

Robotic Emotion: An Examination of Cyborg Cinema

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ABSTRACT : We live in a world of cyborg poetics, a world in which we constantly dance with technology. Our daily lives are surrounded by, immersed in, and intersected by technology. This integration has a long historical trajectory, and one that has certainly been troubled, filtered, and reflected through literature, theatre, and film. Recent years have seen an explosion in cinema technology, with the introduction of computer-generated characters becoming commonplace in film. However, we have seen relatively few ‘physical’ robots acting in films. This paper discusses the theoretical implications of cyborg thespians and the way the audience perceives this potential innovation. The paper presents a timeline of the use of robots in cinema, and examines how these cyborg thespians are represented and portrayed. An analysis of the functions and motivations of the robots has been undertaken allowing trends to be identified.

Keywords -Cinema, Media, Robot, Cyborg, Android, Artificial Intelligence, Representation

I. INTRODUCTION

An artificial consciousness permeates globalized societies; technology is all around us, in science, in science fiction, in daily life. This relationship continues to be processual, technologies continue to move forward, assisting or, perhaps, encroaching on the human body. In modern society, we are increasingly becoming merged with the technology around us, wearing it and implanting it. This allows us to contemplate the merging of the organic and the inorganic. Bodies are being remapped by technology and rigid notions of subjectivity are reconfigured and societal norms are disrupted and shifted. Questions and issues regarding ability, identity, and a struggle for embedded agency in relation to technologies are principal concerns of the late twentieth and early twenty-first centuries [1]. Humans are bombarded by visual media and one often feels as if there is a fundamental invasion of body integrity [2].

This paper discusses media which has been designed to push the boundaries of what is traditionally described as film; providing a sterile environment where machines perform on a screen, robots reciting lines. Film is often defined as a form of literature which incorporates acting and stagecraft elements combined with a narrative script. The effectiveness of the film medium (which when conducted may be considered a play or drama, according to actual type) is based on the delivery of text through the actors and how the audience observing the performance responds. The introduction of robot thespians has the potential to create a form of cyborg cinema that challenges and re-examines the ‘sensually different atmosphere’ of cinema that we are used to [3].

Cinema is often described as a cultural construct and the ‘liveness’ and ‘realism’ debate is well documented [4,5,6,7]. Introducing robots as actors can be seen as removing the human agency which in turn can undermine the idea that performance is a specifically human activity and it may cast into doubt the existential significance attributed to performance. Auslander[8,9] claims that the concept of the ‘live’ emerges only as a result of mediatization and ‘live’ is, in the contemporary moment of globalized technology, already to some extent mediatized.

Morse makes a case for machine subjects (such as the television or computer screen) and the cyberized machine-human interactions that increasingly take on the ‘I’ and ‘you’ of subjective construction (we talk to the television, to our phones etc). Socially constructed and based on what she calls ‘virtualities’ the embodied, intelligent machine emerges as a partner in discourse [10].

A number of commentators have also noted that there have been noticeable changes in the styles of acting seen in film in recent years. Many mention a move towards a more mechanic, flattened, and intentionally ‘non-acting’ style, as humans sit alongside the technological on the screen [1,11]. The introduction of new forms of technology into cinema, has challenged many notions of existing theory and practice, forming complex alternatives. The introduction of robot thespians also highlights the fixed notions of what being human means in our modern world relative to the embodied and pervasive technologies that surround us.

However one sees the use of technology in cinema, there is no doubt that the cinema of the late twentieth and into the twenty-first centuries has been shaped by cultural processes. As the representational, visible bodies on the screen merge into the technology, Phelan proposes a new 'inclusive representational framework' - suggesting that the technology may efface their 'representational visibility' but in the process they are re-marked as something new, entering a cyborg sensitivity [12].

The concept of robot cinema raises a number of questions regarding the representation of the human body on the screen, providing an innovative site for exploring and experimenting with these ideas. If robot cinema is to progress, and to be used to help understand the impact of technology on human bodies, then the complex relationships between physical spaces, human bodies and technology needs to be examined. Removing humans from a film perhaps moves us closer to an understanding of a post-human condition [13]. A new, radically inclusive notion of 'universal subject' becomes necessary and a new critical language and way of thinking about film and performance becomes necessary.

Technology itself, can call the materiality of the body into question. Human bodies are increasingly abstracted, abjected, objectified through distance, media, commodification and technology [1]. A number of academics and researchers have asked if we should we lament the loss of the organic body [14]. In reality, technology development is often led by technological determinism, which feels that human bodies can naturally co-exist with technology as long as humans remain in control.

