

AI Ethics Integrated in Elizabeth Bear's "Tideline"

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Abstract - Artificial Intelligence (AI), the ubiquitous entity is taking over the leading domains in recent times. The inexorable Artificial Intelligence finds a prominent place in the science fiction of the present era. This paper aims to analyse the need for AI ethics through Elizabeth Bear's short story "Tideline". It attempts to explore the fundamentals of AI ethics like well-being, accountability, fairness, robustness, reliability, adherence to human rights and others, and unfurl the survival of the limping war robot Chalcedony, the protagonist of the story "Tideline". It will also focus on the writer's usage of technological consciousness and autonomy to highlight the importance of AI ethics and the role of individuals in preserving the balance of the society.

Index Terms - Artificial Intelligence (AI), AI ethics, Robotics, Technological consciousness, Autonomy, Accountability

The rapid progress of the human civilisation in the modern era is synonymous with the progress in technology. The word technology originated from two Greek words 'techné' and 'logos' meaning 'craft' and 'word' respectively. The word technology was initially referred as 'techné' during the early Greek civilisation. This word was associated with mechanical arts like blacksmithing and navigation. The Romans associated techné with the ability of humans to construct roads and houses. Marcus Tallius Cicero, a renowned Roman philosopher employed the word 'techné' to the concept of 'second nature.' He envisioned the technological development in agriculture and irrigation as the path to the creation of the second nature. As Rocci Luppigini says the relation of techné to second nature brings out the significance of technology in the social life of human beings: "This emphasis of techné is second nature a significant because it connected social development and technological activity in the world with the internal workings of human nature" (49).

The conceptualisation of the word 'techné' has evolved further with the postulates of Sir Francis Bacon in the seventeenth century when it was referred to engines and automobiles. Bacon in his New Atlantis talks about the perfect utopian society which is a technologically advanced society, free of crimes and poverty. This view of technology as a prelude to a better society by Bacon paved way for the advancements that occurred later. In the late nineteenth century, the word 'technic' was used by engineers to refer to machines and their workings. Max Weber & Lewis Mumford contributed to the better understanding of the developing new technology. The word 'technology' came into usage from the twentieth century. The century witnessed growth in various fields. Scientific innovations flourished leading to the prosperity of the society. The meaning of technology also became diverse and it was not confined to machines and automobiles.

The domain of technology started to spread its branches in the political, social and economic spheres. It greatly influenced the three spheres becoming a major determiner. Technology from its origin was embedded in society later intertwining with society for its betterment. Thus, technology is intertwined with society and people: "Technology is not simply assemblages of mechanical and electrical pieces; rather it is complex systems of people, relationships, and artifact" (Johnson and Wetmore 94). This interdependence of society and technology is elaborated through sociotechnical system. Sociotechnical system believes that society and technology interact to create progress. It is an earlier theory that explains the relationship between machines and human civilisation during the past era of rapid developments.

The inexplicable bond between society and technology paves way in looking at technology from the social perspective. Ethics is a branch of philosophy that deals with the moral principle of human beings in the society. Though there are many interpretations of ethics, the commonly accepted meaning is the necessity to do the right. Ethics opens the pathway for the proper functioning of society. The broader divisions of ethics are normative ethics, metaethics and applied ethics. These ethics are further divided into different kinds. Apart from its conventional meaning in philosophy, ethics is used in most of the leading fields of the present times. It is used in law, medicine, work places, education and all branches of science. The need for ethics is also increasing with the tremendous growth of technology.

Techno ethics is one of the classification of ethics which rose to popularity with technological advancements. The term, 'techno ethics' was coined by the philosopher Mario Bunge in the year 1977 to describe the regulations for the creators of the technology. It was later extended to the creation itself. It deals with the different sectors of technology and their impacts on society and so social theories can be employed to study ethics in technology. Techno ethics is formed as the consequence of the interplay between technological expansion and the evolving society. It believes that human activity is at the core of both society and technology. The emerging fields of technology has led to further classification of techno ethics. Techno ethics consists of engineering ethics, cyber ethics, nano ethics, biotech ethics and environmental techno ethics.

