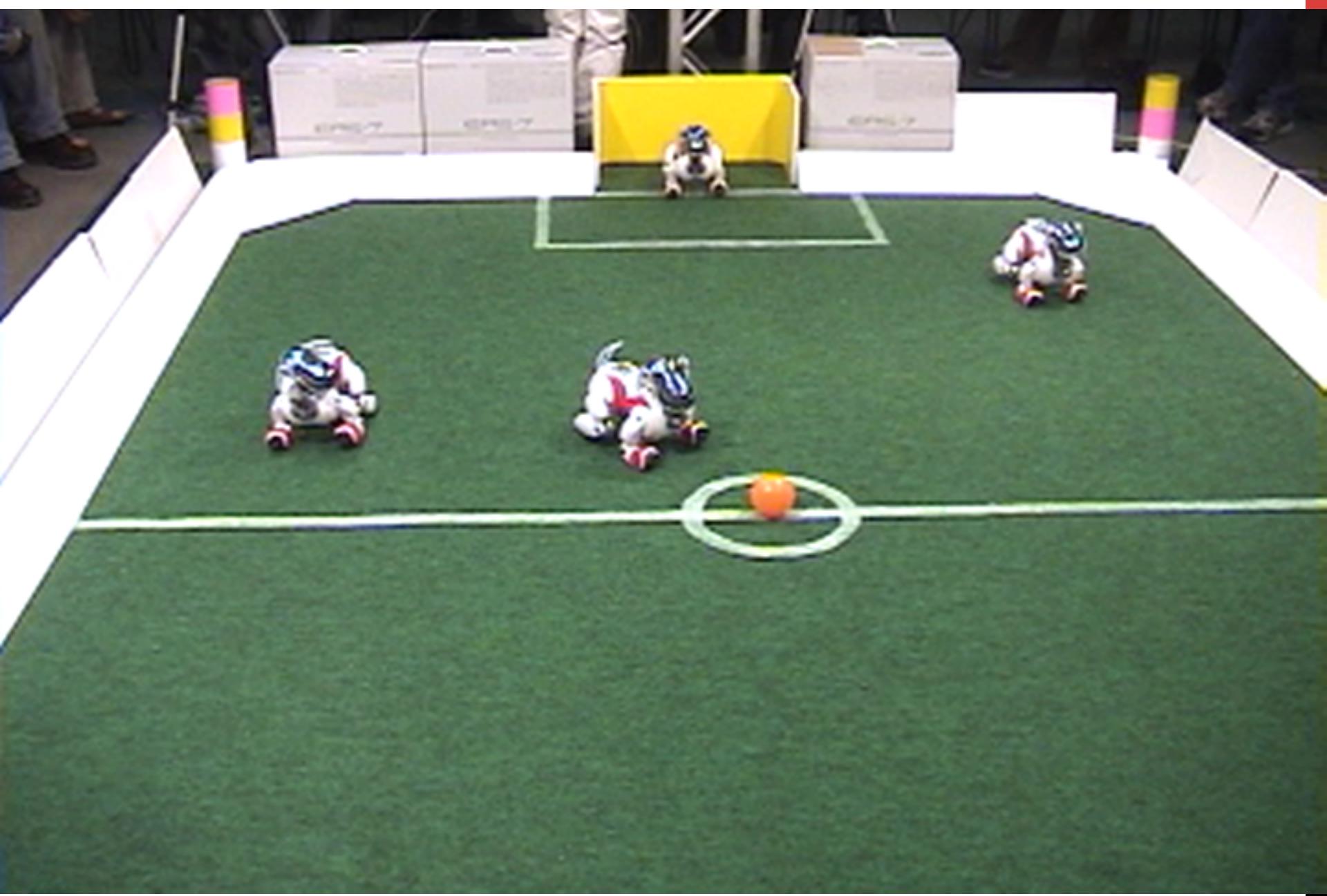


SONY AIBO ROBOT DOG LEAGUE



aibo

SONY



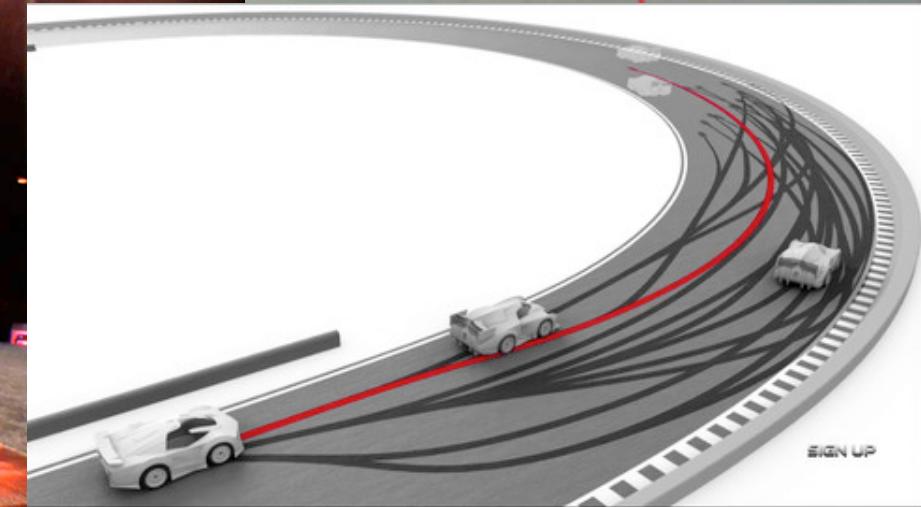
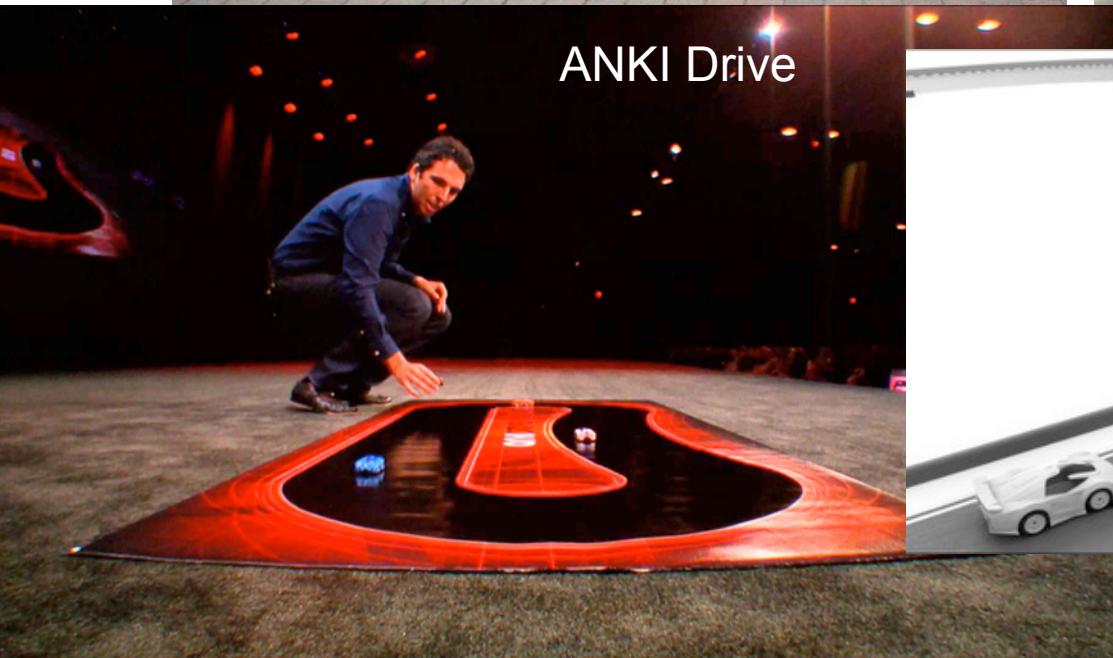
DARPA URBAN CHALLENGE (2007)



SELF-DRIVING CAR



ANKI Drive



RECENT AI SUCCESSES

2009: Ada and Grace

<https://www.youtube.com/v/K6kcv3woo8>



2011: IBM Watson wins in Jeopardy!

<https://www.youtube.com/watch?v=Puhs2LuO3Zc>



2013: USCD emotional baby robot Diego-San

<https://www.youtube.com/embed/knRyDcnUc4U>

2014: Google self driving car

<https://www.youtube.com/watch?v=CqSDWoAhvLU>



2014: Google computer vision solves CAPTCHAs

<http://googleonlinesecurity.blogspot.com/2014/04/street-view-and-recaptcha-technology.html>

WHAT IS AI?

The exciting new effort to make computers think ... machine with minds, in the full and literal sense"
(Haugeland 1985)

"The study of mental faculties through the use of computational models"
(Charniak et al. 1985)

"The art of creating machines that perform functions that require intelligence when performed by people" (Kurzweil, 1990)

A field of study that seeks to explain and emulate intelligent behavior in terms of computational processes" (Schalkol, 1990)

