

MORAVEC`S PARADOX

BURAK ADAM

CSCI 446

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A LONG-CHASED DREAM



ARISTOTLE

START THE

FIRE

Analyzing Logical reasoning

All A`s are B

C is A

Therefore C is B

This work resulted in the inv the programmable digital co 1940s, a machine based or essence of mathematical re



A SHORT

HISTORY OF

AI



A SHORT

HISTORY OF

AI

Brief Resurgence (1980-1987)

A brief resurgence in "expert systems" in the 1980s created additional excitement about AI. Expert systems are computers that mimic the decision-making abilities of humans through a series of if-then statements.

The second AI winter 1987–1993

. Rodney Brooks and Hans Moravec, researchers from the related field of robotics, argued for an entirely new approach to artificial intelligence.

Rebirth of AI (1990s- Now)

Today, the field is finally achieving some of its old goals. New formulations in Bayesian probability, Markov models, information theory, stochastic modeling, and optimization brought a wealth of new tricks to the trade.

AI HAS NEVER

BEEN

SMARTER





BUT WHY

IS IT

SO DUMB ?

Moravec`s paradox is the observation by artificial intelligence and robotics researchers that, contrary to traditional assumptions, high-level reasoning requires very little computation, but low-level sensorimotor skills require enormous computational resources.

The principle was articulated by Hans Moravec, Rodney Brooks, Marvin Minsky and others in the 1980s.

WHAT

IS

INTELLIGENCE ?



A

NEW

APROACH

Moravec wrote, "It is comparatively easy to make computers exhibit adult level performance on intelligence tests or playing checkers, and difficult or impossible to give them the skills of a one-year-old when it comes to perception and mobility."

Similarly, Minsky emphasized that the most difficult human skills to reverse engineer are those that are unconscious. "In general, we're least aware of what our minds do best, we're more aware of simple processes that don't work well than of complex ones that work flawlessly".

CAN

AI

BEAT

EVOLUTION



"Encoded in the large, highly evolved sensory and motor portions of the human brain is a billion years of experience about the nature of the world and how to survive in it,"

The deliberate process we call reasoning is, I believe, the thinnest veneer of human thought, effective only because it is supported by this much older and much more powerful, though usually unconscious, sensorimotor knowledge."

TOP TO BOTTOM OR BOTTOM TO

TOP ?



HISTORICAL

EFFECT

The AI effect is a phenomenon that has seen AI-powered tools lose their 'AI' label over time

Al unemployment

Nouvelle Al

NOUVELLE

AI

Rodney Brooks, MIT

Nouvelle AI distances itself from traditional characterizations of AI, which emphasize human-level performance.

One aim of nouvelle AI is the relatively modest one of producing systems that display approximately the same level of intelligence as insects

HERBERT

FRAME

PROBLEM

Al researchers call the problem of updating, searching, and otherwise manipulating, a large structure of symbols in realistic amounts of time the frame problem.

The frame problem is endemic to symbolic AI.

Nouvelle systems do not contain a complicated symbolic model of their environment.

BBAI

Behavior-Based Artificial Intelligence

It is extremely popular in robotics and to a lesser extent to implement intelligent virtual agents

Real-time dynamic systems that can run in complex environments

Intelligence situated in a given environment

Braitenberg

vehicle

Simply wired sensor/motor connections

Result in some complex-appearing behaviors, fear and love

Minimal intelligence is attributed to a cockroach.

Yet, the functioning of the agent is purely mechanical, without any information processing or other apparently cognitive processes.

Braitenberg

vehicle



CONCLUSION

To be able to teach the machines first we need to understand.

We are not sure what intelligence is

An insect is intelligent?

Can we beat the evolution?

Frame problem seems insolvable

BONUS:

STRANGE

LOOPS

Gödel, Escher, Bach: An Eternal Golden Braid

1979 book by Douglas Hofstadter