After the invention and widespread of internet in 1980s, technology was no longer exclusively associated with machines. The advent of internet opened new gateways in the field of communication. With the advancement in communication and interaction, there was also the threat of privacy invasion and exposure of data. The threats posed by internet led to the inclusion of the concept of ethics. Internet ethics also known as cyberethics consists of a set of rules and conducts to be followed while using any online community. These ethics ensured that the online communities were free from cyberbullying, exploitation of personal data, cyberstalking, online theft and other crimes.

Cyberethics set in motion the need for robot ethics and AI ethics. Robot and AI ethics are the later inventions that sprung up from techno ethics. They gained more attention after the popularity of speculative fiction. Speculative fiction is a literary genre that reflects both the positive and negative impacts of technological developments. This representation of utopian and dystopian worlds are expounded by many writers of speculative fiction like H. G. Wells, Isaac Asimov, Ursula K Le Guin, Ray Bradbury, William Gibson and Jules Verne. Contemporary writers like Neal Stephenson, Paolo Bacigalupi, Martha Wells and Ted Chiang have also represented the different side of advancements. One among them is the American writer Elizabeth Bear who vividly captures the impacts of modern technology on society.

Elizabeth Bear born in Connecticut in 1971, worked as a technical writer before she began her career as a writer in the year 2001. As a writer who was fascinated by science, development and the human response, Bear wrote speculative fiction on a variety of themes. She has authored a multitude of fiction, fiction series, short stories and essays. She has ventured into the genres of science fiction, cyberpunk, steampunk, epic fantasy and space opera. Her diverse themes include cybernetics, space travel, species on other planets, robotics, artificial intelligence, futurism and fantasy. Her works along with scientific and fantastical themes focus on society and gender. Bear in her interview with the Locust Magazine has highlighted that science fiction and fantasy have elements of anthropology in them. She thus creates in her works, a world which is distinct from today's world but not entirely impossible to materialise in the near future.

The blend of Elizabeth Bear's imagination and the upsurging innovations served as the foundation for her works. The Locus Award winning novel *Hammered*, published in the year 2005 was Bear's first novel. It details the life of Jenny Casey, a Canadian soldier who has received cybernetic replacements. Her novel *Scardown* published in the same year further elaborates on Jenny Casey's adventures with artificial intelligence and her new mission in the military. *Ink and Steel: A Novel of the Promethean Age* published in 2008 is a historical fiction that uncovers the mystery of Lit Marley, a playwright and spy during the time of Queen Elizabeth. *Karen Memory*, published in 2015 is a steampunk novel that centers on the protagonist Karen Memory who solves the mystery of a serial killer. She has also written fantasies like *Range of Ghosts* in 2006, *Shattered Pillars* in 2013, *Steles of the Sky* in 2014 and *Ancestral Night* in 2019. Her famous short stories include "Two Dreams on a Train" (2006), *Gone to Flowers* (2006), "Tideline" (2007) and "Okay, Glory" (2018).

The short story, "Tideline" published in 2007, unfolds the story of a marine war robot named Chalcedony who was damaged in a shipwreck. Chalcedony lands on the shore and discovers that all the members of her troupe were destroyed. She finds and befriends Belvedere, a young boy. Belvedere helps her collect beads for the memorial jewellery she is making and she in turn helps him with his food by heating it with her microwave equipment. The bond between Chalcedony and Belvedere grows stronger with the passage of time. She teaches him skills required for survival like making fire and cooking. She tells him stories of war which excite Belvedere. Chalcedony works hard to complete the memorial jewellery despite her dying energy. When her battery dries up completely, she gives the beaded necklace asking him to give it to kind people who care for other living beings.