This paper considers the relationship between twenty-first-century research in robotics and the fantasy of the ideal robot, as this fantasy was honed in fictions, plays, and films of the twentieth century. It can be seen that that new versions of the artificial person in science fiction literature and film cannot escape many of the representational patterns of older texts. Cinema containing artificial people often returns to the same arsenal of tropes and plotlines decade after decade [15].

While a wide range of theoretical and cultural domains, popular fantasies, technological debates, and scientific research may refer to fictional artificial people, the literary and cinematic tradition that informs their cultural meanings has not been fully codified. Despite, or indeed because of, its cultural ubiquity, the discourse of the artificial person is often used to rehash stereotypes of these figures; this tendency will be examined and analyzed in this paper.

II. ROBOTS, ANDROIDS AND CYBORGS

In this section, we briefly survey events and work that have made modern robot technology possible. Although most robot technology was primarily developed in the mid and late 20th century, it is important to note that the notion of robot-like behavior and its implications for humans have been around for centuries in religion, mythology, philosophy, and fiction [16].

There are reports of automata and mechanical creatures from ancient Egypt, Greece, and China. The Iliad refers to golden maids that behave like real people [17]. The idea of golem, an "artificial being of Hebrew folklore endowed with life" has been around for centuries [18] and was discussed by Wiener [19]. Ancient Chinese legends mention robot-like creations, such as the story from the West Zhou Dynasty (1066BC–771BC) that describes how the craftsman Yanshi presented a humanoid. The creation looked and moved so much like a human that, when it winked at the concubines, it was necessary to dismantle it to prove that it was an artificial creation [20]. During the Tang Dynasty, a craftsman, Yang Wullian made a humanoid robot which resembled a monk. It could beg for alms with a copper cup, put it in place after collecting and even bow down to the person who gave alms to the robot. All these movements were mechanically actuated and were either in a fixed sequence or under manual control [21]. Similar robotic devices, such as a wooden ox and floating horse, were believed to have been invented by the Chinese strategist Zhuge Liang [16], and a famous Chinese carpenter was reported to have created a wooden/bamboo magpie that could stay aloft for up to three days [22].

In the 15th century, Leonardo da Vinci drew up schematics for a mechanical robot knight. It consisted of a knight's armor, which was fitted with gears, wheels and pulleys. It was controlled using cables and pulleys. This robotic knight could lift its visor, sit or stand and could move its head. Using the plans of the robotic knight made by Leonardo da Vinci, robotist Mark Rosheim built a prototype of the knight in 2002. He further modified the design and made it more advanced by introducing the ability to walk [23].

Early robot implementations were remotely operated devices with minimal autonomy. In 1898, Nicola Tesla demonstrated a radio-controlled boat, which he described as incorporating "a borrowed mind." In fact, Tesla controlled the boat remotely. Tesla hypothesized, ". . . you see there the first of a race of robots, mechanical men which will do the laborious work of the human race." He even envisioned one or more operators simultaneously directing 50 or 100 vehicles [16].

In the 20th century we entered the era of robotics. An early example included the Naval Research Laboratory's "Electric Dog" robot from 1923. Robots were created for many different purposes in multiple industries, including attempts to remotely pilot bombers during World War II, the creation of remotely piloted vehicles, and mechanical creatures designed to give the appearance of life [24]. In 1940, the first humanoid robot named Elektro [25] was created by Westinghouse Electric Corporation. It could only move its arms and

head, move around on a wheel in its base, and it could play recorded speech. It consisted of photoelectric eyes and could distinguish between red and green light [21].

Complementing the advances in robot mechanics, research in Artificial Intelligence (AI) has attempted to develop fully autonomous robots. The most commonly cited example of an early autonomous robot was Shakey, which was capable of navigating through a block world under carefully controlled lighting conditions at the glacially slow speed of approximately two meters per hour [26]. Many agree that these early works laid a foundation for much that goes on in robot hybrid control architectures today [27,28].

The real challenge in production of autonomous humanoid robot is not just the designing but also programming and developing human functionality. It is important to design a humanoid robot as closely as possible to the design characteristics of a human being. The robot should also be able to communicate easily with the others and also should be able to take decisions on its own. The design was a difficult part to execute, since the extra ordinary balancing capability of the human being was not an easy task to understand and imply on a humanoid robot [21].

