

The background features a gradient from light green at the top to light blue at the bottom. On the left side, there is a large, semi-circular scale with numerical markings from 150 to 260 in increments of 10. Several circular patterns, including solid and dashed lines with arrows, are scattered across the background, suggesting a technical or scientific theme.

INTRODUCTION TO MACHINE INTELLIGENCE WRAP UP

SUMMER 2023

DR. GARRETT DANCIK

WHAT IS MACHINE INTELLIGENCE?

- **Machine intelligence**, or *artificial intelligence*, involves the automation of tasks traditionally carried out by humans.
- What are some examples of machine intelligence?

MUST READ: [Windows or Chromebook? A Best Buy salesman told me it isn't even close](#)

Apple Siri vs Amazon Alexa vs Google Assistant: Tests reveal which is smartest

Voice assistants from Amazon, Apple, and Google all improve on smartphones but Google Assistant is still top

CBS
NEWS

NEWS

SHOWS

LIVE



Coming soon to Netflix: Movie trailers crafted by AI

BY SARAH MIN

AUGUST 19, 2019 / 10:30 AM / MONEY

Letter | Published: 25 January 2017

Dermatologist cancer with de

Andre Esteva , Brett Kuprel , Roberto A. Novoa , Justin Ko, Susan M. Swetter, Helen M. Blau & Sebastian Thrun 

Nature **542**, 115–118 (02 February 2017) | [Download Citation](#) ↓

• Sources

- <https://www.zdnet.com/article/apple-siri-vs-amazon-alexa-vs-google-assistant-tests-reveal-which-is-smartest/>
- <https://www.cbsnews.com/news/netflix-trailers-made-by-ai-netflix-is-investing-in-automation-to-make-trailers/>
- <https://www.nature.com/articles/nature21056>



PERSONAL FINANCE

CAREERS

COLLEGE

DEBT

FINANCIAL ADVISOR HUB

RETIREMENT

SAVINGS

TAX PLANNING

Automation threatening 25% of jobs, especially the ones:

The New York Times

Prosecutors Don't Plan to Charge Uber in Self-Driving Car's Fatal Accident



The Best Algorithms Struggle to Recognize Black Faces Equally

TOM SIMONITE BUSINESS 07.22.19 07:00 AM

THE BEST ALGORITHM RECOGNIZE BLACK FACES

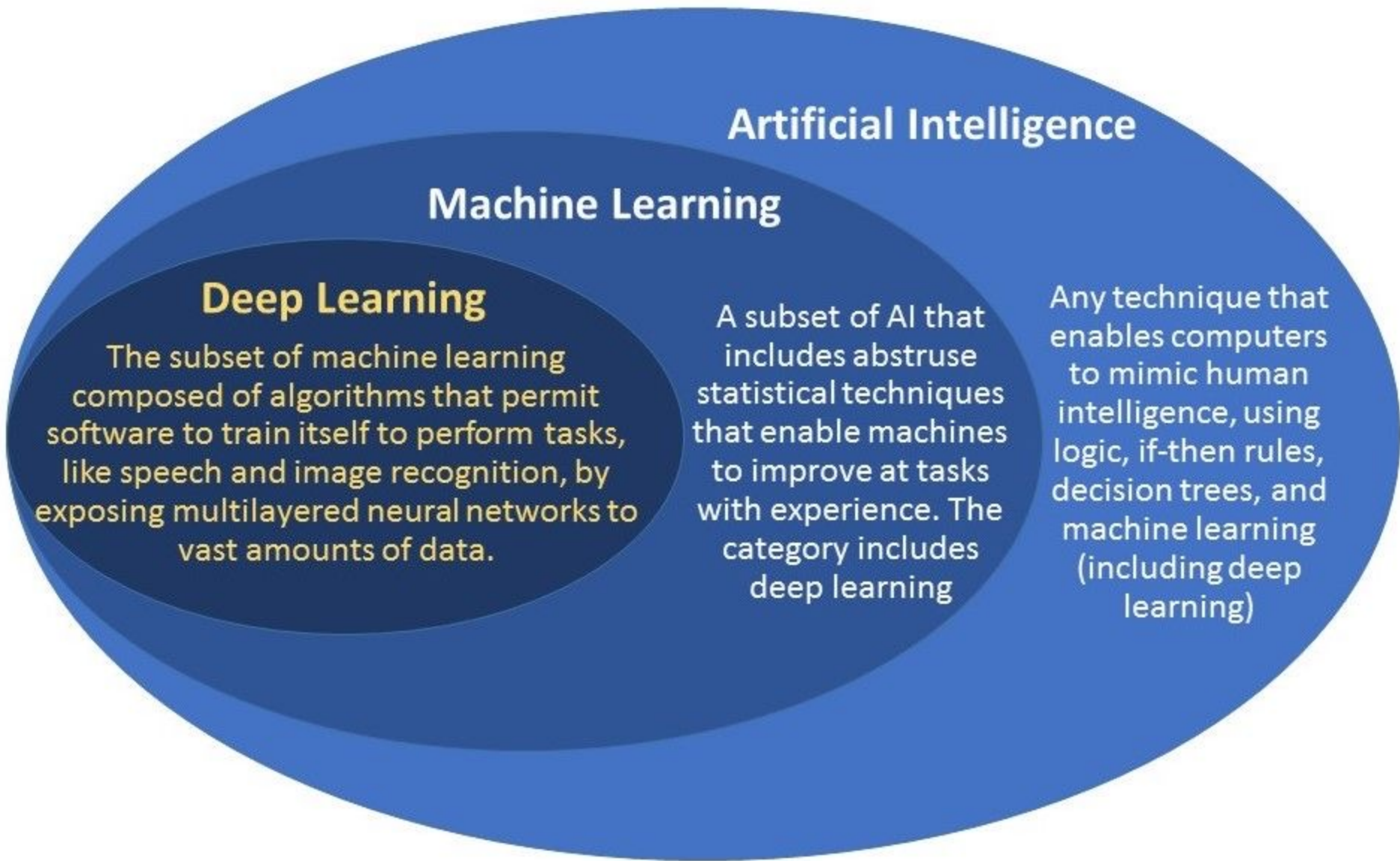
NEWS

AMAZON ALEXA CAPTURING AUDIO OF PEOPLE HAVING SEX, POSSIBLE SEXUAL ASSAULTS: REPORT

BY ASHER STOCKLER ON 8/1/19 AT 1:25 PM EDT

- Sources
 - <https://www.cNBC.com/2019/01/25/these-workers-face-the-highest-risk-of-losing-their-jobs-to-automation.html>
 - <https://www.nytimes.com/2019/03/05/technology/uber-self-driving-car-arizona.html>
 - <https://www.wired.com/story/best-algorithms-struggle-recognize-black-faces-equally/>
 - <https://www.newsweek.com/amazon-alexa-recordings-romania-sex-privacy-1452173>

OVERVIEW OF MACHINE INTELLIGENCE

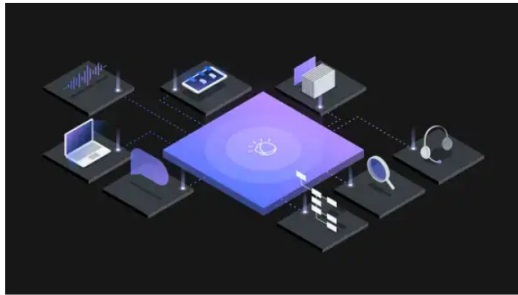


WHAT ~~WILL~~ DID WE LEARN IN THIS CLASS?

- Python is a general purpose programming language commonly used for Machine Intelligence
- While the details of many methods are complex, many methods can be used directly within Python or by using Python and the application program interfaces (APIs) of cloud-based services
- We will learn the basic concepts of:
 - Python
 - Natural Language Processing
 - Data Mining Twitter
 - Digital Assistants
 - Machine Learning and Neural Networks, including those for image recognition

ADDITIONAL CLOUD-BASED SERVICES

IBM Watson® Assistant



Deliver fast, accurate information across any channel at the scale you and your customers need

IBM Watson® Discovery



Surface answers and insights from complex enterprise data with AI-powered search and text analytics

IBM Watson® Natural Language Understanding



The natural language processing (NLP) service for advanced text analytics



<https://www.ibm.com/watson/products-services>

- Python can be used with IBM and Google APIs to integrate powerful machine learning tools into software / apps

ADDITIONAL CLOUD-BASED SERVICES

AI and Machine Learning →



Vertex AI

Unified ML Platform for training, hosting, and managing ML models.



