

## ARTIFICIAL INTELLIGENCE

(AI)

**DEFINITION:** ar-ti-fi-cial in-tel-li-gence – The capability of a machine to imitate intelligent human behavior. Any system that perceives its environment and takes action to maximize its chance of achieving its goal.

What comes to your mind when you hear the words Artificial Intelligence? Do you think of a robot or maybe for those of us that are old enough to remember the movie *2001: A Space Odyssey* which depicted a computer called, Hal 9000 that had a human personality. Hal 9000 controlled most of the operations aboard a spacecraft called “Discovery One”. There was a crew of scientists and pilots as well as three other separate scientists who were being kept in suspended animation, while the spaceship traveled to Jupiter. During the flight Hal 9000 reports to the pilots and scientists onboard that there is an imminent failure of an antenna control device. One of the scientists gets in a pod and retrieves it only to find out that there is nothing wrong with it. After much discussion Hal 9000 recommends reinstalling the device so it can fail and the problem can be verified. Mission Control advises the astronauts that Hal has made an error, which causes the crew to make a decision to disconnect Hal 9000 from his life support wiring system, if in fact he is proven wrong. Unbeknown to the crew was the fact that Hal 9000 had figured out their intentions by lip reading their secret conversation. While one of the scientists goes on a spacewalk to replace the antenna device Hal 9000 takes control of the pod and severs the scientist’s oxygen hose setting him adrift into space. Another scientist goes off in another pod to rescue his endangered comrade at which time Hal 9000 turns off the life support system of the three scientists on board who were in suspended animation, killing them. When the scientist returns to the spacecraft with the other scientist’s body, Hal 9000 refuses to let them in, saying, “I’m sorry Dave, I’m afraid I can’t do that”.

This scenario of an intelligent machine going rogue and creating death and mayhem played out on movie screens across America in 1968 leaving us to wonder whether or not that could ever really happen. *2001: A Space Odyssey* screenwriter Arthur C. Clarke and director Stanley Kubrick imagined a machine with intelligence that matched or exceeded the capability of human beings by the year 2001. This view of Artificial Machine Intelligence and its range of possibilities has been driving the scientific world long before Hollywood ever had an inkling of its impact on audiences across the globe, aka the *Star Wars* franchise.

Back in the 1940's a man by the name of Alan Turing developed the "Turing Test" to test whether a computer's behavior had human intelligence. This test would stand the test of time as it is still used today. In 1957 Frank Rosenblatt designed the first neural network for computers, which simulates the thought process of the brain. The 1960's brought about the Department of Defense training computers to mimic basic human reasoning. A robot called, "Shakey" was developed by a company called, SRI International. Shakey could perceive its environment surroundings, logically deduce implicit facts, navigate, make a plan to achieve a goal, monitor the execution of a plan in the real world and recover from its errors along with communicating in simple English. In 1979 the first computer-controlled autonomous vehicle circumnavigated a chair-filled room at the Stanford AI Lab located at Stanford University. The 1990's brought about a shift in machine learning switching from knowledge-driven approaches to data-driven approaches. This results played out on the world scene when IBM's Deep Blue defeated world chess champion Garry Kasparov and years later when Google's Deep Mind AlphaGo defeated 3 time European Go champion Fan Hui by a score of 5 to 0 at the ancient Chinese game Go, one of the most complex board games in history. IBM's Watson supercomputing system beat the two best human players of the TV game show Jeopardy demonstrating the ability to understand and answer nuanced questions that had previously stumped computer programs. All of these amazing feats by intelligent machines had been just the tip of the iceberg in terms of how autonomous machines could be used for future industries, especially the military.

This unlimited potential had grabbed the attention of the Department of Defense back in the 1950's. They would create the Advanced Research Projects Agency that would later become DARPA in order to facilitate research and development of military industrial strategies. The Department of Defense would unveil the "Third Offset Strategy", which stated that rapid advances in AI would define the next generation of warfare. China had long ago understood the implications of falling behind in AI technology as they unveiled the "Next Generation Artificial Development Plan" stating a goal of world domination in AI by 2030. Russia's leader Vladimir Putin went on record declaring that "whoever reaches a breakthrough in developing AI will dominate the world".

