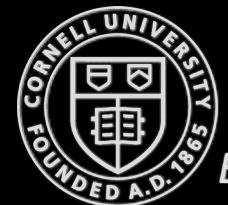


Fast Robots

Ethics II



Logistics

- Open Lab hours after classes end...
 - <http://whenisgood.net/8yp37dj>
- 2 free re-grades
 - Last day to inform us of new sites: May 21st
 - But we appreciate being told sooner!
- May 3rd: Katie Bradford, Senior Electrical Engineer at Vecna Robotics
- May 5th: Adam Kane, Dir. of Software and Electrical Engineering, ASML
 - Both are hiring engineers and interns...
 - Any interest in demos?

Ethics II

- Robot Ethics
 - Can we program ethics?



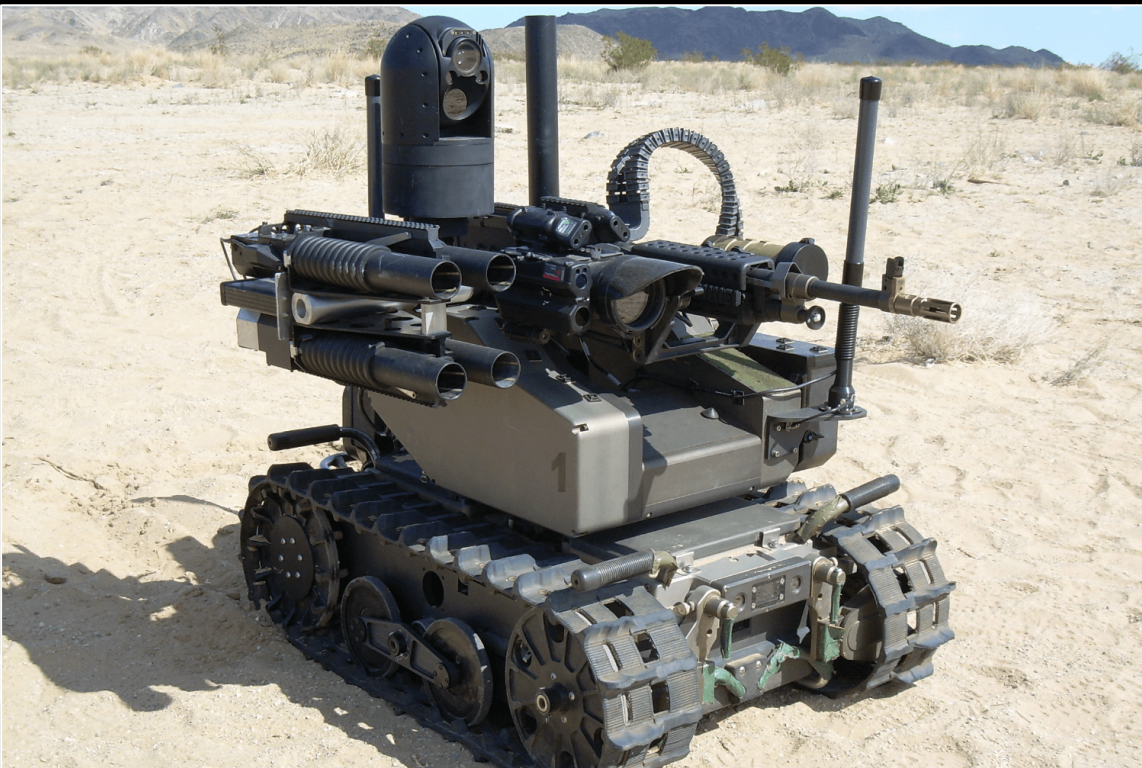
Accredited

ABET

Engineering
Accreditation
Commission

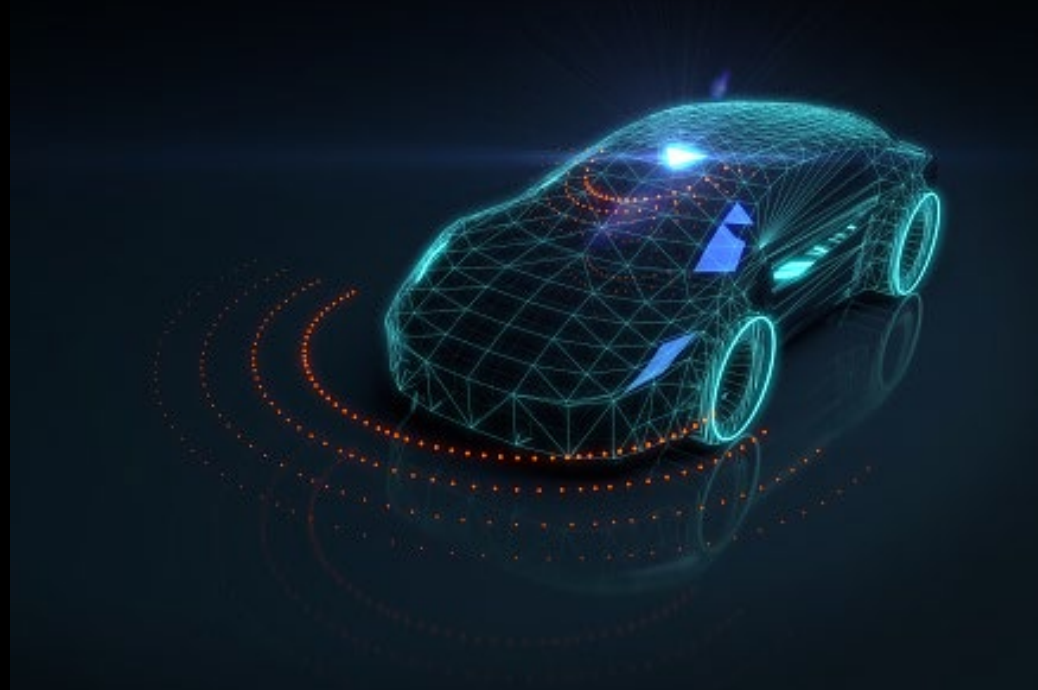
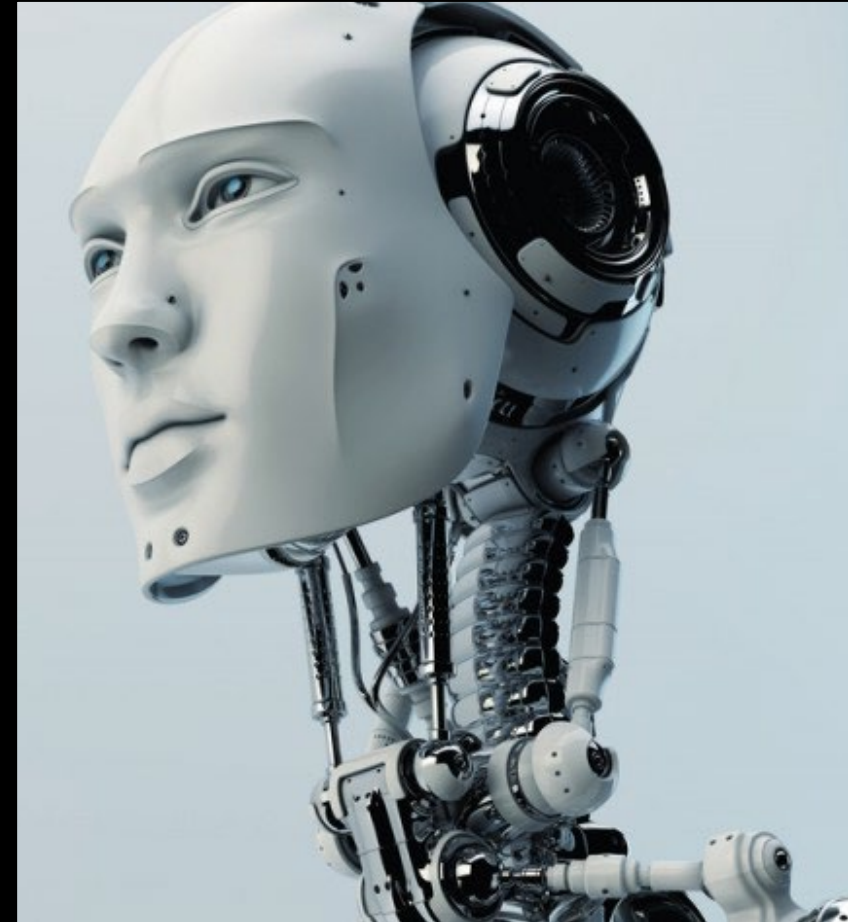
Ethics II

- Are there robots that shouldn't be created?
- Are there things that robots shouldn't do?
- If something goes wrong, who is responsible?



Robot Ethics

- How does a machine make an ethical decision?
- Can it “learn” to choose in situations that would strain human decision making?
- Can morality be programmed?



