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Artificial Intelligence

Reframing Thinking Machines Within the History of Media and Communication

Abstract: Beginning with a critical exploration of the canonical histories of AI, this chapter stresses how the history of communication and media research may contribute to existing historiographies of AI. Four key aspects of the long-standing relationship between communication, media, and AI are discussed: the cross-history of communication theory (especially cybernetics) and AI, the early development of AI and human-computer interaction, the relevance of media and science fiction narratives in AI research and imaginaries, and the role of games in shaping interaction with AI software as communication between humans and machines. Relying on an historical and critical discussion of these four aspects, we claim that reconsidering the history of AI does not only contribute to the historiography of the field but adds more ground for rethinking and discussing the theoretical foundations of communication and media studies at large.

Keywords: artificial intelligence, communication research, media history, historiography of AI, media studies

With the emergence of technologies such as voice assistants, chatbots, and communicative robots, Artificial Intelligence (AI) is today increasingly discussed as a medium of communication. Scholars have recently argued that the development and impact of AI should be reassessed by bringing the question of communication to the center stage as AI raises new questions about the nature of communication itself, considering that communication theory has long since mostly focused on human-human communication (Guzman and Lewis 2019; Gunkel 2020; Hancock, Naaman, and Levy 2020). At the same time, in public forums, widely discussed phenomena, including the ubiquity of voice assistants such as Apple's Siri and Amazon's Alexa or the use of bots on social media to manipulate political campaigns, have attracted attention to the many challenges raised by contemporary AI. The quest for "ethical AI" – one of the most important transdisciplinary intellectual debates in recent years – is thus deeply connected with the prominence of AI in cultural and communication phenomena.

However, few efforts have been made to reframe the relationship between AI and communication as part of the wider history of communication and media. This chapter aims to fill this gap by more firmly contextualizing the history of AI

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through the lenses of media and communication history. Feeding into likeminded efforts that consider communication phenomena as central to the development of AI (e.g., Ekbia 2008), we aim to show that historicizing communication and AI is essential to understanding contemporary AI technologies that engage in dialogue and communication with users. As we will show, the close relationship between communication and AI is neither a novelty nor a recent evolution in this field: it accompanied AI from its very inception. As Gunkel (2020, 7) notes, "communication – and not just verbal communication through the manipulation of language but also various forms of nonverbal behaviors – is fundamental to defining and detecting intelligence."

In order to meet this goal, the chapter first looks at how the historiography of AI has hitherto been written and disseminated, and how a more specific focus on the role of communication and media may contribute to existing approaches. Then, the chapter examines four key aspects of the long-standing liaison between communication and AI: the cross history of communication theory (especially cybernetics) and AI, the early development of AI and human-computer interaction in parallel lines, the role of media narratives in science fiction and popular culture, and the role of games in shaping interaction with AI software as communication between humans and machines. In conclusion, we point to the fact that reconsidering the history of AI does not only contribute to the historiography of AI but adds more ground for rethinking and discussing the theoretical foundations of communication and media studies.

1 Beyond Canonical Histories

With the pace of technological change constantly accelerating, the history of AI, whose emergence is usually situated in the 1950s, already seems quite old. There is a universe (or two) between W. Grey Walter's 1948 *Machina speculatrix* – a purely analogue robot tortoise showing "some degree of self-awareness" (Nilsson 2010, 24) – and today's digital chatbots. In this context, it is difficult to recast artificial intelligence into the broader history of "intelligent machines" and non-human forms of intelligence, which can be traced back to the origins of the human species. To put it differently, while AI was not invented before the 1950s, it had many precursors, some famous and others forgotten. As Nilsson (2010) rightly claimed, the long history of AI begins with dreams such as self-propelled chairs (as in Homer's *Iliad*) and ivory statues coming to life (as in Ovid's *Metamorphoses*). Non-Western literatures and oral traditions also abound with examples of imagined forms of non-human and artificial intelligence and these many objects

and narratives irrigated the western imagination for centuries (Truitt 2020). The historiography of artificial intelligence mentions many of these precursors, including Ramond Lull's thirteenth century *Ars Magna*, Leonardo da Vinci's fifteenth century robot knight, Thomas Hobbes' Leviathan, Blaise Pascal's seventeenth century calculator (the "pascaline"), and Jacques de Vaucanson's eighteenth century sophisticated mechanical duck (Nilsson 2010; Dyson 1997; Russell and Norvig 1995; Riskin 2003).

