(Brief) History of Artificial Intelligence

COMP9414: Artificial Intelligence

Artificial Intelligence: The First 2,400 years

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• Logic (Aristotle c. 350BC, Boole 1848, Frege 1879, Tarski 1935)	Deductive reasoning, problem solving
• Formal algorithms (Euclid c. 300BC)	Theoretical foundations
• Inductive Reasoning (Bacon 16th C, Hume 18th C)	Machine Learning
• Probability (Pascal 17th C, Bayes 18th C)	Uncertain reasoning
• Utility theory (Mill 1863)	Uncertain reasoning, reinforcement learning
• Structural linguistics (Saussure 1916, Bloomfield 1933)	Natural Language Processing
• Formal systems (Gödel 1929, Turing 1936)	Theoretical foundations
• Neural networks (McCullogh & Pitts 1943)	Machine Learning
• Cybernetics/Control theory (Wiener 1948)	Autonomous systems
• Game theory (von Neumann & Morgernstern 1947)	Game play, adversarial agents
• Decision theory (Bellman 1957)	Reinforcement learning
• Formal linguistics (Chomsky 1957)	Natural Language Processing

Milestones

- 1950 – Turing's paper in the imitation game and child machine

- 1951 – Game of draughts (Chritopher Strachey, Manchester)

- 1955 – Checkers learning program (Samuel, IBM)

- 1956 – Dartmouth Conference (first use of "Artificial Intelligence")

- 1959 – General Problem Solver (Newell, Simon & Shaw)

- 1960 – Adaptive Control (Widrow & Hoff)

- 1962 – Perceptron (Rosenblatt)

Milestones

- 1963 – Symbolic Algebra (Slagle)

- 1969 – Shakey (Nilsson, Duda, Hart, Fikes, … SRI Intenational)

- 1975 – Freddy and the AI Winter (Michie *et al*, Edinburgh)

- 1981 – First International Workshop on Machine Learning

- 1981 – Decision Trees (Quinlan, Stanford, USyd, NSWIT,UNSW)

- 1997 – Deep Blue beats Gary Kasparov (IBM)

- 1997 – First RoboCup competition

Turing's Imitation Game (1950)
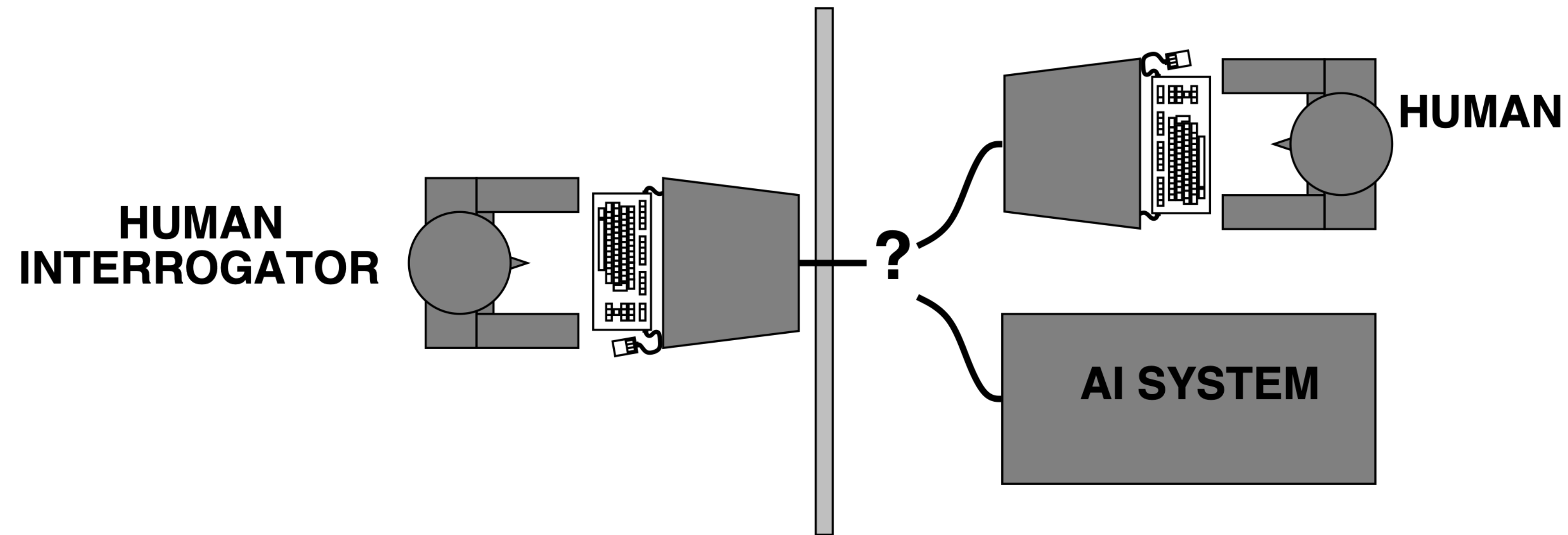
I believe that in about fifty years time [2000] it will be possible to programme computers to make them play the imitation game so well that an average interrogator will not have more than 70 per cent chance of making the right identification after five minutes of questioning.