Robot Lawyers

- Law is reason free from passion
- DoNotPay (Parking tickets)
- AirHelp (Flight reimbursements)
- ROSS Intelligence (Bankruptcy laws)
- Neota Logic (builds legal applications)
- Predictive coding is widely used to identify relevant documents

World's First Robot Lawyer Helps 160,000 People Void Their Parking Tickets

4.6K
SHARES

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TECHNOLOGY



Robot Surgeons

- 1.7M procedures in the US between 2000-2013
 - Pros:
 - Reduced risk of infections
 - Faster healing
 - Robots do not get tired
 - The surgeon does not have to be on site
 - Against: Over 144 deaths, 1,391 injuries, 8,061 device malfunctions (FDA)
 - *Who is responsible for errors?*
 - *What are the security implications?*



Intuitive Surgical

Aviation Autopilots

- 2015: Germanwings Flight 9525
 - All 144 passengers + 6 crewmembers killed



© Getty Images

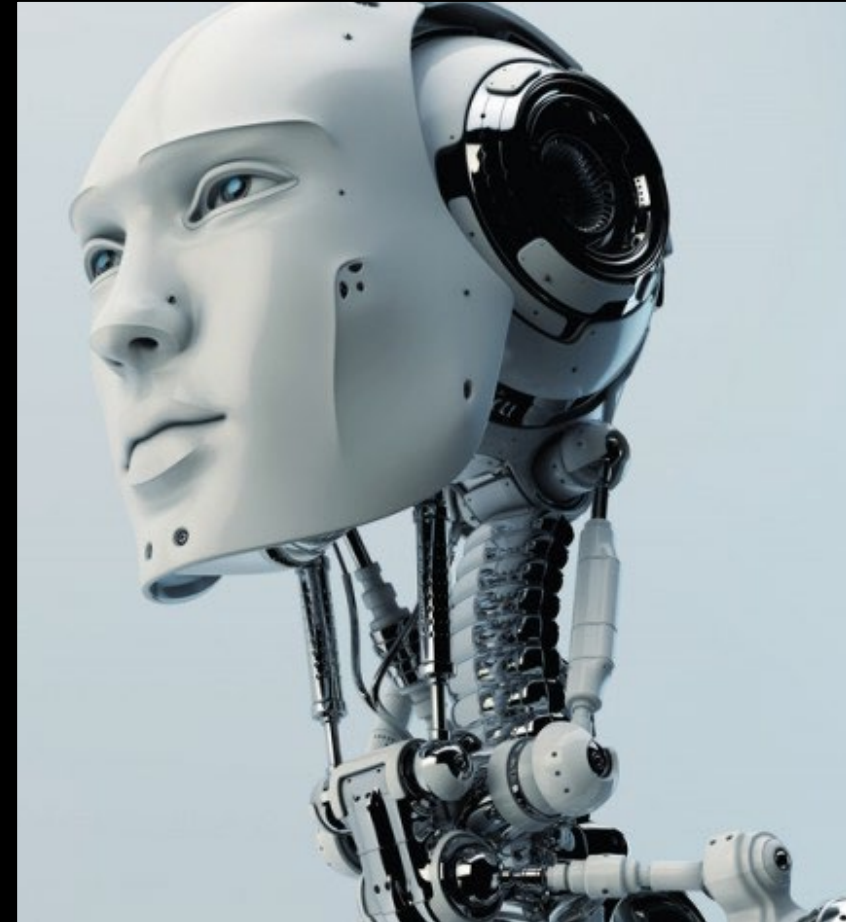
If a human pilot can deliberately crash an airliner, should such planes have autopilots that can't be over-ruled?
(Credit: Getty Images)



Robot Ethics

- How does a machine make an ethical decision?
- Can it “learn” to choose in situations that would strain human decision making?
- Can morality be programmed?

- Today’s topic
 - Defense robots
 - Military is a huge driver of robotics and AI



Defense Robots

- *Mission: Reduce friendly casualties*
 - Reduce the number of personnel needed
 - Conduct combat over larger areas
 - Extend the reach of individual soldiers
- Human Rights Watch
 - Call for an outright ban of autonomous kill-systems



StratoEnergetics LIVE STREAM
<http://www.stratoenergetics.com>
Buenos Aires Event
TV Truck 02

<https://www.stopkillerrobots.org/>

Defense Robots

“For a significant period into the future, the decision to pull the trigger or launch a missile ..., but it will remain under the full control of a human operator.