Such a pantheonization testifies to the prevalence of a teleological and chronological approach to the history of the AI, which is essentially the history of technical progress achieved or envisioned by great minds. Mirroring broader dynamics in the history of computing (Campbell-Kelly 2007), the first scholarly book-length studies about the history of AI were mostly written from the viewpoint of computer scientists directly involved in the development of the field. Pamela McCorduck's pioneering work is mostly based on interviews conducted with "founders" of the field such as Marvin Minsky and Allen Newell, who also made detailed comments on the manuscript. Among others, Daniel Crevier and Nils Nilsson made successful careers in AI before writing influential histories of the field focusing on key American and British scientists. In as early as 1983, Newell (2000, 25) himself highlighted the danger of such a kind of historical work, writing that "the accuracy of the participant observer is at least tinged with bias, if not steeped in it". He then envisioned the development of historical works focusing on "intellectual issues" that are still largely to be written.

When exploring the historiography of AI, it is imperative to keep in mind that a distinctive feature of AI is the centrality of discursive practices. As Ekbia remarks, "what makes AI distinct from other disciplines is that its practitioners 'translate' terms and concepts from one domain into another in a systematic way" (2008, 5). In this respect, the historiography of AI is at least partly a translation process aimed at people outside the field. While AI becomes increasingly integrated in our daily lives and raises many important political and philosophical questions, these narratives have complex strategic implications. Not only do they legitimize specific actors and technologies, set boundaries, inform and fascinate the public, but they are also tracing a path from the past to a future largely defined by these narratives.

According to the canonical narrative, the emergence of AI as a full-fledged field of research coincided with the organization of three meetings in 1955 (Session on Learning Machines, Western Joint Computer Conference, Los Angeles), 1956 (Summer Research Project on Artificial Intelligence, Dartmouth College) and 1958 (Mechanization of Thought Processes, National Physical Laboratory,

UK).[1] AI is mostly associated with the work of American and British "founding fathers" such as John McCarthy, Marvin Minsky, Allen Newell, Herbert A. Simon and Alan Turing. In some respect, this "canonical narrative" is similar to the received "standard" history of media and communication research according to which Wilbur Schramm, Harold Lasswell, Kurt Lewin, Paul Lazarsfeld, and Carl Hovland were the "founding fathers" of this field (Rogers 1994; Schramm 1997). Recently, new approaches to disciplinary history exposed the strategic functions of this form of storytelling which is common to many young disciplines establishing their legitimacy and tracing their boundaries (Pooley 2018). In line with the work of Ekbia and others – who emphasized the communication phenomena that are central to the field of AI – and the development of critical approaches to the history of media and communication, this chapter recasts the development of AI into the history of media and communication. Rather than proposing a History of AI, we more modestly propose media and communication studies as one of the possible standpoints for exploring the history – or better said, histories – of AI.

2 From Feedback to Communication Theory: Cybernetics, AI and Communication

The field of communication and media research owes a great debt to cybernetics. While media and communication research certainly predates cybernetics, it is only with cybernetics, defined by Norbert Wiener (1948) as the "science of control or communication in the animal and the machine," that communication became a central concern across disciplines and that "communication theory" and its key concepts (feedback, noise, entropy, signal, etc.) were defined (Shannon 1949).

One of the key features of AI is "feedback control," that is the capacity of a machine to use its output as an input in order to "behave" autonomously. These mechanisms are not exactly new. Two thousand years ago, Byzantine lamps were equipped with a float regulator to maintain a constant level of oil, as the floater

1 The canonical narrative of AI history has faced numerous critiques. While Dreyfus (1965, 1972) ridiculed the teleological accounts put forward by AI scientists and historians, Collins (1992) debunked the claims and promises of AI and argued that machines can only be "intelligent" in areas where humans behave like machines. Edwards (1997) critically recast the development of the field in the context of the Cold War's political context and strategic imperatives. There are also local histories of AI in particular labs (Hounshell 1997), specific countries (Chamak 2004) or subfields (de Mantaras and Arcos 2002).

would open or close the flow of oil in the lamp. While feedback mechanisms have been well-known for centuries, it is only with cybernetics that feedback became a well formalized theory of self-regulation and a field of scientific inquiry. The contribution of cyberneticians was not only at the theoretical level as they also invented many "intelligent" machines using feedback control such as Ross W. Ashby's mobile homeostat, Norbert Wiener's "Moth," Claude Shannon's "Theseus" mouse, and W. Grey Walter's aforementioned tortoise.[2] These works bridging feedback theory and its applications were of great importance in the early days of AI as they were a starting point for imagining other forms of intelligent machines. The work of Claude Shannon (1950, 1953) – which describes logic machines, game-playing machines, learning machines, Turing machines, and Von Neumann machines – was of particular importance in this regard.

