

AI

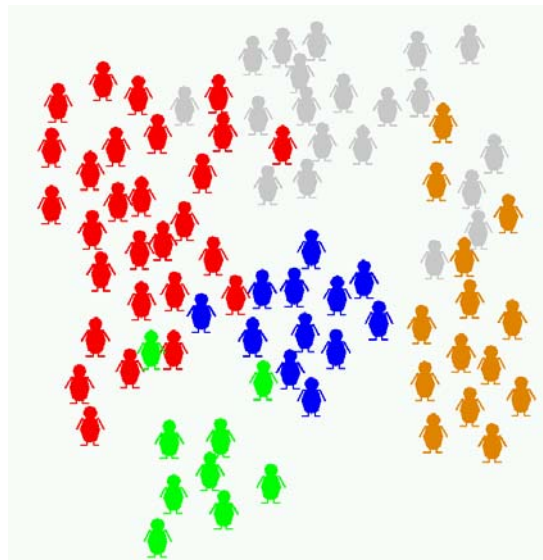


Andrew W. Moore
Carnegie Mellon University

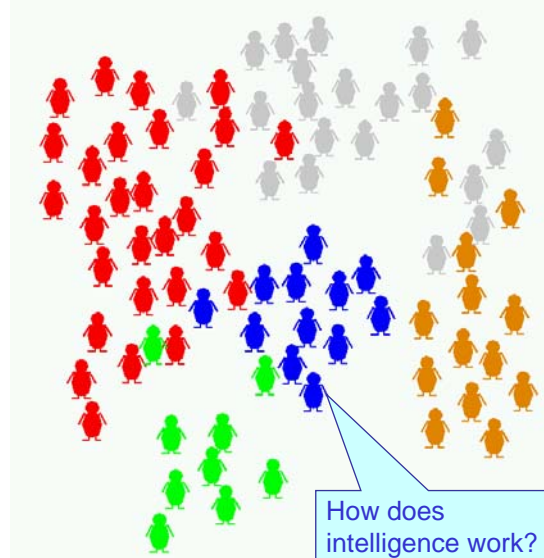
awm@cs.cmu.edu

(Questions welcome about
anything)

An AI cocktail party



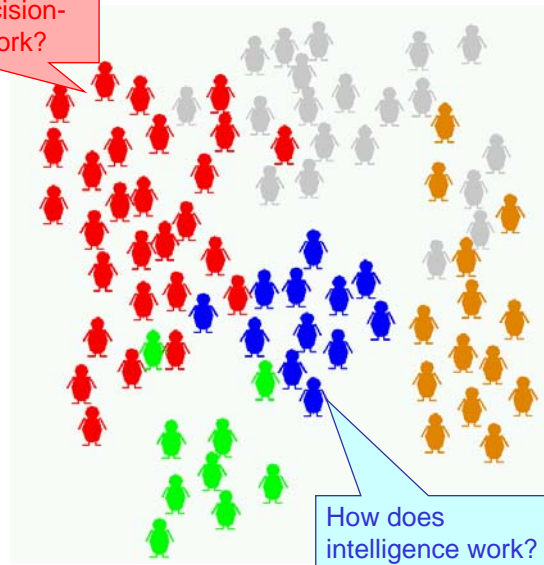
An AI cocktail party



3

An AI cocktail party

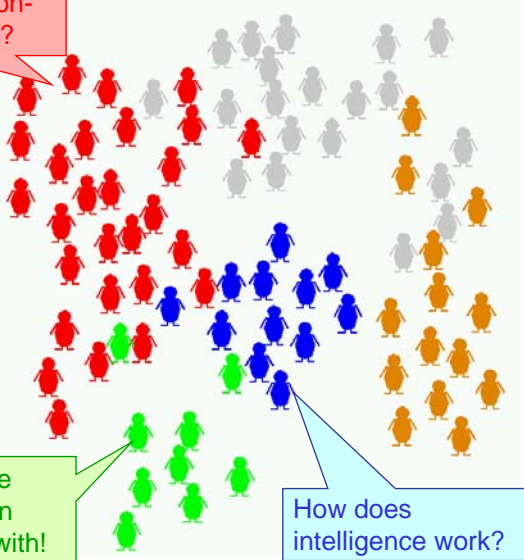
How can we put professional decision-makers out of work?



4

An AI cocktail party

How can we put professional decision-makers out of work?