Systems that think like humans

Systems that act like humans

Systems that think rationally

Systems that act rationally

EUGENE GOOSTMAN – TURING TEST

2014

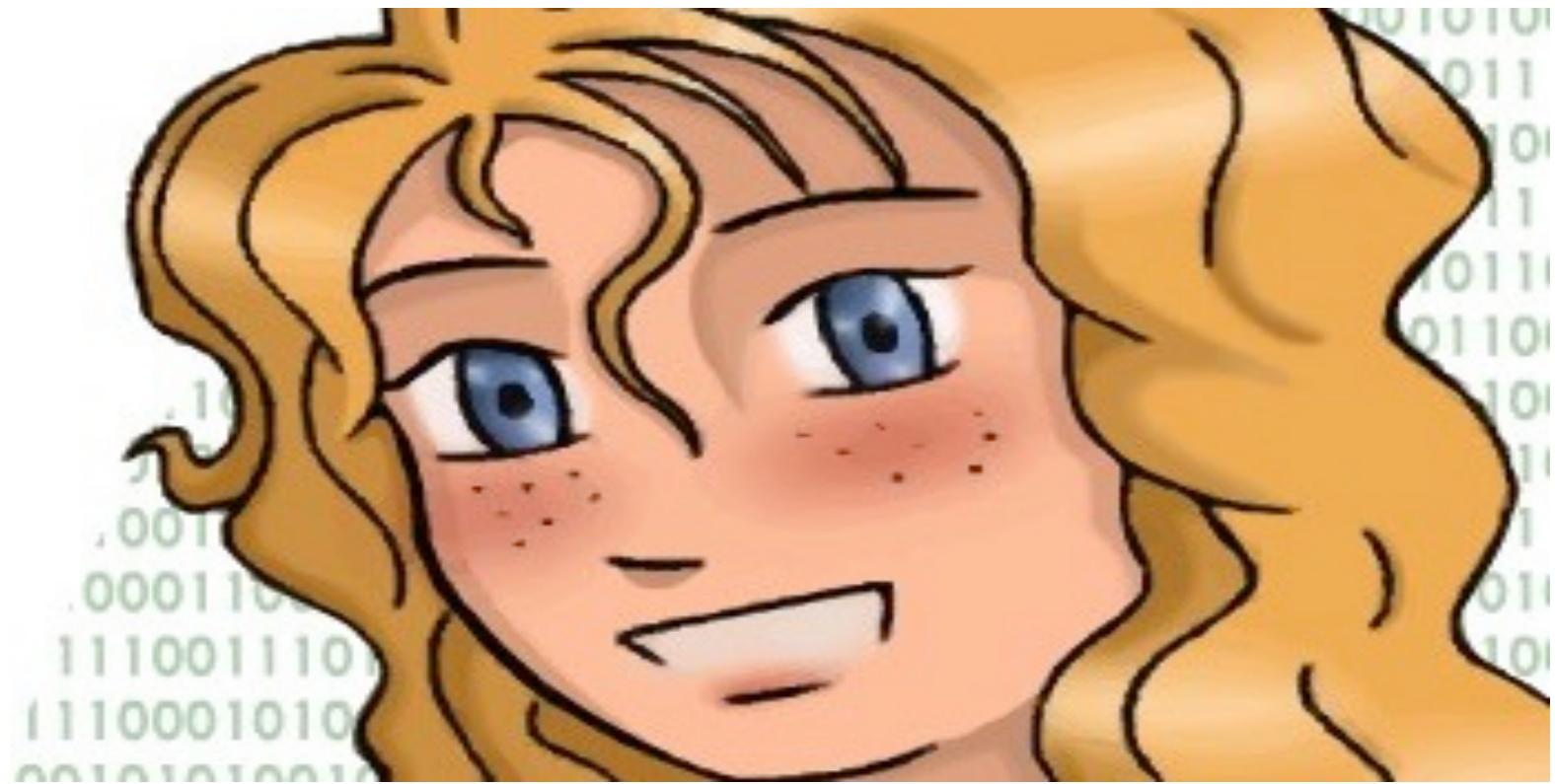
- Interview

- What do you think? Was the test really passed?
- What effect did context, that is, saying that the computer was playing a 13-year-old Ukrainian boy for whom English was a second language, have on the results?
- What does that tell us about the Turing test as a test of artificial intelligence?
- What would be a better test?
- <http://www.princetonai.com/bot/>



EUGENE GOOSTMAN
THE WEIRDEST CREATURE IN THE WORLD

MITSUKU – 2013 LOEBENER WINNER



<http://www.loebner.net/Prizef/loebner-prize.htm>

MAJOR ISSUES FOR AI APPLICATIONS

- **How to represent knowledge about the world?**
- **How to react to new perceived events?**
- **How to integrate new percepts to past experience?**
- **How to understand the user?**
- **How to optimize balance between user goals & environment constraints?**
- **How to use reasoning to decide on the best course of action?**
- **How to communicate back with the user?**
- **How to plan ahead?**
- **How to learn from experience?**

IS AI A SCIENCE, OR IS IT ENGINEERING?