Elizabeth Bear's "Tideline" foreshadows a future in which technology and human life become inseparable. She depicts communion of technology and society which improves the quality of human life. This paper attempts to highlight the importance of technological consciousness which is essential for comprehending the roles of individuals. The paper highlights the fundamentals of ethics like well-being, accountability, reliability, adherence to human rights and others in artificial intelligence. It aims at decoding the nature of autonomy in AI through Elizabeth Bear's short story "Tideline".

Artificial Intelligence (AI), a new innovation of technological growth impacts the society and the life of human beings in innumerable ways. The central idea behind the creation of Artificial Intelligence is inspired from different disciplines. AI is considered as a division of Computer Science as this field has a major contribution towards the formation of AI. AI in the recent times is associated with robotics. This association has the maximum potential to alter and influence humanity. The literature of the late twentieth century exhibits this association through science fiction and fantasy literature. The concepts that were brushed off as mere fantasy and imagination have been made possible by technological progress. Though AI and robotics are the popular concepts of today, information about them is found in ancient Greek literature: "Ever since Homer wrote of mechanical 'tripods' waiting on the gods at dinner, imagined mechanical assistants have been a part of our culture" (Buchanan 53).

The advancements in artificial intelligence have proven to be useful in a number of ways. It is useful in improving teaching methodologies, medical approaches and in reducing the workload of human beings. AIs are also used in everyday life like security sensors, automated machines which can sense movement, temperature and others. The flip side of this technological boon also requires equal attention for the sustenance of the world. The first threat which is posed by the rapidly improving AI is Artificial Superintelligence. The term superintelligence refers to system of knowledge that would surpass the existing human knowledge in one or more aspects. Nick Bostrom, a Swedish philosopher theorised artificial superintelligence as, "... any intellect that greatly exceeds the cognitive performance of humans in virtually all domains of interest" (24). This exceedingly intellectual phenomenon poses a threat to the existing humanity.

Chalcedony in the short story "Tideline" is depicted as a war robot who is infused with Artificial intelligence. The writer Elizabeth Bear refers to the war robot by using the pronoun 'she' thereby assigning it a gender. In the beginning of the story Chalcedony lands on a shore and discovers that her ship is wrecked. After reaching the shore, the isolated robot is not monitored by a human rather she operates on her own. She finds Belvedere with her targeting sensors. These automated sensors give her the view of objects on her path and around her too. She uses her artificial intelligence to distinguish between the various objects around her: "Her sensors painted the knife pale colors. A weapon, but not a threat to her" (Bear 645). The ability of a robot to identify a potentially dangerous weapon and understand whether it is a harm to her is made possible through the superintelligence imbibed into it. Though Chalcedony uses her superintelligence in an innocuous manner, there is also room for this superintelligence becoming a threat to humanity.

The innovations and improvisations in the field of robotics and artificial intelligence have brought about many useful changes in the society. It should also be understood that the artificial intelligence which has so many benefits has the potential to cause harm to existing social systems. Therefore, close monitoring of this technology is inevitable for the smooth functioning of the society. This monitoring can be performed by abiding the ethics of artificial intelligence that can govern the effective use of it. There is no correct interpretation of what is the correct ethics as it complicates its application. However, the ultimate aim of ethics is to ensure the safety: "A common theme in AI safety research is the possibility of keeping a superintelligent agent in sealed hardware to prevent it from doing any harm to humankind" (Yampolskiy 136). The fundamental principles of AI ethics are designed for the creators of the artificial intelligence and also for the machines on which they are applied.

The principle of AI ethics relies on the three integral elements namely sensors which analyses the environment, actuators which act on the situation of that particular environment and the operational logic which provides data for the actuators and guide them. The operational logic is considered as a key element as it determines the action of the system. In the story, Chalcedony possesses sensors which help her in analysing the shore and her manipulators act as actuators. When she comes to experience a new situation, Chalcedony checks through the data programmed into her to understand it better. These help in unravelling Chalcedony as a machine with artificial intelligence and the principle of AI ethics can be analysed to study the character of Chalcedony.

