

# Hyper-intelligent systems and Fully Autonomous Weapons are gravest risk to mankind

Prof Stephen Hawking, one of Britain's pre-eminent scientists has said that the invention of artificial intelligence could be the biggest disaster in humanity's history, warning that if they are not properly managed, thinking machines could spell the end for civilisation. Professor Hawking, a prominent critic of making unchecked advances in AI, said that the technology promised to bring great benefits, such as eradicating disease and poverty, but "will also bring dangers, like powerful autonomous weapons or new ways for the few to oppress the many".

The primitive forms of artificial intelligence developed so far have already proved very useful, but he fears the consequences of creating something that can match or surpass humans. "It would take off on its own, and re-design itself at an ever increasing rate," he said. "Humans, who are limited by slow biological evolution, couldn't compete, and would be superseded." His comments come amid breakthroughs in artificial intelligence that are being achieved faster than many predicted. Google's DeepMind subsidiary defeated the world champion of the ancient board game Go earlier this year. Microsoft has said it had achieved voice recognition on a par with humans.

AI enabled machines can also act as potential lethal multiplier at the hand of terrorists. FBI in its report, had also hinted at the dangers of fully autonomous cars, such as those being developed by Google and a number of automotive manufacturers, being "more of a potential lethal weapon", allowing criminals to pack cars full of explosives and send them to a target.

In the Robot Baby Project at Vrije Universiteit Amsterdam, scientists have developed a way for robots to have 'sex' and pass on their DNA to offspring. Doing this can allow them to 'develop their bodies through evolution,' making for successive generations that have more advanced physical and behavioural capabilities. As the process continues, the researchers say robots can become more suitable for use in unknown environments that could be hazardous to humans, like deep sea mines or even other planets.

This self evolving , self replicating robots could be boon to militaries and terrorists as they could employ few robots in battlefield or cities and these robots would multiply, evolve, and learn as they carry out their mission to destroy or damage military targets . They would also rapidly learn to defeat any weapons or countermeasures employed against them and proe to be invincible.

In Nov 2017, academics, non-governmental organisations and representatives of over 80 governments gathered at Palais des Nations for a decisive meeting on the future of lethal autonomous weapons (LAWS). Organised under the Convention on Certain Conventional Weapons (CCW), to formalize their efforts next year to deal with the challenges raised by weapons systems that would select and attack targets without meaningful human control. It comes as experts warn 'time is running out' for controls on the technology.

## **Threat of fully autonomous weapons**

Artificial intelligence (AI) term was coined by John McCarthy, defined it as "the science and engineering of making intelligent machines". The field was founded on the claim that a central property of humans, intelligence can be so precisely described that a machine can be made to simulate it. The general problem of simulating (or creating) intelligence has been broken down into a number of specific sub-problems. These

consist of particular traits or capabilities that researchers would like an intelligent system to display. These include reasoning, knowledge, planning, learning, natural language processing (communication), perception and the ability to move and manipulate objects.

“Artificial Intelligence” is also enabling development of fully autonomous weapons that can select and fire upon targets on their own, without any human intervention. Fully autonomous weapons can be enabled to assess the situational context on a battlefield and to decide on the required attack according to the processed information. The use of artificial intelligence in armed conflict poses a fundamental challenge to the protection of civilians and to compliance with international human rights and humanitarian law.

The oldest automatically-triggered lethal weapon is the land mine, used since at least the 1600s, and naval mines, used since at least the 1700s. Some of the Some current examples of Lethal autonomous weapon (LAWs ) are automated “hardkill” active protection systems, such as a radar-guided gun to defend ships such as the Russian Arena, the Israeli Tropy, and the German AMAP-ADS. Israel Aerospace Industries’ Harop drones are designed to home in on the radio emissions of enemy air-defense systems and destroy them by crashing into them.

Although weapons with full lethal autonomy have not yet been deployed, precursors with various degrees of autonomy and lethality are currently in use.

On the southern edge of the Korean Demilitarized Zone, South Korea has deployed the Super aEgis II, a sentry gun that can detect, target, and destroy enemy threats. It was developed so it could operate on its own, although so far the robots reportedly can’t fire without human intervention.

Several states support and fund activities targeted at the development and research on fully autonomous weapons. Amongst

them are China, Germany, India, Israel, Republic of Korea, Russia, and the United Kingdom.

“When we look at autonomous weapons, our concern is about the degree of human control over their targeting and attack functions. Those are the functions that we think should always be under human control, and that’s what the debate is coming down to,” says Mary Wareham, global coordinator of the Campaign to Stop Killer Robots.

## **Fully Autonomous Robots**

The field of robotics is closely related to AI. Intelligence is required for robots to be able to handle such tasks as object manipulation and navigation, with sub-problems of localization (knowing where you are, or finding out where other things are), mapping (learning what is around you, building a map of the environment), and motion planning (figuring out how to get there) or path planning (going from one point in space to another point, which may involve compliant motion – where the robot moves while maintaining physical contact with an object).

Robotics has made significant progress, since its first deployment as an industrial robot more than 50 years ago. Robots are now days being used extensively in manufacturing, services, healthcare/medical, defense, and space. They have enhanced safety of humans from dangerous tasks, improved the productivity and the quality of life. In the future the robots are poised to transform the human society in the same way as the computers or internet did in the past.