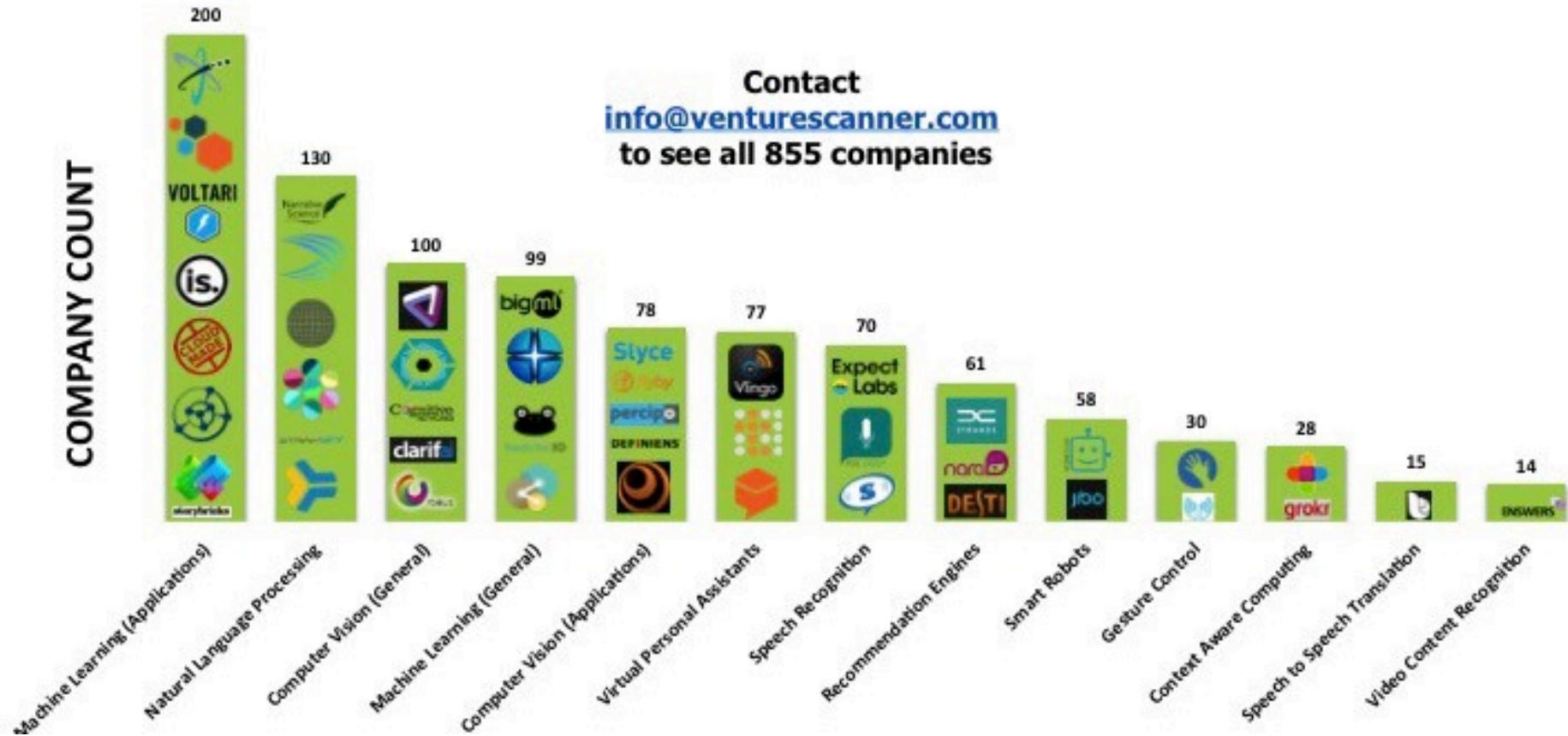
A *science* is a field of study that leads to the acquisition of empirical knowledge by the scientific method, which involves falsifiable hypotheses about what is.

A pure *engineering* field can be thought of as taking a fixed base of empirical knowledge and using it to solve problems of interest to society.

What are examples of AI systems that support your answer to this question?

AI COMPANIES

COMPANY COUNT



Contact
info@venturescanner.com
to see all 855 companies

WHAT YOU SHOULD KNOW

- **What is AI? Why study AI?**
- **What is a performance measure? Rational action? Why are they important for an agent?**
- **What is the relationship between the agent and task environment? How does the environment affect the agent design?**
- **Why is the boundary between agent and environment important?**
- **How is this demonstrated by the recent AI successes?**
- **What is the Turing Test? How has it shaped the field of AI?**

WANT MORE?

Chapter 1 Problem# 1.14

Chapter 2 Problem# 2.2, 2.5

Chapter 3 Problem# 3.9, 3.14