

# INTRODUCTION TO MACHINE INTELLIGENCE

## CSC 202

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# 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



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## 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 ✉

- 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>

# Grocery store robot coming to hundreds of Stop & Shop, Giant, Martin's locations

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WCWB 5abc

Updated: 7:38 AM EST Jan 16, 2019



<https://www.wcvb.com/article/grocery-store-robot-coming-to-hundreds-of-stop-and-shop-giant-martins-locations/25915618>



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# Automation threatening 25% of jobs, mainly the 'I' ones:

The New York Times

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



WIRED

The Best Algorithms Struggle to Recognize Black Faces Equally

TOM SIMONITE BUSINESS 07.22.19 07:00 AM

# THE BEST ALGORITHM RECOGNIZE BLACK FACES EQUALLY

NEWS

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

### 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>

# HOW DOES MACHINE INTELLIGENCE WORK?

- Example: tic-tac-toe, <https://www.google.com/search?q=tic+tac+toe>
- Some possible approaches:
  - Logic-based:
    - Analyze board, if you can win, go for it
    - Otherwise, if the other player has 2 in a row, block them, etc
  - Search and optimization:
    - Look at all possible games that can be played from the current configuration, and make the “best” move (typically the move that minimizes the best outcome of the opponent)
    - For tic-tac-toe, there are *only* 255,168 possible games
  - Machine learning (learning from data):
    - The machine learns from a "training" dataset, consisting of a specific moves for different board configurations and the final outcome of the game.
    - The machine “learns” how to play by playing a large number of games against itself and learning which moves maximizes the value of a “cost function” (Reinforcement Learning)

# OVERVIEW OF MACHINE INTELLIGENCE

**Artificial Intelligence**

**Machine Learning**

**Deep Learning**

The subset of machine learning composed of algorithms that permit software to train itself to perform tasks, like speech and image recognition, by exposing multilayered neural networks to vast amounts of data.

A subset of AI that includes abstruse statistical techniques that enable machines to improve at tasks with experience. The category includes deep learning

Any technique that enables computers to mimic human intelligence, using logic, if-then rules, decision trees, and machine learning (including deep learning)

# WHAT WILL 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
  - Machine Learning and Neural Networks, including those for image recognition
  - Machine learning as a service (in the cloud), including Digital Assistants