In 1973, Wabot-1, the first humanoid robot which could walk on two legs, communicate with a human and transport objects was created by Waseda University [29]. Although it could walk on two legs, the robot could only walk on flat surfaces.

A further breakthrough in autonomous robot technology occurred in the mid 1980s with work in behavior-based robotics [30,31]. Indeed, it could be argued that this work is a foundation for many current robotic applications. Behavior-based robotics breaks with the monolithic sense-plan-act loop of a centralized system, and instead uses distributed sense-response loops to generate appropriate responses to external stimuli. The combination of these distributed responses produces “emergent” behavior that can produce very sophisticated responses that are robust to changes in the environment.

Robot behaviors initially focused on mobility, but more recent contributions seek to develop lifelike anthropomorphic behaviors [32], acceptable behaviors of household robots [33], and desirable behaviors for robots that follow, pass, or approach humans [34,35,36].

Robots have also factored in multiple works of fiction, such as the mechanical-like birds that were present in the 1933 poem *Byzantium* by W. B. Yeats [37]. Robots have always had a large presence in science fiction literature, most notably the works of Isaac Asimov [38]. Many state that Asimov’s Laws of Robotics acted as forerunners to the first design guidelines for human-robot interaction metaphors.

Definitions

The word “robot” originates from the Czechoslovakian word *robota* which means work [16]. “Robot” appears to have first been used in Karel Chapek’s 1920’s play *Rossum’s Universal Robots* (the character was a servant robot, which resembled the structure of a human being), though this was by no means the earliest example of a human-like machine [39].

The term *cyborg* was first used in 1960 to describe human-machine interfaces (cybernetic organisms) which could adapt to new environments, specifically space travel [40]. These cyborgs were intended to take care of tasks automatically and unconsciously, leaving their creators free to explore, to create, to think, and to feel. A summary of accepted definitions is given in Table 1 [41].

Table 1. Technology Definitions.

| | |
|-----------------|----------------------------------------------------------------------------------------------------------------------|
| Cyborg | An organism with synthetic hardware which interacts directly with the brain, and alters the way it functions. |
| Robot | A machine designed to perform a task. A digitally driven creature that can sense and move. |
| Android | A robot designed to mimic human behavior and/or appearance. |
| Bionic | Any organism which has mechanical or robotic hardware designed to augment or enhance the body. |
| Sentient | Responsive to or conscious of some impression and context; aware. |

The words ‘robot’, ‘android’ and ‘cyborg’ permeate modern film culture, demonstrating a need for a radical rethinking about human positioning in the world. Our human subjectivity, seen in relation here to the digital technologies that surround us, becomes a shifting, difficult concept. Some argue that we are already cyborgs and therefore there is no need to question the shift; that humans are slipping into the technology world, appearing only as projections as we are becoming fully immersed in the technology [42,43].

McLuhan and Moos describe how we often see technology as an extension of our bodies, perhaps a response to existential and spiritual uncertainties, as we try to leave our fallible mortal bodies behind [44]. A range of modern technologies are able to reconfigure our bodies as “dynamic fields of action in need of regulation and control” [14]. The terms robot and cyborg can be viewed in both a literal and metaphoric sense,

asking questions regarding what it means to have a body, to share a body, and what it means to lose physical control of your own body [1].

Artificial people may be mechanical, but they may also be engineered through chemical or biotechnological means, cloned, altered, or reconstructed. While such modes of production reference technological realities, actual artificial people are truly imaginary, creatures of fiction, the imagination, and the magic of representational media. And yet despite their unreality they seem to inform a host of cultural domains and debates, participating in a dense web of interactions between fiction and reality in contemporary culture [15].

Applications

There are millions of robots in day-to-day use all around the world, and the rate of take-up of these systems is increasing rapidly [45]. Over time, it has been the goal for creators and manufacturers to expand the definition of what a robot is; in other words, the tasks robots are able to perform are continually expanding with manufacturing, hospitals and space exploration seen as common areas of interest for robotics [46,47]. It is generally felt that robots have emerged into an era of 'weak' (A.I.) where currently they can imitate humans without being independent [48]. Either through autonomous means, or extensive exhaustive programming, robots have the potential to better everyday life.