Many aspects of the firing sequence will be fully automated but the decision to fire will not likely be fully automated until legal, rules of engagement, and safety concerns have all been thoroughly examined and resolved.“

NAS Distinctive Voices
NAS Distinctive Voices



Defense Robots

“Authorizing a machine to make lethal combat decisions is contingent upon political and military leaders resolving legal and ethical questions.

...

Ethical discussions and policy decisions must take place in the near term ... rather than allowing the development to take its own path apart from this critical guidance.”



NAS Distinctive Voices
NAS Distinctive Voices



Lethal Autonomy



Lethal Autonomy



Lethal Autonomy

- *Can robot soldiers be more humane than humans?*
 - Process more information faster (just statistics)
 - Incorporate the rules of war
 - Give a robot the right to refuse an order!
 - Monitor and report others
 - Robots don't have a right/desire to perform self-defense
- *What if others do it first??*

Hague Convention, 1899



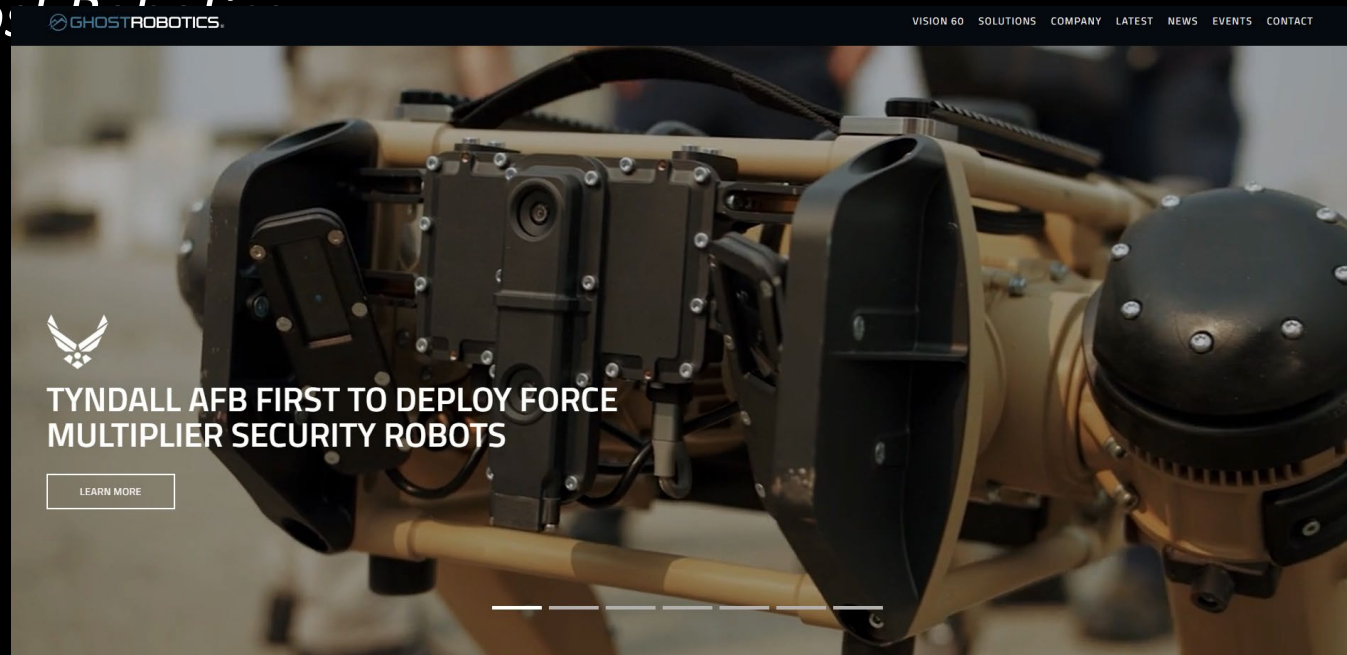
THE GENEVA
CONVENTIONS
OF AUGUST 12
1949

- *Very nuanced topic*
- *No clear answers*



To help us start this conversion...

- Cornell Combat Robotics Team
 - Sophie Helburn, Rochelle Barsz, Richard Jin, Mohammad Moghaddasi, Spencer Hurst
- GRASP Lab, UPenn
 - Victoria Edwards, 2nd year ME student working with Prof. Ani Hsieh
 - Shane Rozen-Levy, 4th year ME student working with Prof. Dan Koditschek
- ...On the topic of *Ghost Robotics*



To help us start this conversion...