Speech-to-Text

Speech recognition and transcription supporting 125 languages.



Vision AI

Custom and pre-trained models to detect emotion, text, more.



Text-to-Speech

Speech synthesis in 220+ voices and 40+ languages.



Cloud Translation

Language detection, translation, and glossary support.



Cloud Natural Language

Sentiment analysis and classification of unstructured text.



AutoML

Custom machine learning model training and development.



Video AI

Video classification and recognition using machine learning.



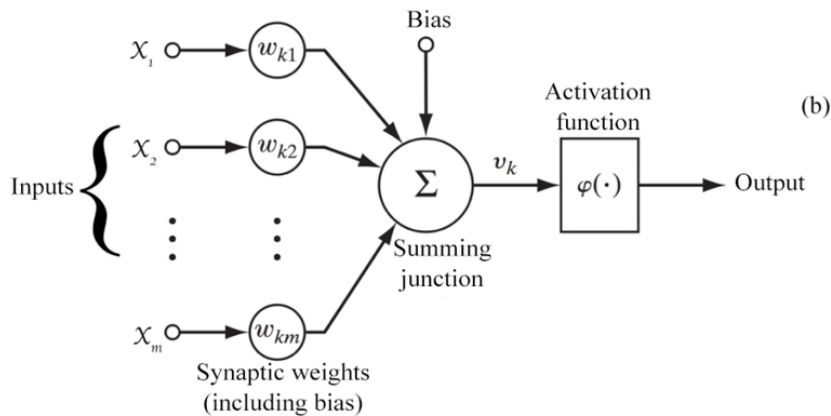
<https://cloud.google.com/vertex-ai>

<https://cloud.google.com/vision/docs/object-localizer?hl=en>

- Python can be used with IBM and Google APIs to integrate powerful machine learning tools into software / apps

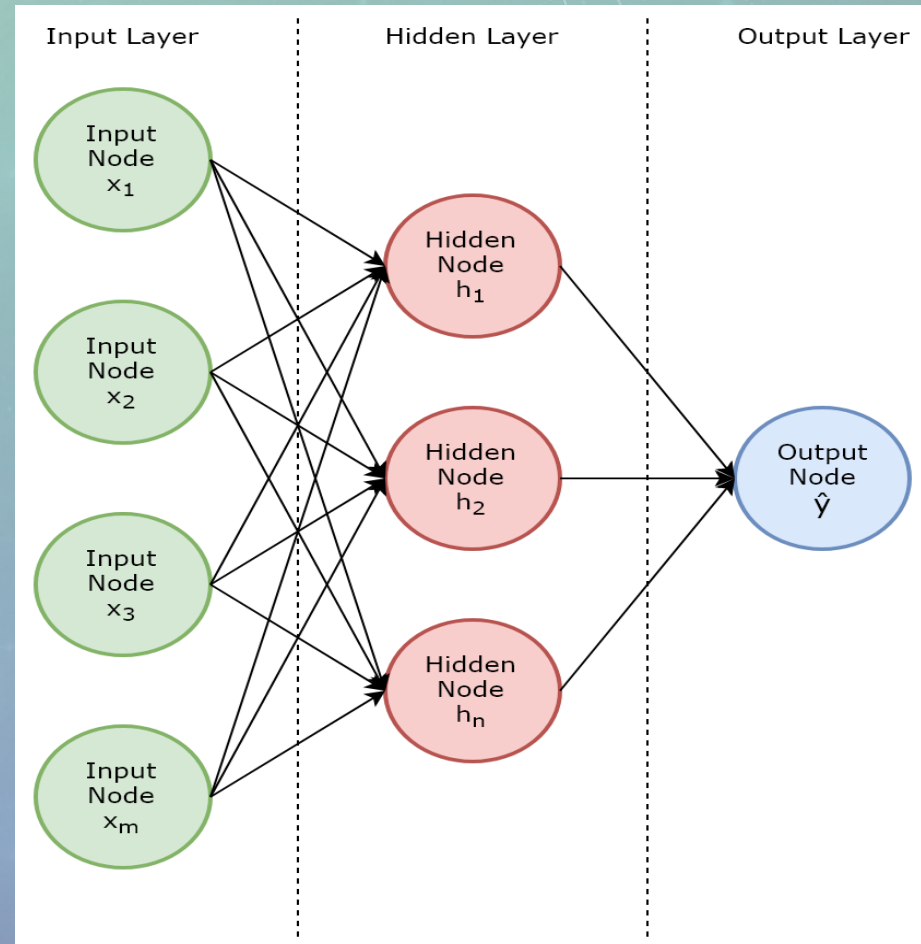
NEURAL NETWORKS (REVIEW)

Perceptron



Similarity between biological and artificial neural networks (Arbib, 2003a; Haykin, 2009b).

