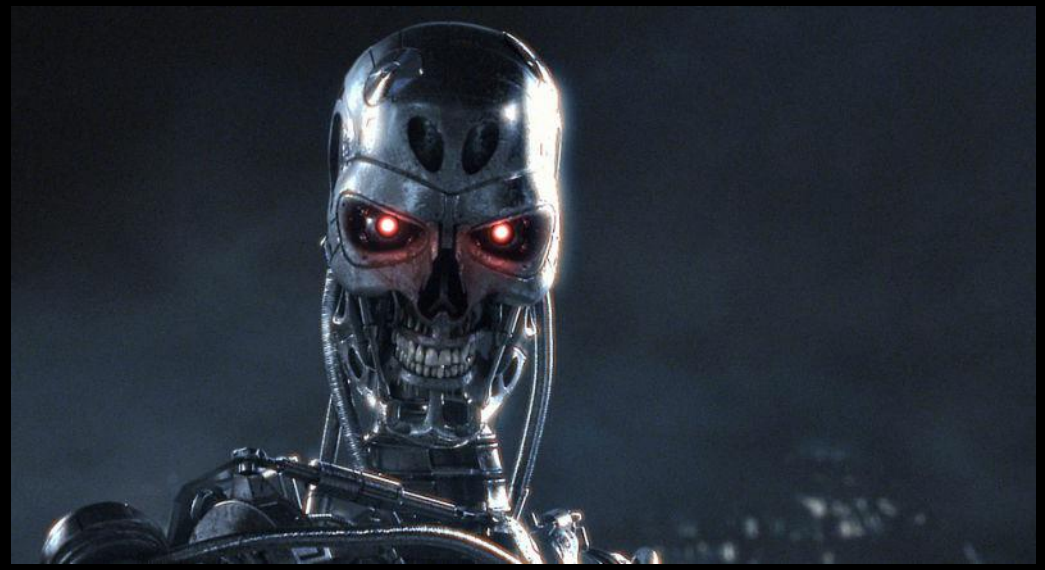


ARTIFICIAL INTELLIGENCE

By Adam Czerwinski

RATIONALITY

What is rational at any given time depends on four things:

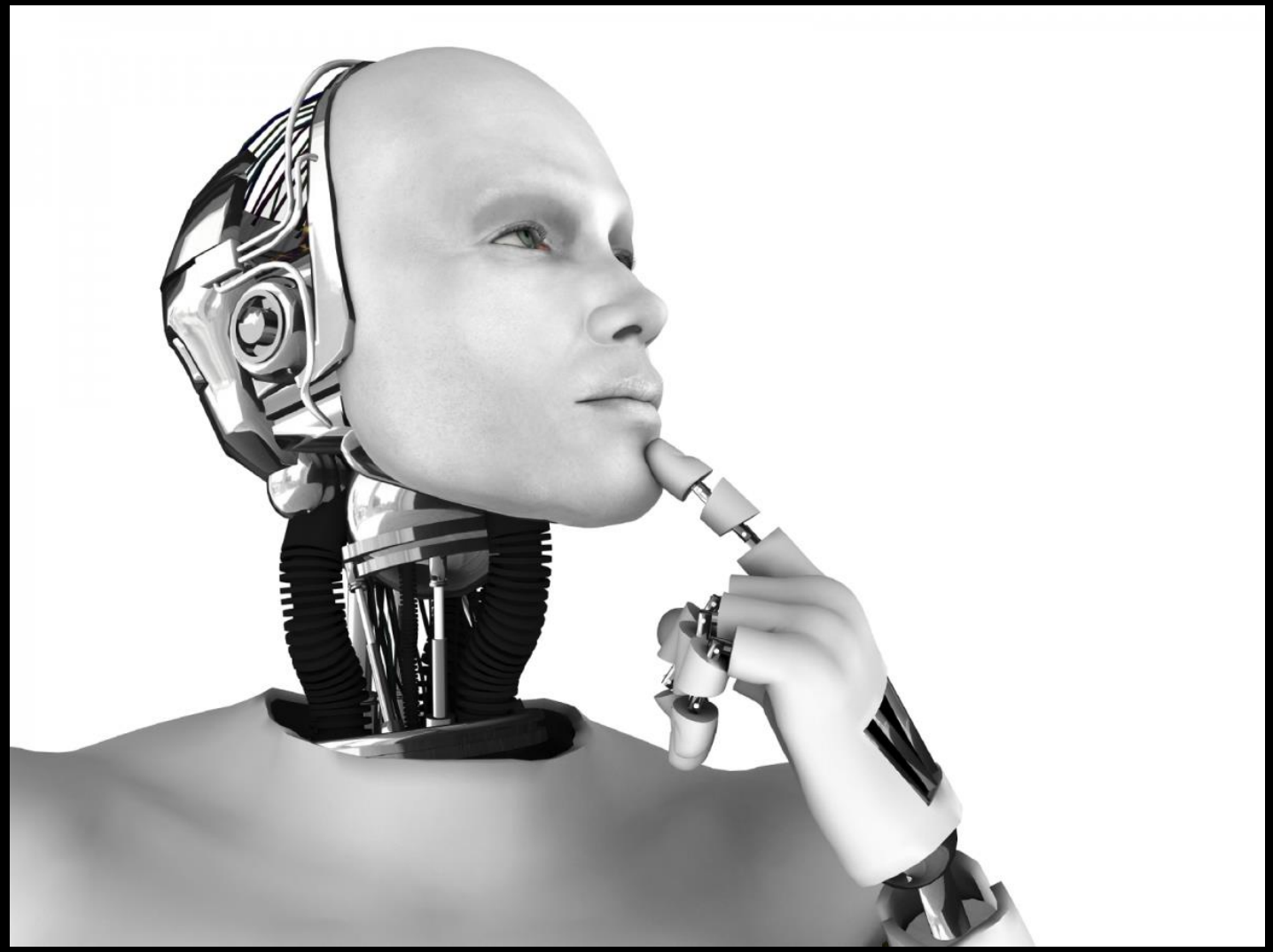
The agent's percept sequence to date

The actions that the agent can perform