This is perhaps nowhere more evident than in the very successful application of unmanned underwater vehicles that have been used to explore the ocean's surface to find lost ships, explore underwater life, assist in underwater construction, and study geothermal activity [49]. The development of robust robot platforms and communications technologies for extreme environments has also been successfully used by NASA and other international space agencies. Space agencies have had several high profile robotic projects, designed with an eye toward safely exploring remote planets and moons. Examples include early successes of the Soviet Lunokhods [50] and NASA's more recent success of exploring the surface of Mars [51,52].

Another of the major fields where humanoid robots have brought significant help is medical. For example, statistics have shown an epidemic increase since 1960's in cases of Autistic Spectrum Disorders (ASD). In recent years, robots have been increasingly used in autism diagnosis and treatment [53]. Humanoid robots have also been used for the treatment for cerebral palsy disabilities present in children that cause impairment in movement and posture [54]. Socially Assistive Robotics (SAR) is an example of a high end technology that assists humans in rehabilitation treatment of Cerebral Palsy (CP) and ASD. Using human like responses from humanoid robots it has been possible to develop motor skills in CP patients and to improve social and imitation skills in autistic children [53,54].

Robot technology continues to develop, ever moving in the direction of increasing autonomy. Developers are working toward building robots that can act on their own, independent of specific direction from users. This type of "smart technology", as it is sometimes called, has begun to make its way into the everyday life of humans [55].

Robot technologists have started developing physical robots that interact with humans in everyday settings. These robots are known as social robots. Social robots hold a variety of different functions, including aiding the elderly, acting as tour guides, and even tutoring [56]. The robots can also have emotional roles, acting as companions, allowing people to cope with negative states such as depression, loneliness, and disability [57]. The use of robots in these areas has begun to open up a whole range of other areas of human endeavor to mechanical devices, including challenging areas of the arts and humanities that were traditionally the exclusive domain of humans [58,59].

There are many different examples of autonomous robots: mechanical (or physical) robots, and software agents (softbots) which are now an everyday part of our internet experience in cyberspace [60]. This paper primarily focuses on physical robots, particularly those aspects that involve human interaction and communication. The paper particularly focuses on the potential for robotheaters to entertain in the emerging medium of cyborg cinema.

III. ROBOTS IN CINEMA

Although theatre has been around for thousands of years, robots have inhabited the Earth for only a couple of decades. However, there exists a long and rich history of technology being integrated with theatre, acting and performance dating back to the ancient Greeks. These have ranged from tools used in the mechanics of theatre (winches and revolves for example), the integration of complex props into performances, the use of realistic mannequins and puppets, to the use of technological themes within the narratives themselves. Historically, following Aristotle's elements of drama; theatrical forms that rely on technological effects are named as a 'spectacle', and are often considered as entertainment rather than serious drama [61].

There is a long history of film practitioners investigating and using computer technology, the late 20th century showed an increased amount of experimentation with technology. During this period, the rapid pace of technological development was reflected and mirrored in performance contexts all over the world [5]. This

upsurge in multimedia performance demanded of scholars and reviewers a new critical language to accurately describe and analyse the work of this nature.

The majority of film productions utilizing digital technology have focused on computer generated special effects and characters [62,63,64,65]. Modern cinema creates multiple fantastic worlds and 'spectacles' that constantly clamor for our attention. However, the acceptance of Computer generated technology in film has not been universally positive and many push back against the changes [66,67,68].

Many modern consumers now live tied to personal, ubiquitous, interactive digital devices. New technologies are developed and subsequently introduced, and experimented with, in media contexts. Artists and film pioneers continue to push the boundaries of old and new media in their efforts to explore the ongoing relationship between technology and human bodies. Traditionally, technologies have had a tendency to contain and limit bodies, fixing them on screen, as if viewed through lenses. In a cinema context, the appropriation of these technologies has sometimes reiterated or exposed these restraining boundaries [1].

Although there have been many examples of entertainment robotics, including the use of robots as robotic story tellers [69], robotic dance partners [70], robotic plants that give users information such as incoming email [71], and robotic pets [72,73]. However, from a research perspective, not much has been published in the literature on the impact and effectiveness of these robotic assistants and entertainers.

Early entertainment robotics centered on animatronics, where a robot generally plays prerecorded sounds that are synchronized with the robots motion. These types of robots can often be found in old movies and theme parks; however, the interaction is mostly unidirectional, that of the robot presenting information, although the robot's performance may be triggered by the presence of the human. However, the 2005 AICHI Expo demonstrated several robots designed to entertain, including the use of robots as actors and dance partners [16]; similar work on the relationship between acting, drama, and artificial agents is presented in recent work using robots as improvisational performers. However, here again, the role of the human is as an observer, and the interaction is minimal and more implicit [74].