Multilayer Perceptron



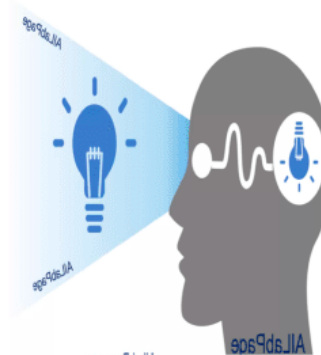
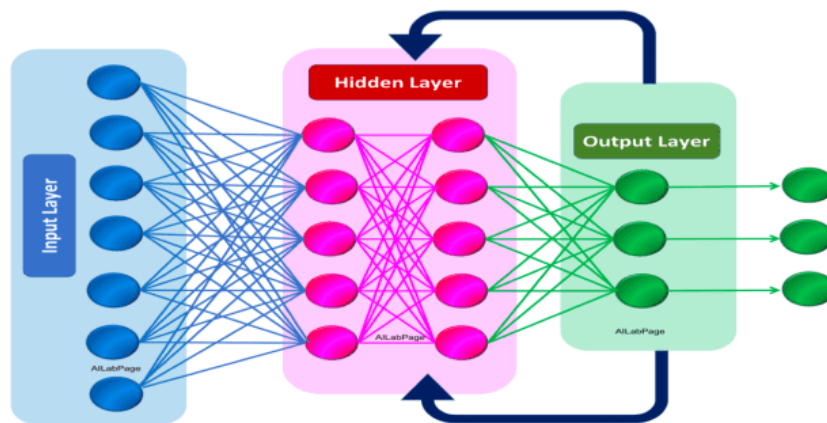
MLP Image from:

<https://www.oreilly.com/library/view/machine-learning-with/9781789346565/961ec36c-b4e9-4899-89b5-c6b762cda234.xhtml>

NEURAL NETWORKS (MORE)

Recurrent Neural Networks

Deep Learning – Introduction to Recurrent Neural Networks



- 01 Useful**
Useful for tasks that are dependent on a sequence of successive states.
- 02 Training**
The network can be trained by backpropagation.
- 03 Memory**
The network has a form of short-term memory.
- 04 Simplicity**
Simple recurrent network (SRN) has a similar form of short-term memory.



Backpropagation through time

BPTT – An algorithm used for updating weights in the recurrent neural network, to minimize the error of the network outputs. For every recurrent network there is a feedforward network with identical behavior.

Back Activation

A recurrent connection feeds back activation that will affect the output from the network during subsequent iterations.



<https://AllLabPage.com>

<https://vinodsblog.com>

Applications:

- Text translation
- Sentiment analysis

Image source: <https://vinodsblog.com/2019/01/07/deep-learning-introduction-to-recurrent-neural-networks/>

NEURAL NETWORKS (MORE)

Applications:

- Photo generation
- Face aging
- Music synthesis
- Video prediction

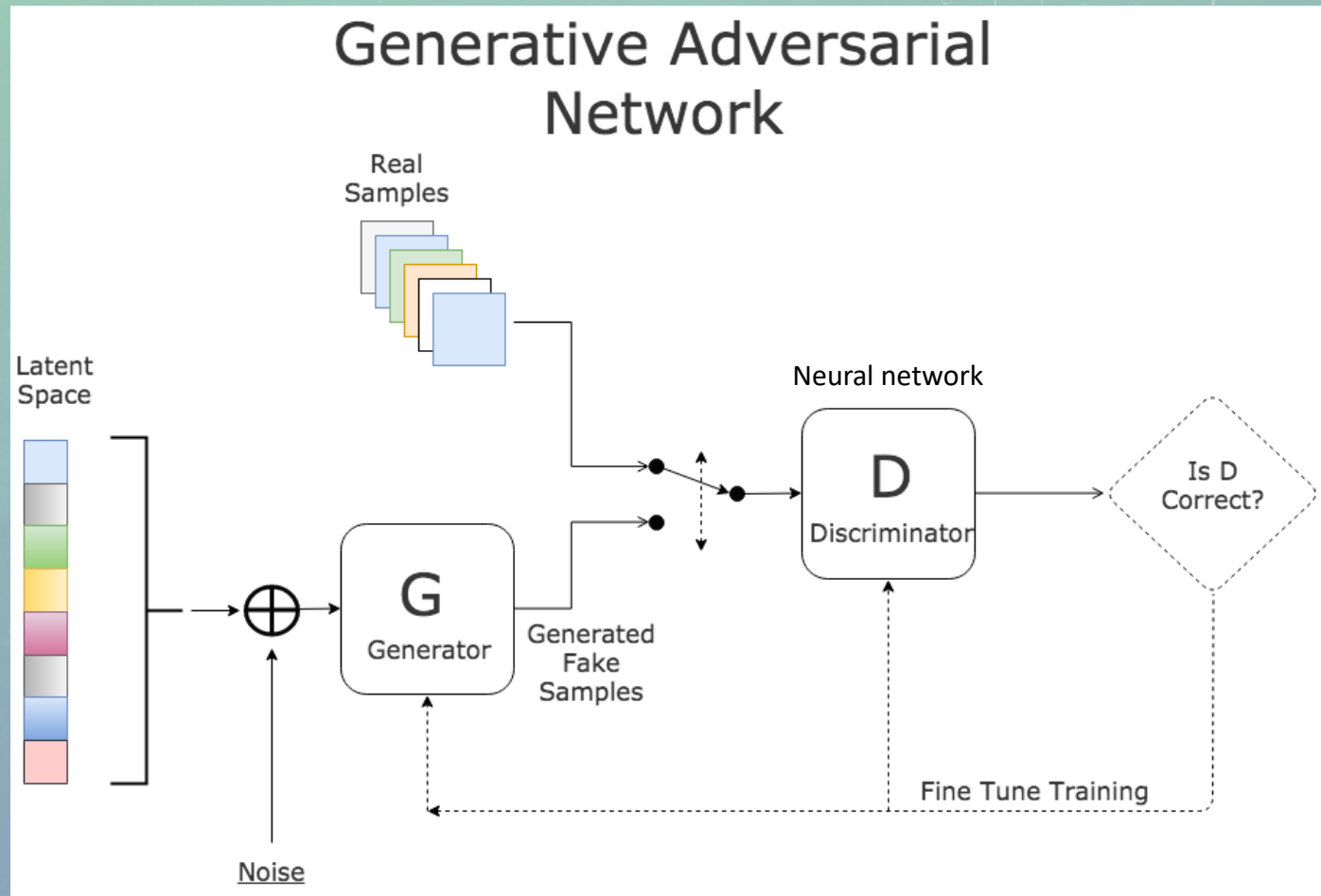
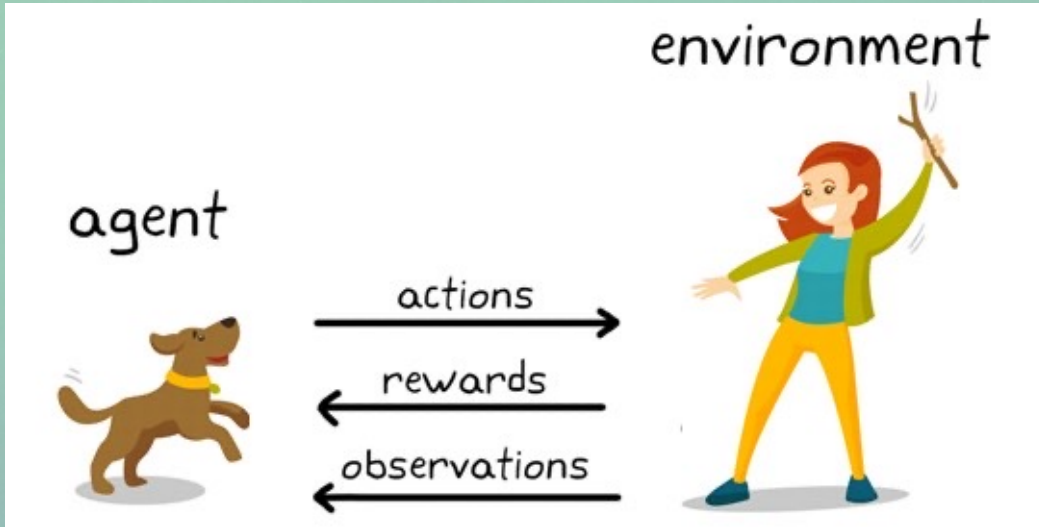