This brings us to the realization that a military arms race in Artificial Intelligence between the world's superpowers had started long ago, specifically China and the United States. This arms race has fallen under the Cold War narrative only this time the war will be waged in the area of AI technology. Artificial Intelligence is rapidly becoming the center of focus for futuristic battlegrounds that have no boundaries or borders and will for the most part have no human involvement in the decision making process concerning who is to be eliminated or spared. Both superpowers are driven by fear of the other one developing weapons with superior AI. Leading the way towards greater speed, accuracy and precision

of weapons that are currently developed or in the process of being built are “Lethal Autonomous Weapons” (LAWSLAWs). These weapons can operate in the air, on land, on water, under water, or in space and once activated, can select and engage targets without further intervention by a human operator. So, let’s step back for a second and grasp what the facts are, which is that robots, aircraft, drones, submarines and anything else that moves with Artificial Intelligence at its core can deliver fatal blows to the enemy without the slightest interference of a human finger. The implications will be devastating for those countries left behind in the AI race, especially when it comes to autonomous weapon warfare.

One thing is for certain, Artificial Intelligence is only as good as the collection and implementation of data that is made available and there is one country that leads the pack in this area and that is China with its 1.4 billion citizens. Concerning its own citizens, the United States is more concerned about individual privacy as being part of a free society, which impedes the governments progress in data collection, whereas China has set up an extensive, powerful surveillance system of its willing citizens that gives them an edge on data collection and how they manipulate that data. Security cameras and facial recognition technology are improving at the speed of light with some experts claiming that China has the capabilities of scanning every face of their citizens in just one second. One can only imagine how recognition technology could be implemented into autonomous weaponry for seeking out its prey. Predictions show China on track to possess 20 percent of the world’s share of data within the next few years with the potential to have over 30 percent by 2030.

Data is the new so called, “oil” of AI and China is the new Saudi Arabia in terms of controlling the world’s share of information. China is pushing tremendously hard in accessing AI technology in companies in the United States through investment strategies. Chinese investments in U.S. companies that focused on AI between 2010 and 2017 were estimated at 1.3 billion dollars. This investment shows up in the intellectual areas of Chinese students graduating with a PhD in computer science. Three decades ago, only one of every twenty Chinese students studying in America returned home. Now, four out of every five return home, which according to those in the know is about 185,000 Chinese computer scientists compared to 65,000 in the U.S. The numbers favor China in terms of how AI is playing out across the board in transforming their economies, but more importantly their military. Speech recognition, facial recognition, and 5g 5G infrastructure all lend to their development in AI weaponry. The numbers are staggering within all these areas of technology. China has dominated the international competitions for facial recognition. Estimations show Chinese facial recognition companies having 1 million more images than their U.S. counterparts.

In the area of speech technology, especially English, which just so happens to be the universal language requirement for AI shows the Chinese beating U.S. firms in all languages, including English. The number one voice recognition company in the world is China's company called "iflytek" with a user base of seven hundred million which is about double the amount of users who speak to Apple's "Siri". Iflytek continually beats teams from Google, Microsoft, IBM, MIT, and Facebook in this area. "Baidu" is a Chinese company that developed a human-level speech recognition system a year before Microsoft did.

We are inundated with advertising about 5g technology and its' ability to connect virtually everyone and everything including machines, objects, and devices. China's company, "Huawei" is the world's leading supplier of 5g 5G telecom equipment. The Chinese market, which is the world's largest along with 28 percent of the global market belongs to China. Of the top four brands building 5g 5G infrastructure, two are Chinese and zero are American. To give you an idea of the speed at which China is moving in computer technology one only has to look at the year 2001 in which China had zero of the world's fastest five-hundred supercomputers. In 2018 it had 219 with the United States at 116. All of these advantages come full circle begging the question, how far has China come in their AI journey as it relates to autonomous weapons, especially those that could yield nuclear capabilities.

What was once thought of as science fiction concerning autonomous weapons has now come to life with a very high probability that China is way out ahead of the United States. The question remains, how long do you wait for that AI threat to become a reality. It's like your about to square off in a fight and you're wondering whether or not you should throw the first punch before the other person beats you to it. Sometimes the answer to your problems can show up in the most unlikely way, perhaps even a robot.