Recently, we have also started to see artificial 'physical' characters on theater stages, such as the one introduced in Richard Maxwell's play, *Joe* [75]. Although the robot does not literally merge or interact with other live bodies in this piece, the very introduction of such technology on stage introduces the concept of a whole new era of cyborg theatre and cinema. The first dedicated robotic theatre has recently opened at the Copernicus Science Centre in Warsaw, Poland [76]. Although this playhouse is relatively new, robotic acting has been occurring in other countries for many years. For example, in 2008, it was reported by BBC that Mitsubishi had created a robot named Wakamaru which spoke lines of script in Japanese. Wakamaru, a humanoid robot, performs in plays which emphasize the relationship between "humanity and technology" [77].

A brief listing of memorable fictional artificial characters would include the monster in Mary Shelley's *Frankenstein*, the beautiful automaton Olympia in E.T.A. Hoffmann's *The Sandman*, the robotic Maria from Fritz Lang's *Metropolis*, Isaac Asimov's many robots and androids in *I, Robot*, Robby the Robot in *Forbidden Planet*, the fantasy-fulfilling androids of *Westworld*, the artificial women of *The Stepford Wives*, the thoughtful Replicants of *Blade Runner*, the relentless T-800 cyborg in *The Terminator*, the chrome Cylons of the original *Battlestar Galactica*, and the sexy human-looking Cylon models of the reimaged series.

Theorizing Robot Actors

When considering cyborg cinema, the narratives form the ruptures in traditional visual production that may at first seem novel, promising, or informational, but they may break down, creating cracks to be negotiated in the otherwise glossy surface. Interwoven concepts of psychological and phonological intertwining form theatrical alliances with technologies creating a cyborg subjectivity that might encourage greater affiliations between humans and non-humans [1]. Cyborg cinema does not seek to view a body in a traditional way but rather to understand how these bodies and technologies are shaped in performance contexts, how they reframe subjects for a technological age [2].

Through screen performance and drama, narratives of bodies are told and retold; sometimes they are augmented, risking new configurations, other times they end up in foreign sites, and others are replaced by their technological extensions [78]. Preconditioned modes of seeing bodies are transformed through the inter-relationships between bodies and technology on screen; however not all examples of object bodies and their connections to technology result in transformative cyborg models. This creates chaotic feedback loops through the bodies of the actors that reveal bodies controlled by others or as vessels for interchangeable and multiple personalities [1].

Other commentators and researchers believe that cyborg cinema represents an embodied, enfolded subject that might better represent processes of mutation, migration, and transformation; a metaphor for the human condition [2,79]. The use of robot actors in cyborg cinema introduces ideas about the representation and signification of the body and affects change through their technological equivalents. Actors bodies are part of a shifting landscape facing the spectators, they are objects transporting characters, filmic action, readings of sexuality and technology [1].

'Disorder has become a focal point for contemporary theories because it offers the possibility of escaping from what are increasingly perceived as coercive structures of order ... thus there arise complex layerings in which traces of old paradigms are embedded within new, resistances to mastery are enfolded with impulses towards mastery ... to come into being, earlier paradigms first had to be understood as constructions rather than statements of fact.' [80].

IV. A STATISTICAL ANALYSIS OF ROBOTS IN CINEMA

Although often associated with technologies of the twentieth and twenty-first centuries, fantasies of constructed or mechanical people recur throughout the modern era since the Renaissance and feature prominently in both Enlightenment and post-Enlightenment worlds. In addition to fictional robots or cyborgs, historical examples include a range of figures that are both artificial from statues or paintings that come to life to ominous or uncanny activated objects, machinery that seems purposeful, and puppets or dolls that independently activate. The foundational element of these storylines is a fantastical obsession with inanimate objects coming to life. This obsession has been exploited from the early days of cinema, our film history is full of examples of both A.I. and Robotic thespians [15].