The agent's prior knowledge of the environment

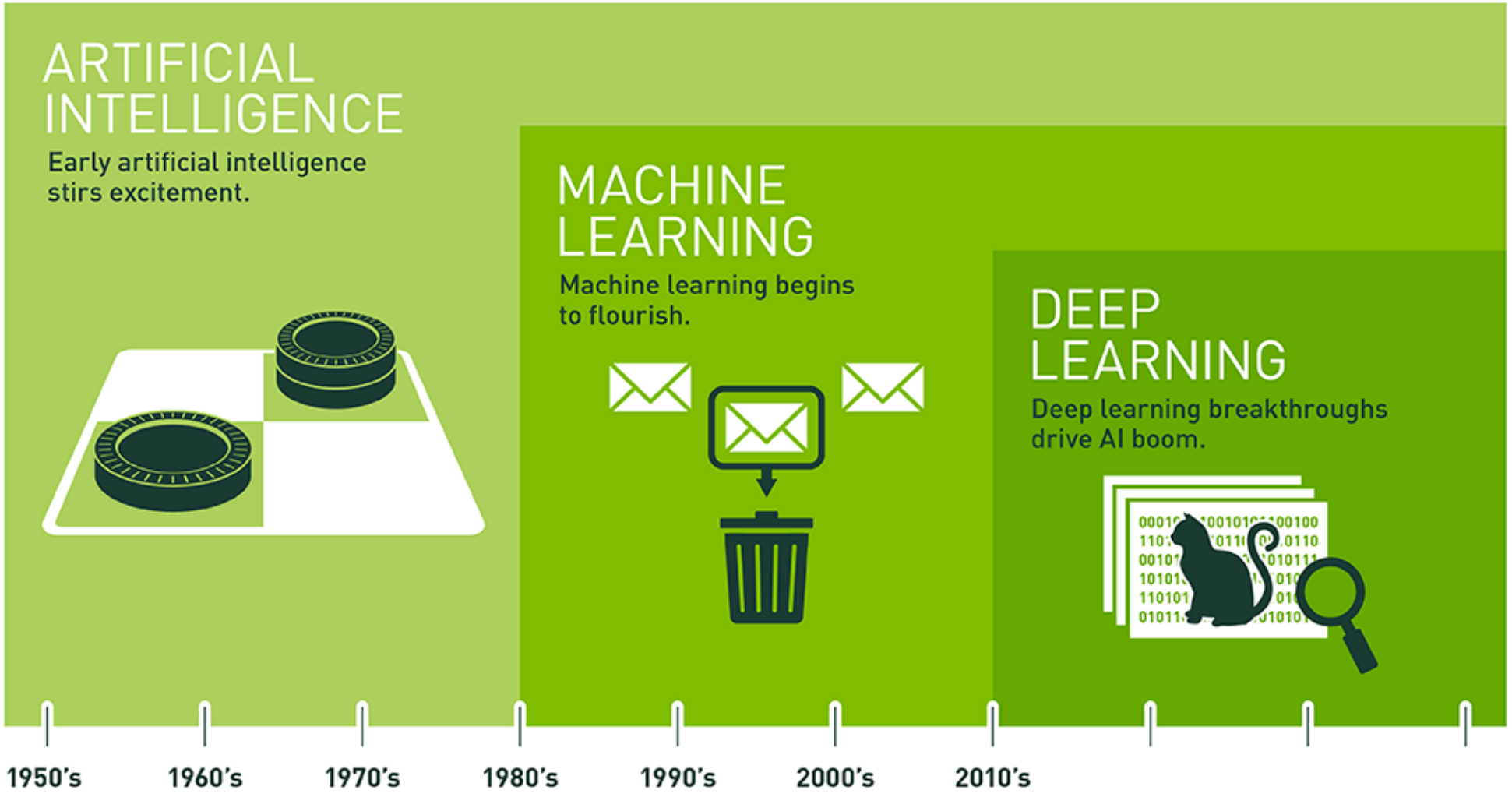
The performance measure that defines the criterion of success