Image source:

<https://www.kdnuggets.com/2017/01/generative-adversarial-networks-hot-topic-machine-learning.html>

REINFORCEMENT LEARNING



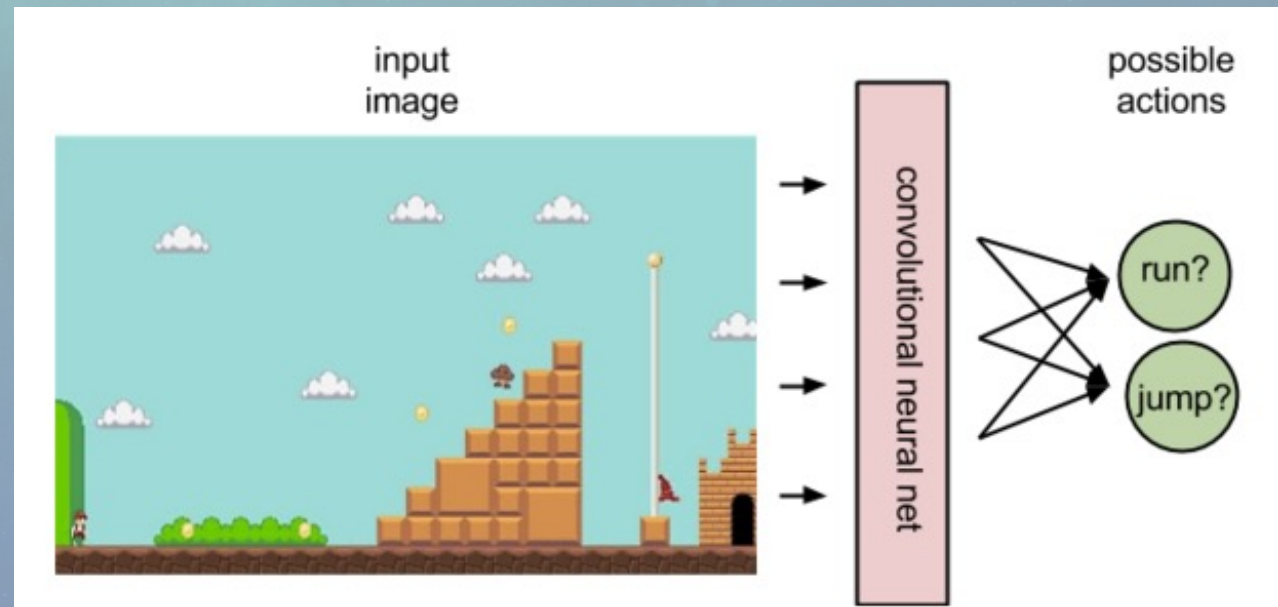
Reinforcement learning

Applications:

- Games
- Robotics / Motion control

Image: <https://www.kdnuggets.com/2019/10/mathworks-reinforcement-learning.html>

Deep reinforcement learning



<https://skymind.ai/wiki/deep-reinforcement-learning>

ChatGPT Sprints to One Million Users

Time it took for selected online services to reach one million users



* one million backers ** one million nights booked *** one million downloads

Source: Company announcements via Business Insider/LinkedIn



CHATGPT

- A large language model
- How it works (simplified)
 - **Given text, the goal is to predict the next word(s)**
 - It was a dark and stormy _____
 - Refined based on human feedback
 - Trained on internet data
 - Including English language Wikipedia

ChatGPT

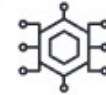
We've trained a model called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer follow-up questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests.

[Try ChatGPT ↗](#)

[Read about ChatGPT](#)



Education or training



Prompts for AI generators



Debugging codes



Predicting questions

Use Cases of ChatGPT

Scheduling and appointment booking



Entertainment



Microsoft is bringing ChatGPT technology to Word, Excel and Outlook

Forbes

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ChatGPT In Schools: Here's Where It's Banned—And How It Could Potentially Help Students



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