The defense forces are primarily interested in mobile robots or unmanned vehicles in air, land and sea domain. The mobile robots or unmanned systems have transformed warfare as evidenced by thousands of them been deployed in Iraq,

Afghanistan and in Pakistan, that have supported the armed forces in targeting, disarming roadside bombs, clearing land mines, surveying intelligence collection etc. Unmanned Systems have also proved very effective in fast response to catastrophic and unexpected incidents, including natural or civil disasters like fires, floods and earthquakes.

Fully autonomous weapons are distinct from remote-controlled weapon systems such as drones—the latter are piloted by a human remotely, while fully autonomous weapons would have no human guidance after being programmed. Military is on way to the development of fully autonomous weapons and platforms and can be considered as “revolution in modern warfare”. Completely autonomous robots are able to operate by themselves without the need for any human input. They are often able to learn by themselves and to modify their behavior accordingly.

‘Fully autonomous weapons, also known as ‘killer robots,’ are quickly moving from the realm of science fiction toward reality. Robotic systems with a various degree of autonomy and lethality have already been deployed by the United States, the United Kingdom, Israel, and the Republic of Korea. Robotic systems with a various degree of autonomy and lethality have already been deployed by the United States, the United Kingdom, Israel, and the Republic of Korea.

Britain’s Taranis, an experimental prototype for future stealth drones, has an autonomous mode where it flies and carries out missions on its own, including searching for targets.

The US Office of Naval Research has been testing the Sea Hunter, the Navy’s next-generation submarine drone that can operate autonomously or by remote control. Currently oriented toward detecting mines and ultraquiet diesel-electric submarines, the drone is expected to be outfitted with weapons at some point.

# **Artificial Intelligence and “singularity”**

Scientists in Amsterdam have created the world’s first batch of robots that can reproduce and create offspring, and experts have warned that the Artificial Intelligence could pose a real threat to humans in the coming years. The new robots have been programmed with a genome that enables them to communicate with each other, learn, and evolve by creating their own new genomes with new information they have learnt

If research into Strong AI produced sufficiently intelligent software, it might be able to reprogram and improve itself. The improved software would be even better at improving itself, leading to recursive self-improvement. The new intelligence could thus increase exponentially and dramatically surpass humans. Science fiction writer Vernor Vinge named this scenario “singularity”. Because the capabilities of such an intelligence may be impossible to comprehend, the technological singularity is an occurrence beyond which events are unpredictable or even unfathomable.

Rollo Carpenter, creator of Cleverbot says we are a long way from having the computing power or developing the algorithms needed to achieve full artificial intelligence, but believes it will come in the next few decades. Ray Kurzweil has used Moore’s law (which describes the relentless exponential improvement in digital technology) to calculate that desktop computers will have the same processing power as human brains by the year 2029, and predicts that the singularity will occur in 2045.

**Ethical considerations of fully**

# autonomous weapons

The development of fully autonomous weapons and platforms raises many fundamental ethical and principle questions:

- Can the decision over death and life be left to a machine, reducing humans to just objects ?
- Can fully autonomous weapons function in an ethically “correct” manner?
- Are machines capable of acting in accordance to international humanitarian law (IHL) or international human rights law (IHRL)?
- Are these weapon systems able to differentiate between combatants on the one side and defenceless and/or uninvolved persons on the other side?
- Can such systems evaluate the proportionality of attacks?
- Who can be held accountable: the programmer, commander or manufacturer of the robot ?
- Would Fully autonomous weapons would lower the threshold of war?
- Would autonomous weapons could be used to oppress opponents without fearing protest, conscientious objection, or insurgency within state security forces?
- What would be consequences if fully autonomous weapon systems fall into the hands of non-authorized persons?

Political scientist Charles T. Rubin believes that AI can be neither designed nor guaranteed to be benevolent. He argues that “any sufficiently advanced benevolence may be indistinguishable from malevolence.” Humans should not assume machines or robots would treat us favorably, because there is no a priori reason to believe that they would be sympathetic to our system of morality, which has evolved along with our particular biology (which AIs would not share). Hyper-intelligent software may not necessarily decide to support the

continued existence of mankind, and would be extremely difficult to stop.

“We cannot quite know what will happen if a machine exceeds our own intelligence, so we can’t know if we’ll be infinitely helped by it, or ignored by it and sidelined, or conceivably destroyed by it,” Elon Musk says. In the longer term, the technology entrepreneur has warned that AI is “our biggest existential threat”. This topic has also recently begun to be discussed in academic publications as a real source of risks to civilization, humans, and planet Earth.

In April 2013, a group of non-governmental organizations launched the Campaign to Stop Killer Robots in London. The campaign seeks to establish a coordinated civil society call for a ban on the development of fully autonomous weapon systems and to address the challenges to civilians and the international law posed by these weapons. The campaign builds on previous experiences from efforts to ban landmines, cluster munitions, and blinding lasers.

Noel Sharkey of the International Committee for Robot Arms Control explained the group’s intentions: “The Campaign to Stop Killer Robots is not trying to stifle innovation in artificial intelligence and robotics and it does not wish to ban autonomous systems in the civilian or military world. Rather we see an urgent need to prevent automation of the critical functions for selecting targets and applying violent force without human deliberation and to ensure meaningful human control for every attack.”

## **References and Resources also include:**

- <http://www.reachingcriticalwill.org/resources/fact-sheets/critical-issues/7972-fully-autonomous-weapons>
- <http://spectrum.ieee.org/automaton/robotics/military-rob>



ots/autonomous-weapons-could-be-developed-for-use-within-years

- <https://www.csmonitor.com/USA/Military/2017/0831/Why-killer-robots-are-becoming-a-real-threat-and-an-ethics-test>