WHAT IS AI?



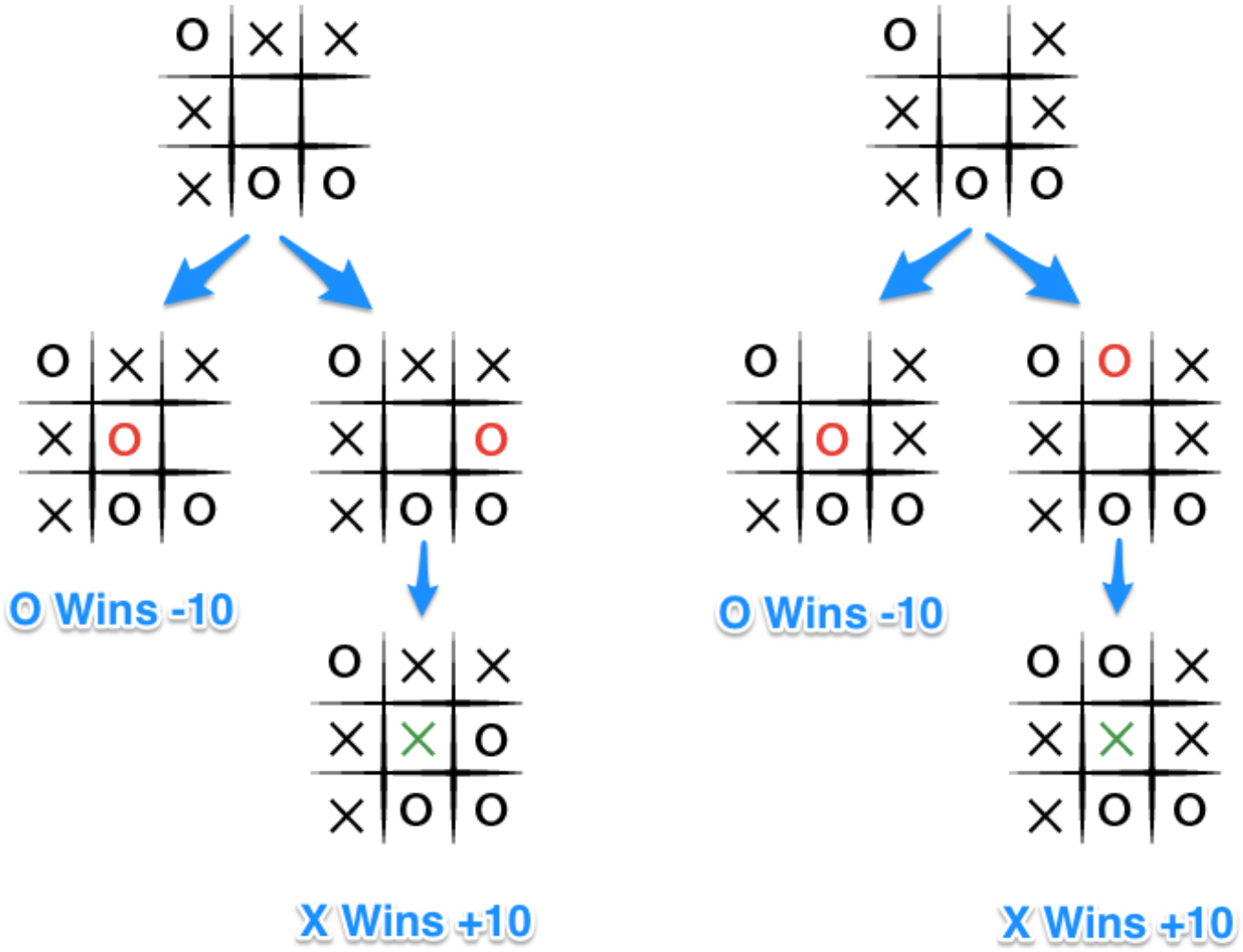
ARTIFICIAL INTELLIGENCE

By Adam Czerwinski

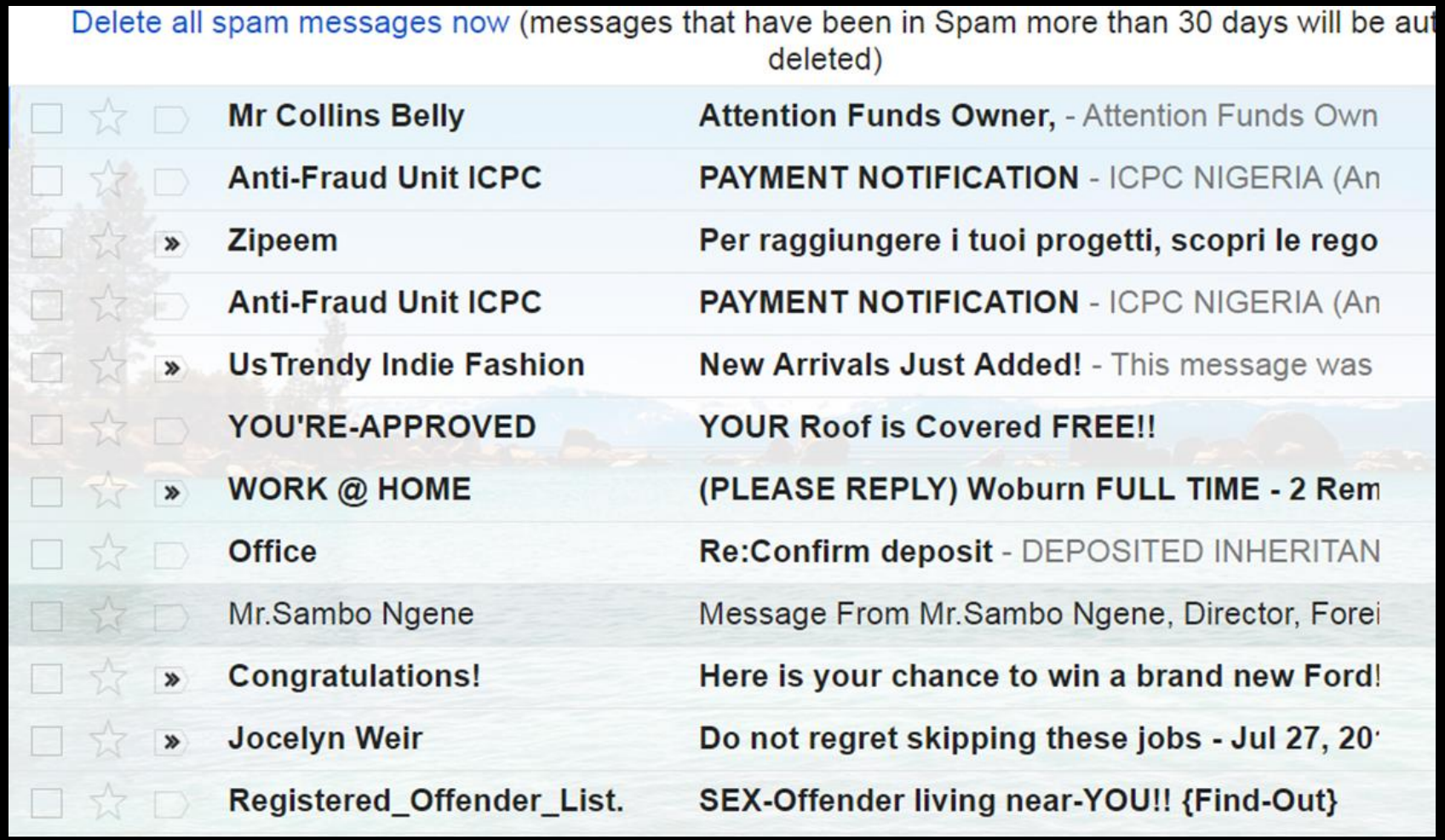


Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.