Eliza Session

Doctor: What brought you here to see me today?
Visitor: Oh, nothing much. I'm feeling a bit tired, that's all.

Doctor: Why do you think you're feeling a bit tired?
Visitor: Well, I've been traveling a lot, and away from home.

Doctor: Tell me more about your family.

Eliza Session

Visitor: The trouble is, my mother's ill.

Doctor: How long has she been ill?
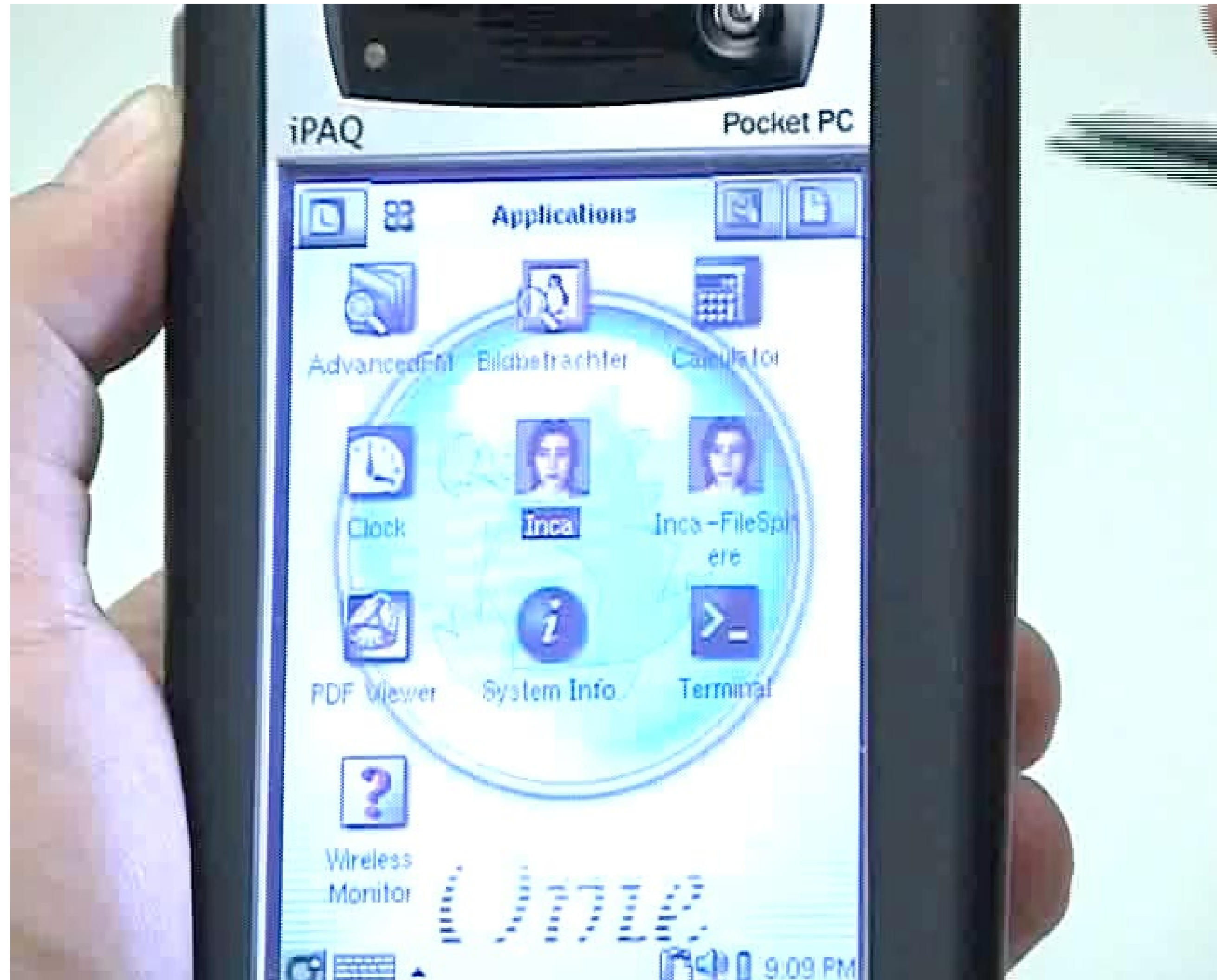
...

Visitor: The trouble is, my mother's Irish.

Doctor: How long has she been Irish?

...

Visitor: The trouble is, my mother's poodle.

Doctor: How long has she been poodle?