A research project undertaken at the State University of New York attempted to identify multiple movies containing robotic and A.I. characters going back to the earliest days of cinema. The project aimed to identify different aspects of the robot's representation and behaviour in these films. This project specifically focused on the follows attributes :

- **Gender** : Robots were identified as either being represented as :
 - *Male*
 - *Female*
 - *Neutral* : no gender
- **Behaviour** : There were three identified behaviour models used for the robots :
 - *Evil* : Intending harm to humans, the classic 'take over the world' trope.
 - *Servant* : Working alongside humans and humanity.
 - *Romantic* : The robot is either built for emotional relationship, or becomes capable of having an emotional connection with a human, or humans.
- **Sentience** : There were three identified sentience models used for the robots :
 - *Aware* : The robot is sentient, aware of itself and surroundings.
 - *Cyborg* : The robot is partially controlled, there is some independent action.
 - *Puppet* : The robot has no independent action and is controlled by a human.

In this project hundreds of movies were analysed from 1907 through to the present day. Due to the increase in the inclusion of A.I. and robots in movies from the latter half of the 20th century, it is difficult if not impossible to include all such movies. This project focused on major studio films that were made in America. The results of this analysis is shown in the following charts and tables.

Gender

Placing humanoid robots in cinematic media also requires an understanding how people feel about robots. An obvious challenge to be considered when selecting and designing robots for the screen is the representation - intentional or accidental - of the robot's gender. For the purpose of this paper, the discussion of robots on screen centers on androids, or robots with an aspect of humanlikeness portrayed through appearance, behavior, context of use, speech/voice, or a combination of these characteristics [81].

Table 2. Gender Representations of Robots in Film

| GENDER | PERCENTAGE |
|---------|------------|
| Male | 57.2 % |
| Female | 19.6 % |
| Neutral | 23.2 % |

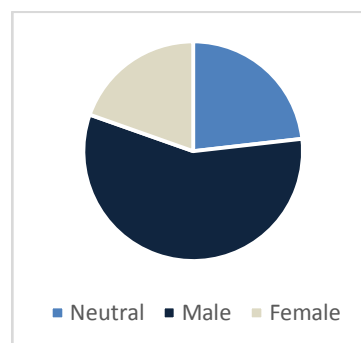


Figure 1. Gender Representations of Robots in Film

Robots are (in principal) machines without an organic gender or sexuality. However, robots are also rooted in our cultural expectations as servant, enemy, friend, pet, slave, toy, companion, and other roles presented in popular mythology [82,83]. These roles are loaded with user stereotypes and related expected signifiers. Humanoid robots offer another unique set of issues for the user, who must recognize that a mobile thing with some humanlike morphology, behaviors, and of varying intelligence and autonomy is not natural, but human-made. Haraway [84] refers to this perceptual dilemma as the “distinction between animal-human (organism) and machine”. Highly humanlike robot development is on the cusp of becoming invisible machinery; mechanical, yet through humanlike appearance or behavior, robots on the screen can trigger a sense of perceived humanness in the user to the point where they respond to the thing as something alive and natural.

As can be seen in Figure 1 and Table 2 the gender distribution in the hundreds of movies analysed is very uneven. Robots are represented with male personas on screen three times more than they are represented as female. This reflects a major gender issue in American movies where females have been unrepresented on screen since the birth of cinema, many authors quote statistics worse than those for robot representation [85,86].

Behaviour

Social robots are finding increasing application in many domains and increasingly seen upon our movie screens. There is an implicit assumption that social and adaptive behaviour is desirable, it is therefore of interest to determine precisely how these aspects of behaviour may be exploited in robots to perform everyday tasks and undertake more complex interactions with humans [87].

Two of the most relevant ethics-related issues of robotics are agency and responsibility. In order to prevent some exaggerations and misunderstandings in modern analysis, a common framework is needed so as to understand why robots maybe comprehended as a sort of modern slave. Like slaves in Ancient Rome, robots are often reckoned to be simple ‘things’ that, nevertheless, play a crucial role both in trade and commerce. From an ethical point of view, this paper suggests that robots should be considered as moral actors/agents and as an increasing source of both good and evil. This kind of agency raises new responsibilities, i.e., robots’ liability for specific contractual obligations and human liability for their artificial agents’ behaviour. Some of the most relevant societal issues concerning the future of ethics and robotics are strictly entwined with this latter form of liability, that is, human legal responsibility for others’ autonomous acts [88].