MINIMAX



MACHINE LEARNING — AN APPROACH TO ACHIEVE ARTIFICIAL INTELLIGENCE

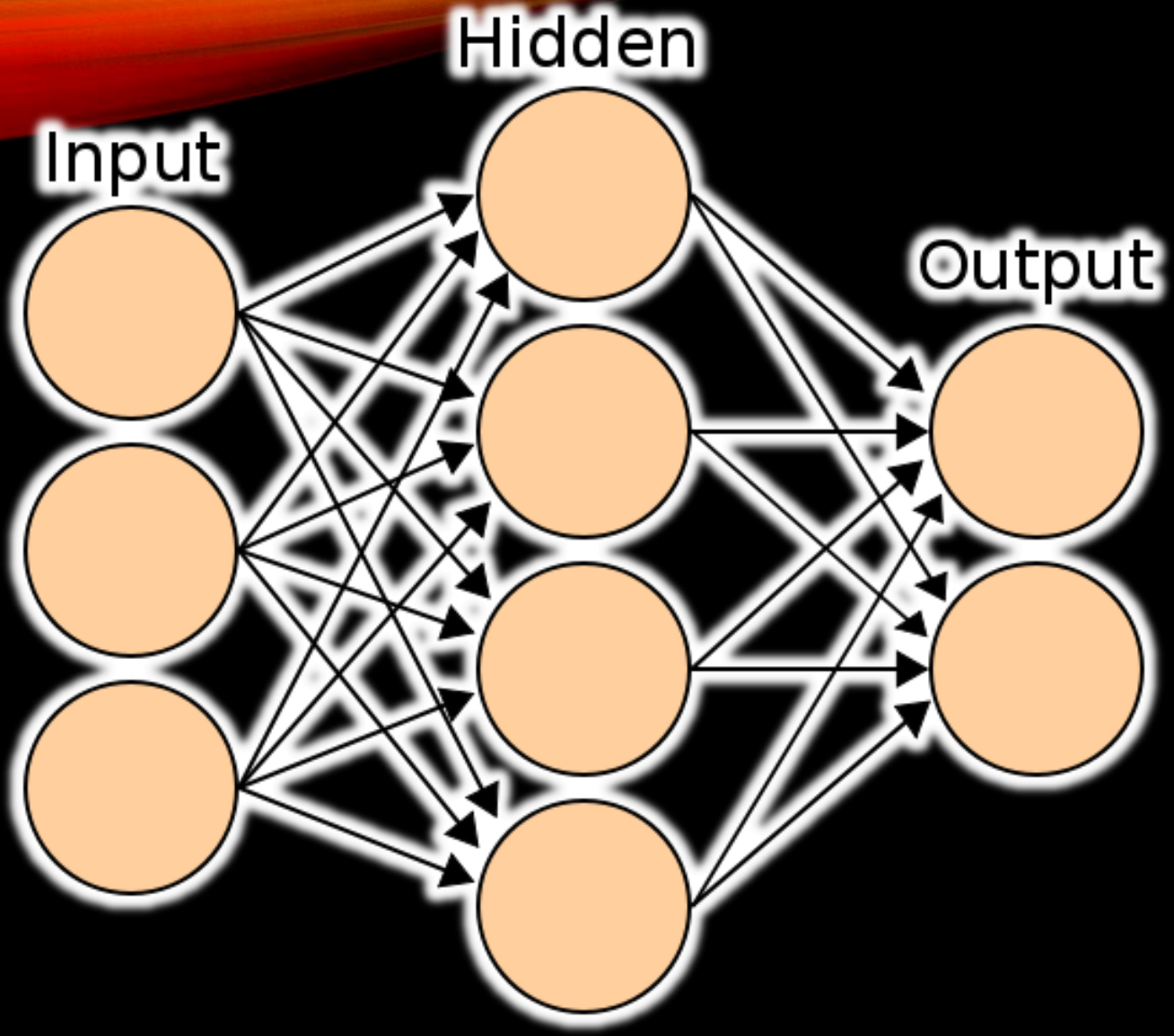


Training using large amounts of data

REINFORCEMENT LEARNING
Q-LEARNING

Learns by exploration

