

Artificial Intelligence and Machine Learning for Engineering Design

What is it and why should we care?

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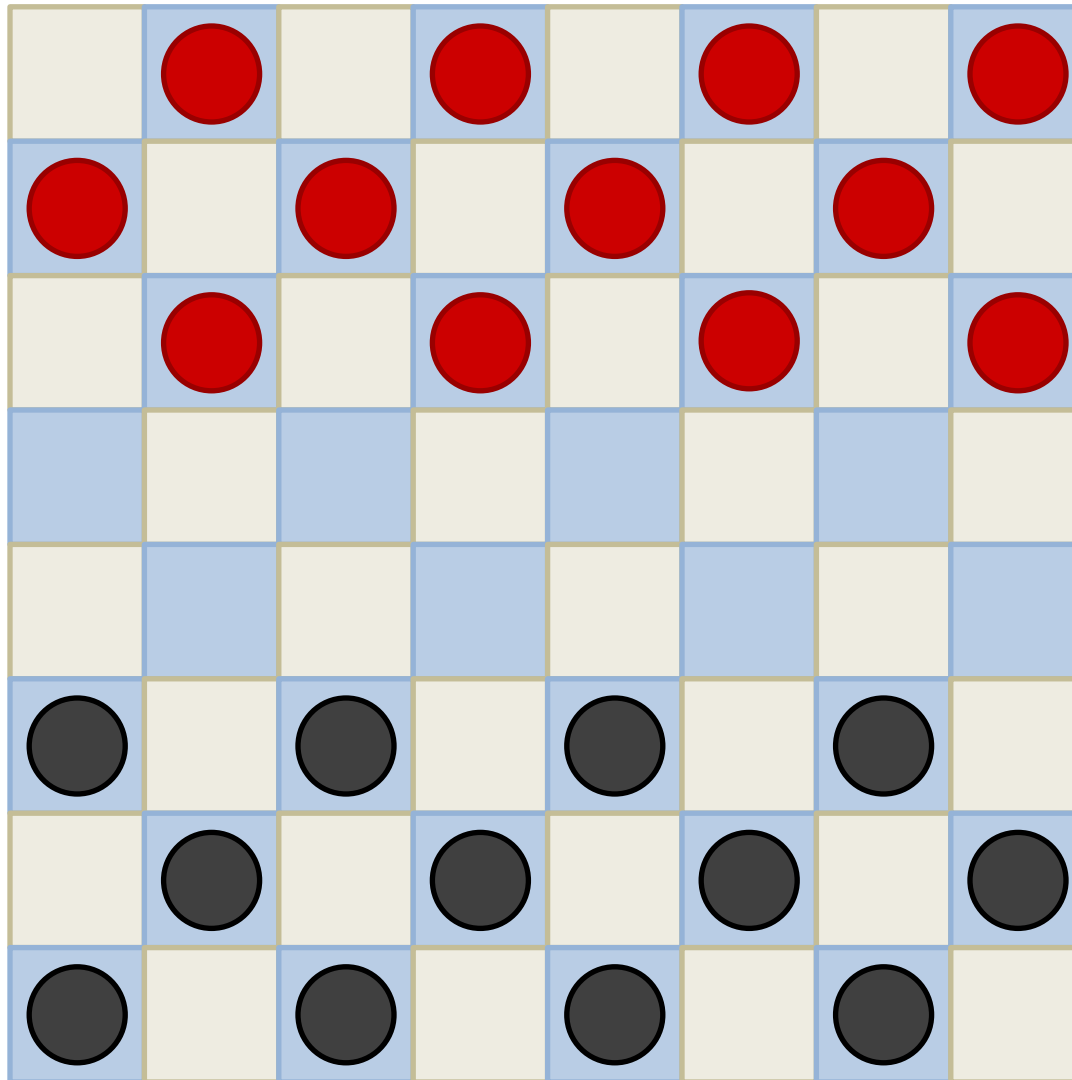
Goals for today