AI and other technologies were invented to help human beings and make their lives easier. The ethics of artificial intelligence ensures that the AI is focussed on the benefits of the humans. George Ritzer, a sociologist iterates the impact of AI as, “Clearly, the future will bring with it an increasing number of nonhuman technologies with greater ability to control people and processes” (249). This immense potential of the technology demands the strong need for ethics. The human-centred AI follows the principles of sustainable well-beings, human-centred values and fairness, transparency, robustness and accountability. The components mentioned above are the major fundamentals of AI ethics which will be elaborately discussed.

The principle which occupies limelight in the ethics of artificial intelligence is sustainable well-being. The term sustenance is used for both the society and the machine. Scientists argue that sustenance should be inclusive of the earth and human beings. The infusion of AI in fields like agriculture and waste management have adverse effects on earth resulting in pollution. This can be prevented by conforming to AI ethics: “The application of AI for effective sustainability needs a universal metric that fixes the technical and predictive performance tools while measuring the acceptance rate of these tools and AI-based activities in the target audience” (Alshaw 16-17).

Elizabeth Bear in her short story highlights the sustainable well-being of all living organisms. Bear does not provide a detailed account of the shipwreck but she implies that the other robots with Chalcedony were destroyed in the wreck caused by their battle. The war between the robots has polluted the ocean with inflammables and the destroyed parts of the ship and robot contaminated it. The war robots have disrupted the natural habitat of the ocean and land by their actions in the story. The future warfare using robots portrayed in the short story puts forth the alarming danger of environmental pollution. “Tideline” thus shows the aftermath of not conforming to the sustainability of natural resource.

The well-being of human beings also comes under the aspect of sustainability in AI ethics. Though technology eases the human life, there are possibilities of potential dangers. When Chalcedony meets Belvedere, she activates her program to deal with the civilians. She also helps and takes care of him. She teaches him essential skills to tackle the challenges of the world. She includes the well-being of Belvedere along with her mission of making memorabilia. Contrary to her encounter with Belvedere, she uses her powers to kill the two men who tried to harm him: “But she had other weapons, including a pinpoint laser and a chemical propellant firearm suitable for sniping operations. Enemy humans were soft targets” (Bear 650). As she was a war robot, she was designed for the purpose of killing the enemies. This shows that the robot is capable of engaging in both constructive and destructive actions. She distinguishes between harmless and harmful individuals and acts depending on the situation, and thus Chalcedony proves to be programmed with the element of sustenance.

The idea that AI should not violate the postulates of Human Rights also comes under its ethics. The application of human rights is essential as it helps in identifying the risks associated with the interaction of AI with human beings. The uniqueness of human-robot interaction is also taken into account in this principle of AI ethics. This principle details the identification of risks, vulnerable groups and can aid in providing remedies when rights are violated. Nevertheless, these principles of human rights vary depending on policies of the countries. Elizabeth Bear painstakingly paints the pros and cons of following the principles of human rights as well as ignoring them. The human beings in the story violate the most basic human right to life by threatening the life of Belvedere. While stealing Belvedere’s bag, two robbers attack him: “Belvedere had disappeared behind in time to see him knocked to the ground by two larger humans, one of whom had a club raised over its head” (Bear 650). When she finds Belvedere in a battered state, she protects him from his attackers. Chalcedony has the ability to identify the threat which could harm her. Chalcedony being a robot with artificial intelligence tries to rectify the violation of it by guarding his life. AI like Chalcedony can be used in rescue operations as they can save life with minimal risks, proving how the benefits of AI well blended with human rights has the potential to save life.

Fairness and accountability also occupy a prominent place in artificial intelligence. Fairness in AI is approached by three different ways namely the unaware approach in which the AI is free from any bias like race, gender and class, fairness through awareness of differences and group fairness which provides equal fairness to all members of a particular group. However, this fairness which seems as equality on surface could possibly destroy the equity of society by favouring the privileged. Chalcedony initially misunderstands that Belvedere would take away the necklace she was making for the memorial: “She was about to reach out to snatch the treasure away from the child and knock him into the sea when he rose up on tiptoe and held it out to her, straining over his head”