Lets see an example –
Q-learning VS MiniMax



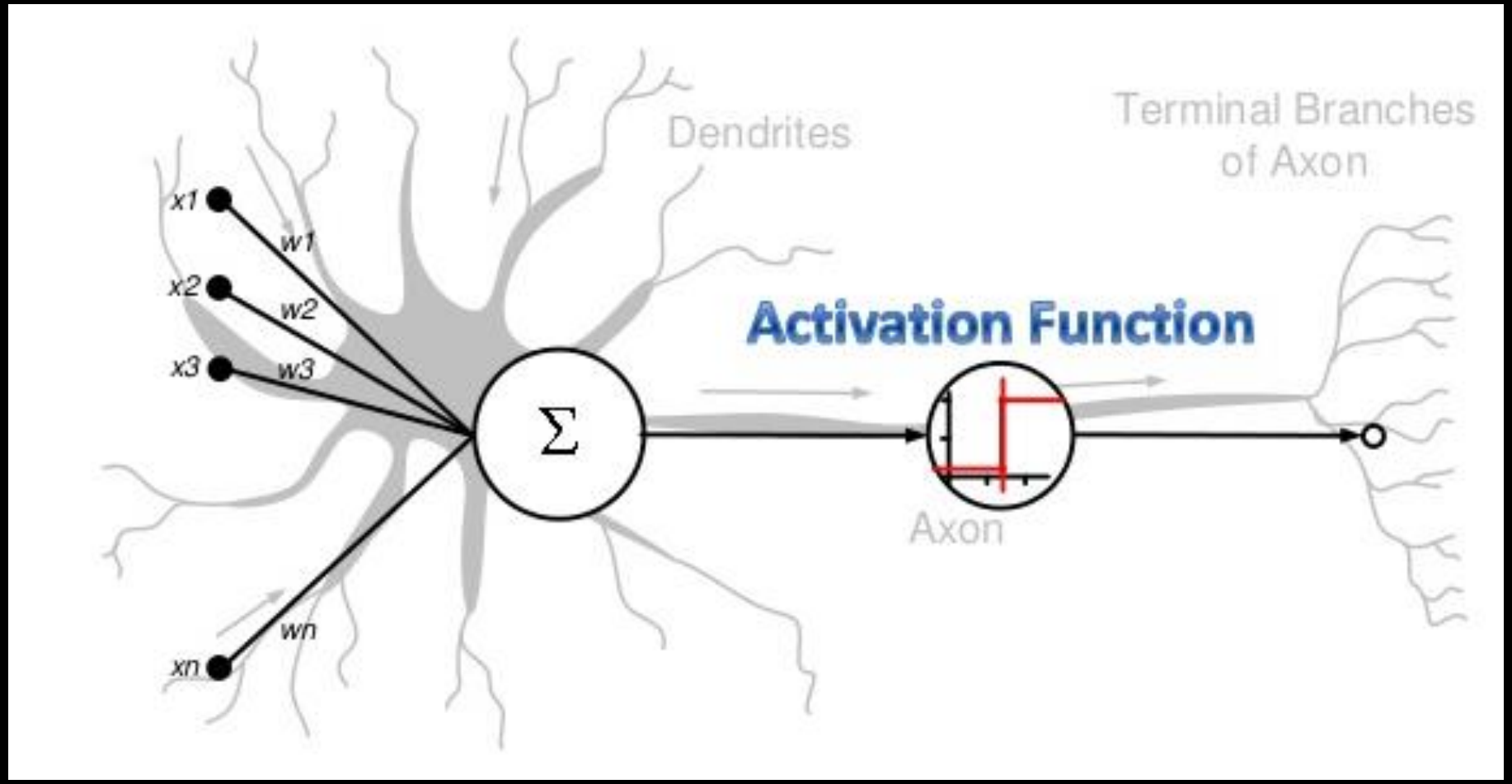
DEEP LEARNING

Breaking it down into bits and pieces!

TRAINING ! !!

Can learn to recognize your face from Facebook or a specific sign!