This course is **interesting**

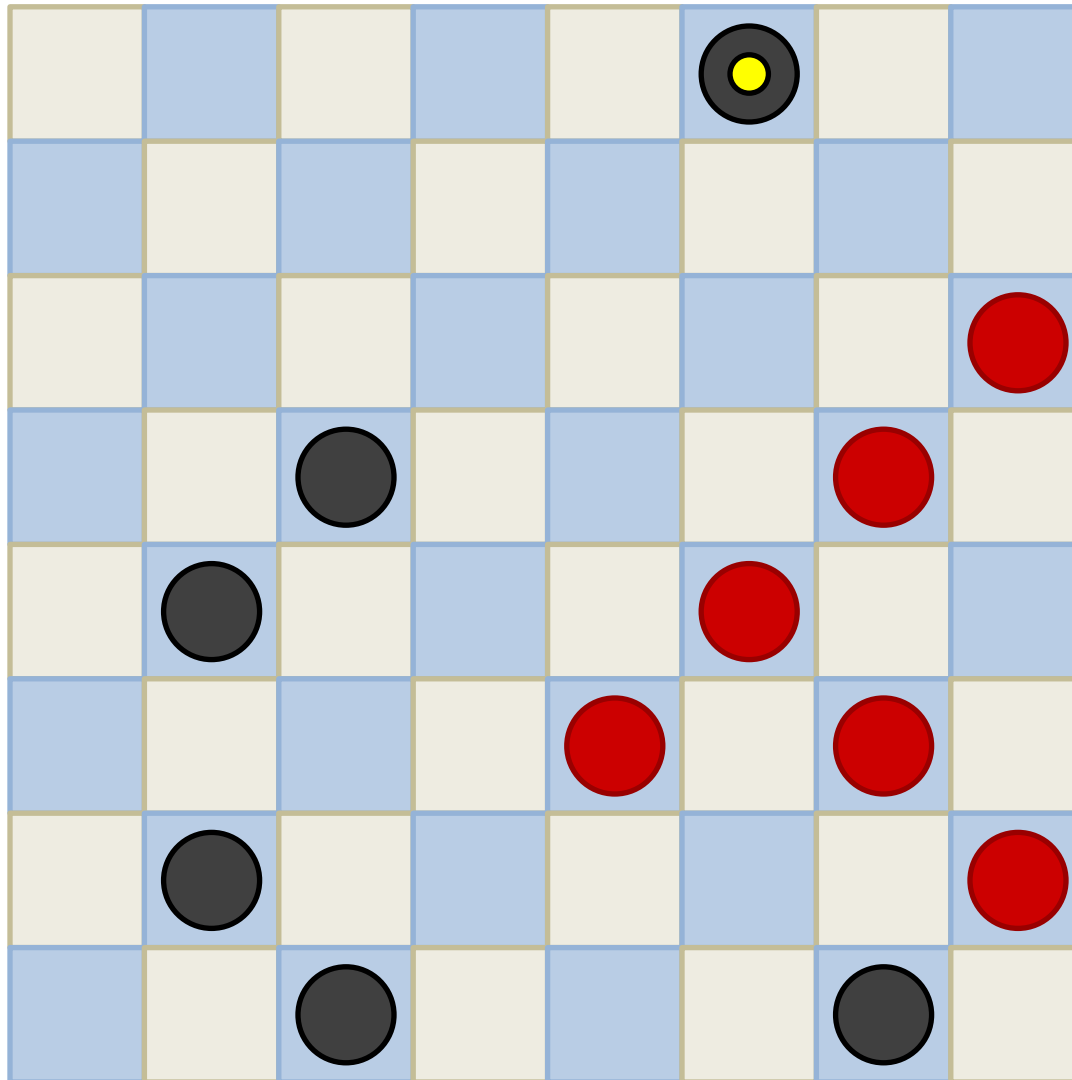
This course will **challenge** you

We are **capable** of meeting the challenge

How would you teach someone to play checkers?



What is the best next move for black?



What is Artificial Intelligence?

Thinking Humanly

“The exciting new effort to make computers think...*machines with minds*, in the full and literal sense.” (Haugeland, 1985)

“[The automation of] activities that we associate with human thinking, activities such as decision-making, problem solving, learning...” (Bellman, 1978)

Acting Humanly

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

“The study of how to make computers do things at which, at the moment, people are better.” (Rich and Knight, 1991)

Thinking Rationally

“The study of mental faculties through the use of computational models.” (Charniak and McDermott, 1985)

“The study of the computations that make it possible to perceive, reason, and act.” (Winston, 1992)

Acting Rationally

“Computational Intelligence is the study of the design of intelligent agents.” (Poole *et al.*, 1998)

“AI...is concerned with intelligent behavior in artifacts.” (Nilsson, 1998)

(Russell and Norvig, 2011)

What is Machine Learning?

Machine learning is the study of algorithms that

...improve their *performance* (P)

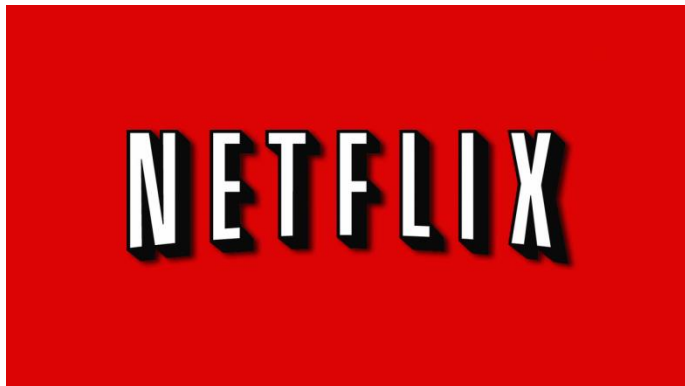
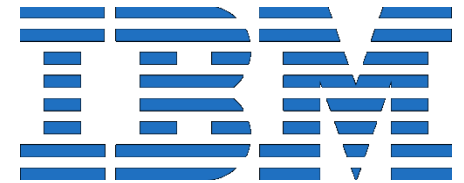
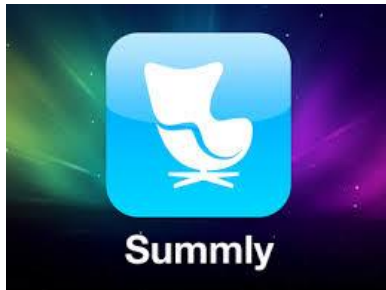
...at some *task* (T)

...with *experience* (E)

Implicit assumptions:

- data, data, data!
- patterns exist

AI/ML is everywhere!



Programming in MATLAB



Download: <https://www.cmu.edu/computing/software/all/matlab/index.html>

Practice: http://www.mathworks.com/matlabcentral/cody/?s_tid=gn_mlc_cody

Self-assessment coming soon!