Technology Trends
Robots and Drones

Center for Learning in Retirement

CLR Fall 2020

Glen Maxson & Alan Freedman
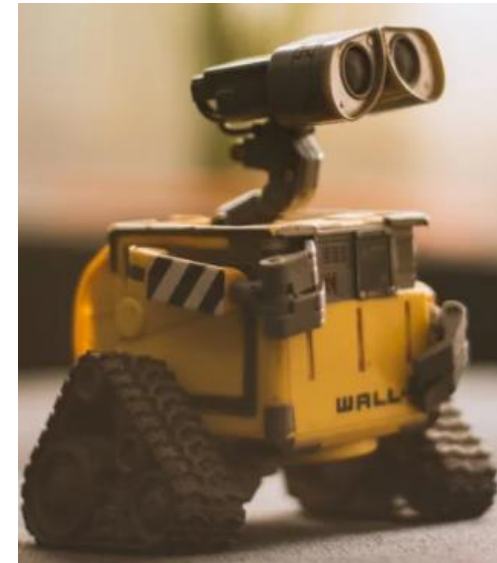
Week 2

Welcome!

Robots

A **robot** is a machine—programmable by a computer— capable of carrying out a complex series of actions automatically. Robots can be guided by an external control device or the control may be embedded within. Robots may be constructed to take on human form but most robots are machines designed to perform a task with no regard to how they look.

[9 Most Advanced AI Robots - Humanoid & Industrial Robots](#) (8.5 min)

Drones (aka UAVs or flying robots)

An **unmanned aerial vehicle** (**UAV**), commonly known as a **drone**, is an aircraft without a human pilot aboard. The flight of UAVs may operate with various degrees of autonomy: either under remote control by a human operator or autonomously by onboard computers.

Civilian UAVs can be seen as an early commercial application of autonomous things.

Dassault Neuron

The Flying Star

DJI Mavic Air 2

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Three Videos

Tesla Model S (4.5 min)   Tesla Model 3 (1.5 min)

Three Videos

Tesla Model S (4.5 min)

Tesla Model 3 (1.5 min)

Three Videos

[Retail](#) (2 min)

Main points

- Tesla Model S
    - 160 robots, 3000 employees (2013)
    - Factory of the future!
- Tesla Model 3
    - ? robots, 10000 employees (Fremont Plant* – 2018)
    - [Tesla relied on too many robots to build the Model 3, Elon Musk says …](#)
    - [Elon Musk agrees robot glut slowed Model 3 production – Engadget](#)
- Kiva Bots at Amazon…
    - 'Job creators'?
    - Makes us more efficient, more accurate
    - Helps the US economy to compete globally

*Tesla's overall production capacity in Fremont will reach close to 600,000 cars per year or over 11,000 cars per week by the end of 2020.

[Andrew McAfee: What will future jobs look like? | TED Talk](#) (12 min)

Robots and Jobs

[Andrew McAfee: What will future jobs look like? | TED Talk - TED Talks](#)

- New machine age: Great news!
    - Technological progress – abundance
    - Freed from drudgery – new possibilities (makers)
- Challenges
    - Economics – tough to offer your labor to an economy that's full of machines
        - Middle class under threat – inequality and polarization
    - Societal – cannot keep turning out 'Bills'
- We <u>can</u> solve 'tough challenges… technology <u>is</u> part of the solution.

Questions

# [P.W. Singer: Military robots and the future of war | TED Talk](#) (8 min)

Military Robots ("unmanning of war")

- "When a Robot Dies, you don't have to write a letter to its Mother"
  - As of 2009, 5,300 drones, 12,000 unmanned ground systems
- A robot's revolution is upon us
- 43 countries working on military robots
- 'Cubical warriors'
- Issue: robots are emotionless
- Question: "Is it our machines, or is it us, that's wired for war?"