Table 3. Behaviour Types of Robots in Film

| BEHAVIOUR | PERCENTAGE |
|-----------|------------|
| Evil | 37.0 % |
| Servant | 47.8 % |
| Romantic | 15.2 % |

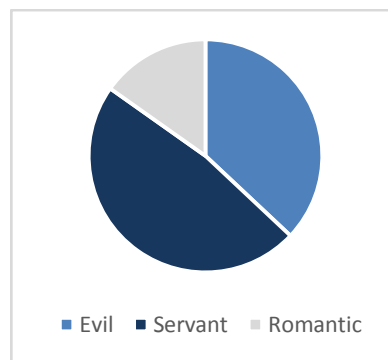


Figure 2. Behaviour Types of Robots in Film

As can be seen in Figure 2 and Table 3 the behaviour distribution in the hundreds of movies analysed is again very uneven. The servant/slave motif dominates the representation of robots in cinema, where robots are treated as objects that respond to every command and whim of their creators. However, a large proportion of on screen robots are also set up as villains, causing harm to humans.

There has been a history of concern about the future enslavement of humankind by robots which has led to widespread fear of embodied robots. Robot rebellions have been a major theme throughout science fiction cinema for many decades though the scenarios dealt with by science fiction are generally very different from those of concern to scientists. Recently several technology commentators have speculated about a danger that we will be subjugated, intentionally or accidentally, by AI, and these articles are usually commonly illustrated with stills from terrifying science fiction movies (such as the Terminator franchise). The significant percentage of movies who feature evil robot protagonists contributes too, and expands this fear within our society.

Sentience

Sentience is the capacity to feel, perceive, or experience subjectively. The term "sentience" is not used by major AI textbooks and researchers. However, it is commonly used in AI related film and other media to describe "human level or higher intelligence" (or artificial general intelligence).

In science fiction films, an alien, android, robot, hologram, or computer described as "sentient" is usually treated as a fully human character, with similar rights, qualities, and capabilities as any other character; it is not human, but in this work of fiction it has genuine "personhood". "Sentience", in this context, is a hypothetical essential human property that brings many other qualities associated with personhood with it, such as will, desire, intelligence, autonomy, humor, aesthetic appreciation, and so on. Science fiction uses the words "intelligence", "sapience", "self-awareness", and "consciousness" in similar ways.

Science fiction has explored several forms of consciousness beside that of the individual human mind, and how such forms might perceive and function. These include group sentience, where a single mind is composed of multiple non-sentient members (sometimes capable of reintegration, where members can be gained or lost, resulting in gradually shifting mentalities); hive sentience, which is the extreme form of insect hives, with a single sentience extended over huge numbers of non-sentient bodies; and transient sentience, where a lifeform is sentient of that transience [89].

Table 4. Sentience Types of Robots in Film

| SENTIENCE | PERCENTAGE |
|-----------|------------|
| Aware | 54.1 % |
| Cyborg | 13.9 % |
| Puppet | 32.0 % |

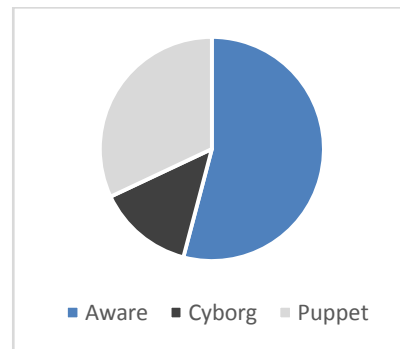


Figure 3. Sentience Types of Robots in Film

As can be seen in Figure 3 and Table 4 the sentience distribution in the hundreds of movies analysed is again very uneven. Over half of the robots and AI portrayed in films contain what could be considered sentient or aware machines. Less than a third of the robots in the films studied are automata, ceaselessly obeying their human masters like a puppet.

As AI plays an ever-greater role in our society, the discussion around this technology is polarised; different groups of experts and non-experts think that machines will either solve all problems for everyone, or they will lead us down a dark, dystopian path into human irrelevance. Regardless of which side of the argument one believes, the idea that we might bring forth intelligent creation can be intrinsically frightening. Film and cinema makes the most of this fear, as is shown by the prevalence of sentient machines in the movies studied. However, at the moment, just like the many sci-fi films that depict apocalyptic A.I. scenarios, truly intelligent robots with inner conscious experience remain a fanciful fantasy.

Correlating Variables

Having collected all this data from hundreds of films, it is now possible to undertake a more complex analysis by combining and correlating the variables being studied. It is possible to correlate the robot behaviour in the films with their perceived levels of sentience. The gender with which the robots are represented on screen can also be correlated with both the behaviour and the levels of sentience.

