Source:

Bostrom, Nick. Superintelligence: Paths, Dangers, Strategies. - OUP Oxford. Kindle Edition.

Artificial intelligence already outperforms human intelligence in many domains.

Table 1 surveys the state of game-playing computers, showing that AIs now beat human champions in a wide range of games.

Checkers: Superhuman

Arthur Samuel's checkers program, originally written in 1952 and later improved (the 1955 version incorporating machine learning), becomes the first program to learn to play a game better than its creator. In 1994, the program CHINOOK beats the reigning human champion, marking the first time a program wins an official world championship in a game of skill. In 2002, Jonathan Schaeffer and his team "solve" checkers, i.e. produce a program that always makes the best possible move (combining alpha-beta search with a database of 39 trillion endgame positions). Perfect play by both sides leads to a draw.

Backgammon: Superhuman

1979: The backgammon program BKG by Hans Berliner defeats the world champion— the first computer program to defeat (in an exhibition match) a world champion in any game— though Berliner later attributes the win to luck with the dice rolls. 44 1992: The backgammon program TD-Gammon by Gerry Tesauro reaches championship-level ability, using temporal difference learning (a form of reinforcement learning) and repeated plays against itself to improve. In the years since, backgammon programs have far surpassed the best human players.

Traveller TCS: Superhuman in collaboration with human

In both 1981 and 1982, Douglas Lenat's program Eurisko wins the US championship in Traveller TCS (a futuristic naval war game), prompting rule changes to block its unorthodox strategies. Eurisko had heuristics for designing its fleet, and it also had heuristics for modifying its heuristics.

Othello: Superhuman

1997: The program Logistello wins every game in a six-game match against world champion Takeshi Murakami.

Chess: Superhuman

1997: Deep Blue beats the world chess champion, Garry Kasparov. Kasparov claims to have seen glimpses of true intelligence and creativity in some of the computer's moves. 50 Since then, chess engines have continued to improve.

Crosswords Expert level

1999: The crossword-solving program Proverb outperforms the average crossword-solver. 2012: The program Dr. Fill, created by Matt Ginsberg, scores in the top quartile among the otherwise human contestants in the American Crossword Puzzle Tournament. (Dr. Fill's performance is uneven. It completes perfectly the puzzle rated most difficult by humans, yet is stumped by a couple of nonstandard puzzles that involved spelling backwards or writing answers diagonally.)

Scrabble: Superhuman

As of 2002, Scrabble-playing software surpasses the best human players.

Bridge: Equal to the best

By 2005, contract bridge playing software reaches parity with the best human bridge players.

Jeopardy!: Superhuman

2010: IBM's Watson defeats the two all-time-greatest human Jeopardy! champions, Ken Jennings and Brad Rutter. Jeopardy! is a televised game show with trivia questions about history, literature, sports, geography, pop culture, science, and other topics. Questions are presented in the form of clues, and often involve wordplay.

Poker: Varied

Computer poker players remain slightly below the best humans for full-ring Texas hold 'em but perform at a superhuman level in some poker variants.

FreeCell: Superhuman

Heuristics evolved using genetic algorithms produce a solver for the solitaire game FreeCell (which in its generalized form is NP-complete) that is able to beat high-ranking human players.

Go: Very strong amateur level

As of 2012, the Zen series of Go-playing programs has reached rank 6 dan in fast games (the level of a very strong amateur player), using Monte Carlo tree search and machine learning techniques. Go-playing programs have been improving at a rate of about 1 dan/ year in recent years. If this rate of improvement continues, they might beat the human world champion in about a decade.

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Remarks:

Go is now superhuman: AlphaGo is a deep deep learning system developed at Google Deep Mind in London. We will study it later in the course.

Most of those results improved since this book was published due to the deep learning revolution of recent years. Many more were added, including video games.