AI for Defence

Baptiste Pesquet

Context

Impacts of AI on Defence

- Like with all highly technical fields, AI has a growing impact on Defence.
- Main areas:
  - Decision and planning support
  - Collaborative combat
  - Cybersecurity and digital influence
  - Logistics and operational readiness
  - Intelligence
  - Robotics and autonomy

A fast-moving ecosystem

- In all countries, traditional defence behemoths (Lockheed Martin, Thales Group, Leonardo…) have embraced AI as a key tool for improving their systems.
- Many startups are entering the field with specialized offerings.
- Some new, state-promoted national sectors emerge (example: Israel for cybersecurity).
- Recent conflicts, most notably the Ukraine war, are catalysts for AI adoption.

National and international initiatives

- (US) DOD Artificial Intelligence Strategy
- (France) AI in support of Defence
- (EU) Guidelines for military and non-military use of AI
- (NATO) An Artificial Intelligence Strategy
- ...

Main issue

- AI is used to assist humans in multiple ways.
- Role and task breakdown is the key question: what's assigned to AI, what's left for humans?
- This decision has huge ramifications:
    - Should AI decide to shoot a target autonomously?
    - Who's responsible for what?
    - ...

Use cases

Missile pack guidance

- Several (5-20) missiles used simultaneously as a pack.
- AI is used to optimize their guidance and help the pilot.
- (PhD in progress in Bordeaux)

Pilot assistance

- Single pilot planes are heavily studied for both civilian and military contexts (with sometimes an unchanged cockpit).
- AI is needed for assistance and decision making.

Object recognition in combat zones

- Project Maven: a US initiative aiming at categorizing and identifying surveillance footage by low altitude devices.
- Uses sophisticated computer vision algorithms and models.

Homeland security

- Predictive analytics (identifying trends and patterns within a dataset to then predict the likelihood of, and when, that trend will occur again) can be used to correlate signs of preparation for unlawful activities.
- Such services make heavy use of Machine Learning and are offered by companies like Palantir.
- There are, of course, many associated ethical issues.

Prevention of cyberterrorism

- Protecting defence networks by identifying and neutralizing threats (viruses, malware, cyberattacks...).
- Detection of unusual patterns in network usage.
- Associated software leverages various supervised and unsupervised learning algorithms.

Autonomous combat units

- "A tank is a car with tracks and a gun".
- Drones and drone swarms.
- (Not there yet) battle robots.
- ...

Battlefield of the future

- A highly complex and dynamic system with multiple human and non-human units interacting in real time.
- Huge flow of information to process.
- AI is used to collect, process and synthesize data for easier and better decision making.
- Dual aspect: same principles can apply to many non-military fields.