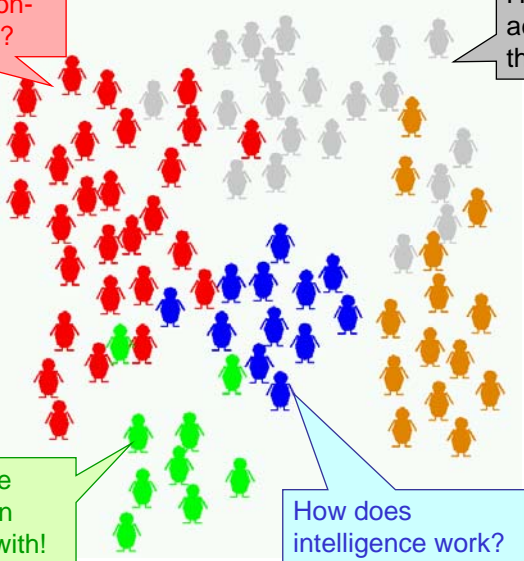
These people have produced some fun questions to play with!

How does intelligence work?

An AI cocktail party

How can we put professional decision-makers out of work?

How can we actually apply this profitably?



These people have produced some fun questions to play with!

How does intelligence work?

An AI cocktail party

How can we put professional decision-makers out of work?

How can we actually apply this profitably?

Revolution. 5 years from now. A new age dawns. Paradigm shift. The one thing they missed up to now is...

These people have produced some fun questions to play with!

How does intelligence work?

7

Why do AI research?

Old fashioned answer:

Make programs that behave like the brain behaves

8

Why do AI research?

New fashioned answer:

Make programs that behave like the brain should behave

9

“Natural AI” questions.....

- Can we make something that is as intelligent as a human?
- Can we make something that is as intelligent as a bee?
- Can we get something that is really evolutionary and self improving and autonomous and flexible....?

“Algorithmic AI” questions.....

- Can we save this plant \$20million a year by improved pattern recognition?
- Can we save this bank \$50million a year by auto fraud detection?
- Can we start a new industry of handwriting recognition / automated negotiation / helpdesks /?

10

Natural AI

Typical Paper Title:

Effective Learning Requires Neuronal Remodeling of Hebbian Synapses -- Gal Chechik, Isaac Meilijson, Eytan Ruppin,

Lee, T.S. (2000) Neural Processes Underlying Attentive Perceptual Organization . To appear in Perceptual Organization in Vision: Behavioral and Neural Perspectives Ed. M. Behrmann, C. Olson and R. Kimchi, Lawrence Erlbaum Associates.

11

Algorithmic AI

Example Paper titles

Andrew W. Moore, The Anchors Hierarchy: Using the Triangle Inequality to Survive High Dimensional Data, In proceedings of UAI-2000: The Sixteenth Conference on Uncertainty in Artificial Intelligence

D. Fox, W. Burgard, and S. Thrun. Markov localization for mobile robots in dynamic environments. Journal of Artificial Intelligence, 11:391--427, 1999.

12

AI theoreticians



Extremely valuable people for the whole AI community.

Often come and clear up the mess made by the red and blue guys.

But remember the cautionary tale of Optimal Control.

13

Theoretical AI

Typical paper titles:

Reasoning in Expressive Description Logics with Fixpoints based on Automata on Infinite Trees, **Diego Calvanese, Giuseppe De Giacomo, and Maurizio Lenzerini**

Ordered Binary Decision Diagrams and Minimal Trellises, **John Lafferty and Alexander Vardy**. *IEEE Trans. Computers*, Vol. 48, No. 9, pp. 971-986, Sept., 1999.

14

Snake-Oil A.I.

Typical paper title

CUTEWARP: A hierarchical framework for agent-based emotes---are fuzzy genomes the T-cell of the heterogenous agent's collaborative protocol-base? (a meta-XML perspective)

15

Buzzwords associated with AI over time

1970s: Artificial Intelligence

1980s: Knowledge Based Systems (IKBS), Fuzzy Logic, Satisficing

1990s: Neural Nets, Cased-Based Reasoning, Genetic Algorithms, Distributed AI

2000s: Agents, Evolutionary Systems

16

Buzzwords associated with AI over time

1970s: Artificial Intelligence

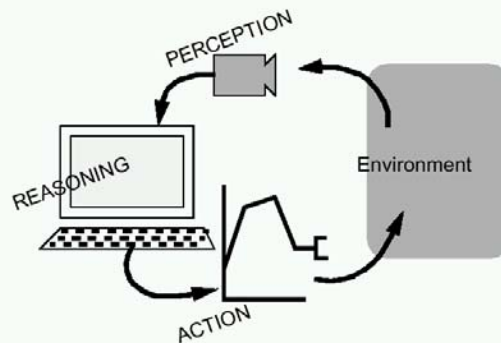
1980s: Knowledge Based Systems (IKBS), Fuzzy Logic, Satisficing

1990s: Neural Nets, Cased-Based Reasoning, Genetic Algorithms, Distributed AI

2000s: Agents, Evolutionary Systems, Bayes, Markov, Nash

17

General properties of AI systems



The research at CMU is most strongly rooted in REASONING. Some Perception and actuation also, but they are covered elsewhere.

(e.g “Perception” part of the Robotics program)

18

Subcomponents of Reasoning