Vijay Kumar: The future of flying robots | (10 min)
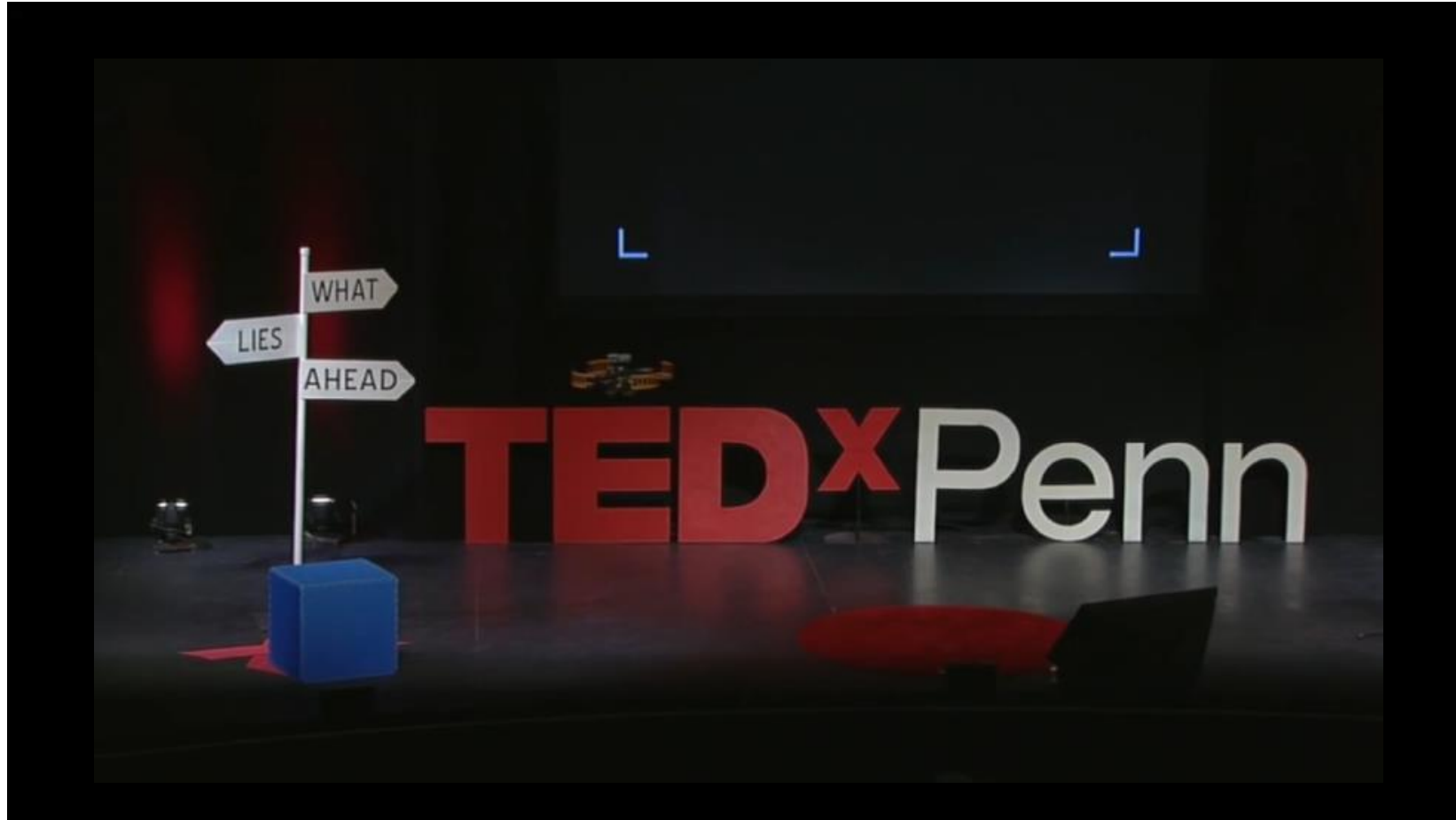
Airborne Robots (aka Drones)

[Vijay Kumar: The future of flying robots | TED Talk](#)

- Autonomous Exploration Drone (large robots)

- 3 Ideas
  - Robots able to sense and be aware of their neighbors – leader/follower net
  - Robots agnostic to identities of their neighbors – no central coordination
  - Abstraction of motion and shape

- Arial Robot Swarms (agricultural application)

- Robot First Response

[Questions](#)

And a plug for Intel's Shooting Star drones

Discussion

- Does this 'emerging' technology' have the potential to benefit everyone equally?

- What are its risks and rewards?

- Does it promote autonomy (self-determination) or dependence?