ARTIFICIAL NEURAL NETWORKS (ANNS)



Supervised
VS
Unsupervised

TODAYS DEEP LEARNING

Image recognition by machines trained via deep learning in some scenarios is better than humans

Voice recognition

Identifying indicators for cancer in blood and tumors in MRI scans

Optimizing restaurant bookings

Learning how to walk

Driving cars

WHERE DO WE USE AI?

Virtual Personal Assistants

Siri, Google Now, and Cortana
Help find useful information when you ask for it using your voice

"Where's the nearest Chinese restaurant?", "What's on my schedule today?", "Remind me to call Morten at eight o'clock"

WHERE DO WE USE AI?

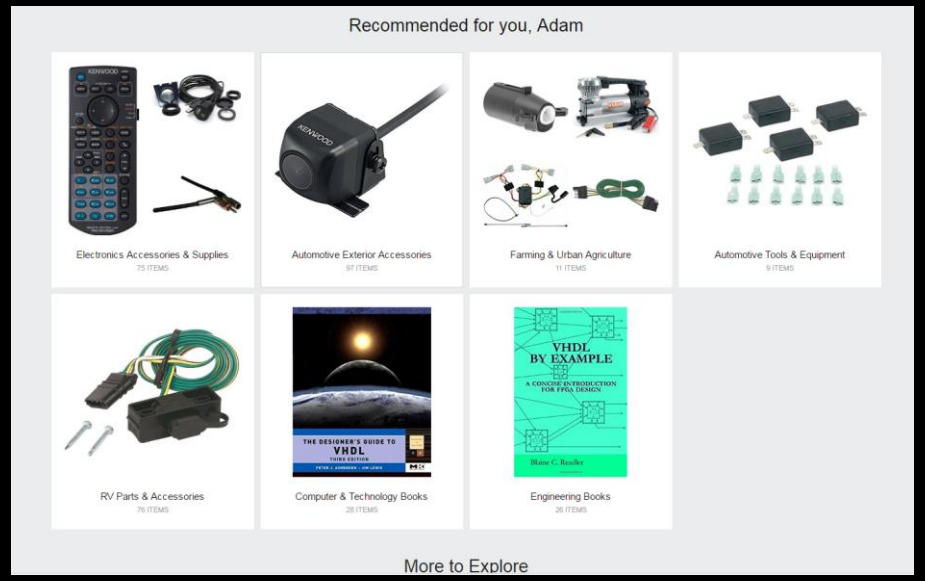
Smart Cars

Tesla's autopilot feature (but not so advanced, YET –but already used on the road)

Google Car

WHERE DO WE USE AI?

- **Purchase Prediction**
  - Target and Amazon
    - anticipate your needs



Amazon's anticipatory shipping project hopes to send you items *before* you need them, completely obviating the need for a last-minute trip to the online store