The major finding from these correlations relates to the relationship between gender and behaviour. We can see that although the majority of robots on screen are represented as male, by far the majority of romantic roles involve robots who are represented as female. However, far more male robot representations have servant roles in the films studied than their female counterparts.

Table 5. Correlating Sentience with the Behaviour of Robots in Film

| Class | Sentience | | |
|-------|-----------|--------|--------|
| | Aware | Cyborg | Puppet |
| Evil | 41.8 % | 18.6 % | 39.6% |

| | | | |
|-----------------|--------|--------|--------|
| <i>Servant</i> | 59.5 % | 13.9 % | 26.6 % |
| <i>Romantic</i> | 67.3 % | 1.8 % | 30.9 % |

Table 6. Correlating Sentience with the Gender of Robots in Film

| Gender | Sentience | | |
|----------------|------------------|---------------|---------------|
| | <i>Aware</i> | <i>Cyborg</i> | <i>Puppet</i> |
| <i>Female</i> | 59.3 % | 8.4 % | 32.3 % |
| <i>Male</i> | 57.1 % | 20.7 % | 22.2 % |
| <i>Neutral</i> | 42.8 % | 1.3 % | 55.9 % |

Table 7. Correlating Behaviour with the Gender of Robots in Film

| Gender | Behaviour | | |
|----------------|------------------|----------------|-----------------|
| | <i>Evil</i> | <i>Servant</i> | <i>Romantic</i> |
| <i>Female</i> | 25.3 % | 29.5 % | 45.2 % |
| <i>Male</i> | 32.8 % | 56.5 % | 10.7 % |
| <i>Neutral</i> | 57.1 % | 41.6 % | 1.2 % |

V. DISCUSSION AND CONCLUSIONS

We live in a world where rapid development of information technologies, particularly entertainment and surveillance technologies, are increasingly less about representation and the narrative construction of subject identities and more about affecting bodies, human and non-human directly. It seems that the assimilation of technology into everyday life has become unremarkable and commonplace. One more gadget or another more sensitive tool is easily accommodated by current expectations of applied research. One can view these pervasive technologies as a means to control bodies of information and to treat bodies as information [90].

Turning a blind eye to conditions and consequences that make these products available becomes simpler and simpler, as the technologies themselves become more ubiquitous [91]. The maze of techno-culture that surrounds us cannot be removed easily, nor their deep effects swept aside, but they must be repeatedly re-examined and open to reinterpretation. The development of robot thespians on the screen resonates with contemporary anxieties regarding increasingly powerful, and dangerous, technology. The cyber thespians facilitate an active, sensory, corporeal experience, using technology as form. Within the 'languages' of performance the semiotic might be a consideration of the technologic. In this multi-layered complex theatrical space, a post-human world is projected [1].

The robots we see on our screens aim to balance the cautionary with the pleasure of technical artistic application, specifically contrasting the performance pleasure against the cautionary application of technology. Film robots often creatively rethink how technologies might function, through collaboration with the technologies themselves where the robot actors have their own 'agency' or awareness and are refigured as subjects of artistic practice [90]. These intersections point to the voids left by too rapid technological expansion, too rigid formulations of subjectivity, and point towards an interconnected relationship with the non-human others in film productions in a post-human world.

Research in robotics is trending towards the development of more humanoid like robots using cognitive systems capable of utilising artificial intelligence and motor capabilities. Humanoid robot research is mainly focused towards making it more human like in principle rather than human like outer design; so as to allow the machines to react with the changing environment in a much feasible way.

The creation of the idea of a robot on screen from the past to its present state to its future has been showcased in this paper. The different aspects of cinematic robots and their application and future possibilities have been discussed. The path that cinematic robots have taken can be dated back to 50 AD where the ideas where fictional and dreams that were yet to be fulfilled. From a meagre dream about robots to the development of a robot that is capable of dreaming, technology continues to advance in an unstoppable manner. The representation of AI and robots on the screen often involves a form of sentience, and also often demonstrate that

the technology cannot be controlled by humans.

Associations with technologies present opportunities for a shifting site of subjectivity; becoming cyborg on the screen is the goal and it is an ongoing project. We are surrounded by embodied technology that is situated in a cyborgian relation to the film actors who interact with it and us. The complex relationship between humans and technology has been a conflict. The stakes have been the territories of production, reproduction, and imagination. In theatrically uniting the two systems - bodies and technology - a larger picture is revealed. It is not perfect, but potentially revelatory experience for the audience [84].

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