- 2021: Ghost Robotics installs a machine gun on quadrupedal robot...
 - SPUR “special purpose unmanned rifle”
 - 1,200m, 20x optical zoom, thermal
 - Remote controlled
 - Intended for “ISR/Comms” missions
 - intelligence, surveillance, reconnaissance, and communications
 - Essential military function: *Lethality*
 - **Autonomy??**
 - Navigation (capable)
 - Detect and lock-on to potential threats
 - Authorizing shots

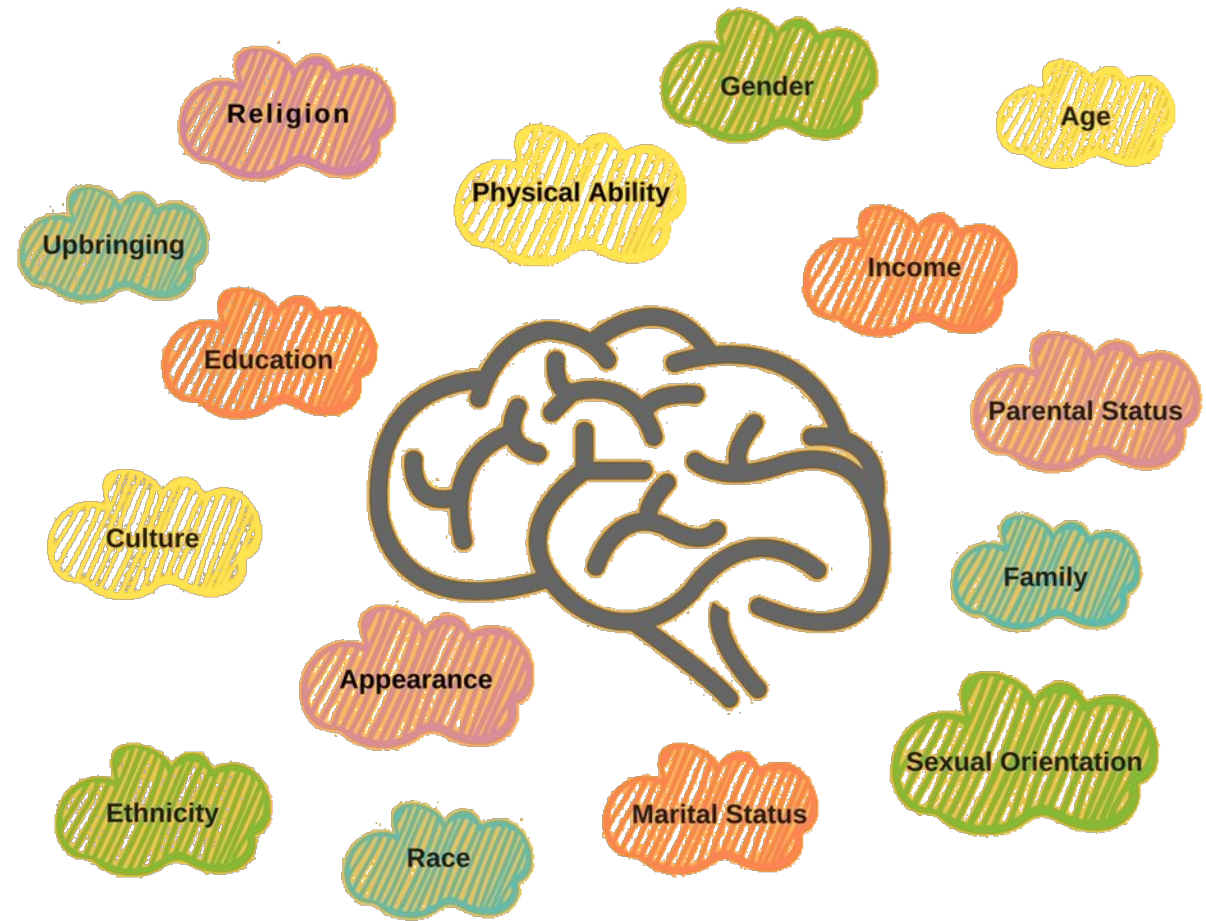


Implicit Bias

- Comes through the environment
- It is hard to change your wiring

What *can* we do?

- Acknowledge that it exists
- Exposition to counter-stereotypical examples
- Base decisions on fact and avoid stressful situations



<https://implicit.harvard.edu/>