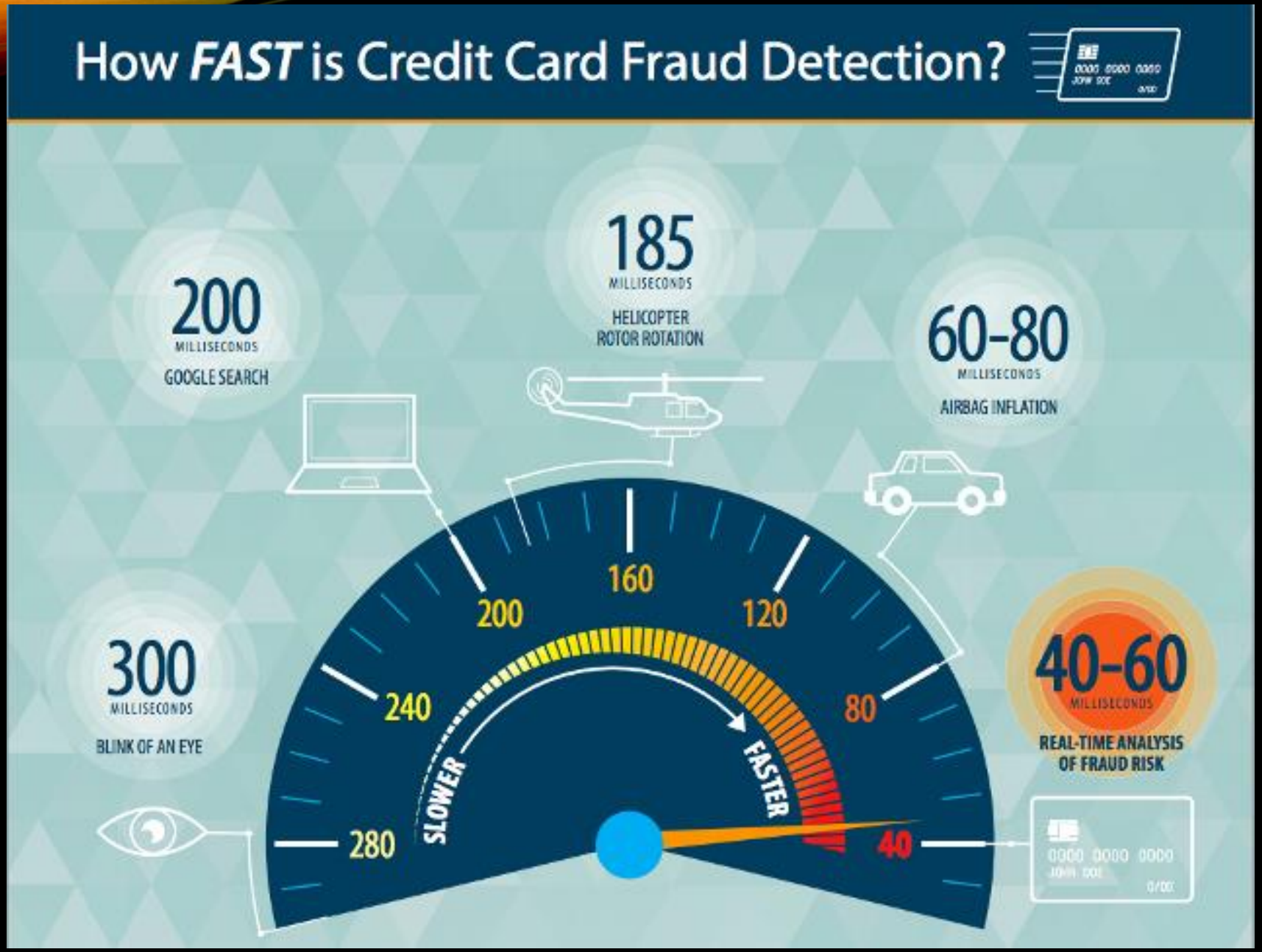
WHERE DO WE USE AI?

Fraud Detection

Have you ever gotten an email or a letter asking you if you made a specific purchase on your credit card?

banks send these types of communications if they think there's a chance of fraud

Artificial intelligence is often the technology deployed to monitor for this type of fraud


How FAST is Credit Card Fraud Detection?
200
MILLISECONDS
GOOGLE SEARCH
185
MILLISECONDS
HELICOPTER
ROTOR ROTATION
60-80
MILLISECONDS
AIRBAG INFLATION
300
MILLISECONDS
BLINK OF AN EYE
40-60
MILLISECONDS
REAL-TIME ANALYSIS
OF FRAUD RISK
280
240
200
160
120
80
40
SLOWER
FASTER

WHERE DO WE USE AI?

- **Security Surveillance**
  - single person monitoring a number of video cameras isn't a very secure system
  - people get bored easily
  - keeping track of multiple monitors can be difficult even in the best of circumstances

  - supervised training exercises, security algorithms can take input from security cameras
  - determine whether there may be a threat
  - alert human security officers
  - currently pretty limited
  - seeing flashes of color that may indicate an intruder
  - someone loitering around a schoolyard etc

WHERE DO WE USE AI?

Virus scanning

Use Heuristic rules

A **heuristic function**, also called simply a **heuristic**, is a function that ranks alternatives in search algorithms

Heuristic scanning looks for code and/or behavioral patterns indicative of a class or family of viruses

Different sets of rules for different viruses

WHERE DO WE USE AI?

Smart Home Devices

Many smart home devices now include the ability to learn your behavior patterns

WHERE DO WE USE AI?

Video Games

Far Cry and *Call of Duty*
Since the very first video games
But the complexity and effectiveness of that AI has increased exponentially over the past several decades
Resulting in video game characters that learn your behaviors, respond to stimuli, and react in unpredictable ways

StarCraft 2 !!

THE END

AI is the present and the future!

You have a C-3PO, I'll take it. You can keep your Terminator.