Conversational Agents

The Child Machine

"Instead of trying to produce a programme to simulate the adult mind, why not rather try to produce one which simulates the child's? If this were then subjected to an appropriate course of education one would obtain the adult brain. Presumably the child-brain is something like a notebook as one buys from the stationers. Rather little mechanism, and lots of blank sheets... Our hope is that there is so little mechanism in the child-brain that something like it can be easily programmed. The amount of work in the education we can assume, as a first approximation, to be much the same as for the human child."

Agents and Autonomous Systems

- Complex behaviours in dynamic environments

- Have to integrate almost all aspects AI

- Combines computing with many other disciplines

Autonomous Systems
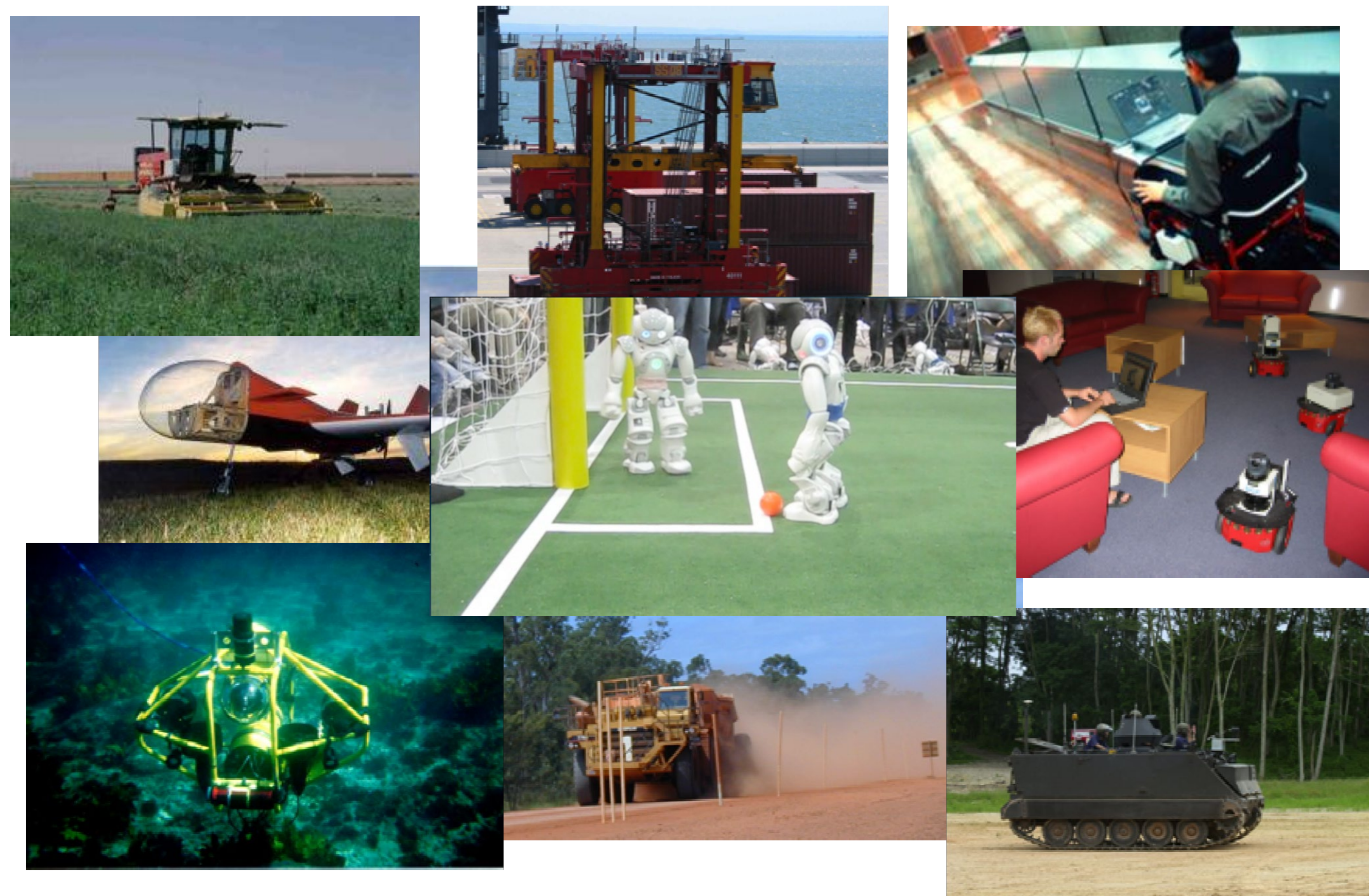
Shakey - The First Integrated AI System

Recent History

- Read Nils Nilsson's "The Quest for Artificial Intelligence"

- https://ai.stanford.edu/~nilsson/QAI/qai.pdf