Cyberneticians were also among the first to observe similarities between the brain and engineered devices (Ashby 1952). As Arbib (1972) shows, the central metaphor of AI (the brain as a machine / the machine as a brain) can easily be traced back to cybernetics. With this metaphor, cybernetics proposed a new answer to the old philosophical question on the nature of machines. Do machines have purpose? And intelligence? For centuries, the standard Cartesian answer was to distinguish between mind and matter. In 1943, two of the founding articles of cybernetics formulated a different answer, arguing that purpose can be instilled in machines by feedback (Rosenblueth, Wiener, and Bigelow 1943; McCulloch and Pitts 1943). This answer was widely adopted by AI scientists who had "not provided any qualitatively different argument" (Newell 2000, 30). In the early days of AI, the brain was considered the model for building intelligent machines as the neural activity of the brain was to be imitated or replicated by the electrical pulses of a computer. Nowadays, this homology is still central in various AI branches, including "brain-computer interfaces," a field of research dedicated to connecting the human brain with intelligent machines. Elon Musk's Neuralink project is among the most prominent experimentations in "brain-computer interfaces", which is widely considered as the new frontier of AI (Touzet 2017).

Cybernetics was also central to the debate, now mostly forgotten, which animated the early days of AI: were computers to be analog or digital? In the 1940s, analog computers were representing quantities by means of physical variables (mostly electrical) while digital computers represented quantities by discrete state.

2 Ashby's homeostat (1948) was a set of four interconnected machines exchanging information (feedback) in order to achieve homeostasis (see Pickering 2010). Wiener's "moth" (1949) was an automated mobile tricycle integrating feedback to guide its movement. Shannon's Theseus (1950) was a mechanical mouse enabled to learn its path through a labyrinth.

The distinction between analog and digital was widely discussed at each of the ten Macy conferences on cybernetics. If a complete synthesis of these discussions falls beyond the scope of this chapter, cyberneticians were mostly convinced that analog and digital were equally important and that their uses depended on the specific nature of the problem under consideration (Pias 2005). However, history and technology eventually resolved this problem. By the 1970s, the progress in digital signal processing was so important that it became evident that computers were digital, and analog computing only survived as a marginalized subfield of electrical engineering. From then on, computer science (the science of digital computers) and electrical engineering were clearly distinct fields, and enthusiasm for cybernetics, as an interdisciplinary field studying analog and digital systems, fizzled out. As Allan Newell remarks, the development of AI, an important subfield of computer science, was characterized by "the loss of an analytical point of view, in which the contrast between analog and digital computation is taken as a starting point for asking what sort of information-processing the nervous system does [. . .]. This style of analysis belongs to the world of cybernetics and not to that of AI" (Newell 2000, 34).

The divorce between cybernetics and AI was not abrupt and required many years of "boundary work" by AI researchers (Kline 2015). During the 1956 Dartmouth conference on artificial intelligence, which is highly regarded as a founding moment in AI history, this distinction between AI and cybernetics was not at all clear. Most of the 20 researchers participating in the conference had deep ties with cybernetics. While Claude Shannon's work is obviously a central pillar of cybernetics, and the names of Julian Bigelow, William Ross Ashby, Herbert Simon, and Warren S. McCulloch are closely associated with cybernetics, other professional, personal or intellectual ties are little-known. As a graduate student at MIT, Oliver Selfridge proofread Wiener's *Cybernetics*. Marvin Minsky also studied at MIT, where he discovered the work of McCulloch with great interest, and he later worked with Shannon at Bell Labs simultaneously with McCarthy (Kline 2015).

According to John McCarthy, the main organizer of the Dartmouth conference, the label "artificial intelligence" was then consciously selected as a means "to escape the association with cybernetics" and "to avoid having either Wiener as a guru or having to argue with him" (McCarthy cited in Nilsson 2010, 78). Another reason for using the then-new term was to distinguish the matter of the conference from a narrower focus on automata, which was that of the book McCarthy co-edited the same year with Shannon, *Automata Studies*, a book that "still seemed part of an integrated subject that might be called cybernetics" (Arbib 1987, 6).

Another possible reason to escape the association with cybernetics stemmed from the strong association between cyberneticians and the Cold War's military-industrial complex (Edwards 1997). Likewise, AI was and still is attracting billions

for defense and military related projects (Allen and Chan 2017), although public discourse, for obvious reasons, mostly emphasizes the conviviality of virtual assistants, the promises of autonomous vehicles and the exploits of chess software. The coming to life of communication research, in the early 1950s, followed a similar pattern by abandoning earlier labels such as "propaganda" and "psychological warfare" (Simpson 1994).

This cross-history of cybernetics, communication research and AI is quite interesting from the standpoint of media and communication theory and history. The field of AI was built on the refusal of a specific discussion (about the merit of analog versus digital feedback) with Wiener and other pioneers of cybernetics. If this discussion did not occur during the Dartmouth conference, cybernetics and cyberneticians were nevertheless "present." As McCarthy himself remarked, "If certain scientists were not present at the conference, their spirit was represented by their work, and sometimes by their colleagues and students. I think here of Norbert Wiener and his work on cybernetics, Warren McCulloch and Walter Pitts [. . .] John von Neumann, and to a lesser extent, Alan Turing" (McCarthy cited in McCorduck 1979, 113). This reference to the "spirits" of cyberneticians is maybe the best way to summarize the complicated relationship between cybernetics and AI, a field so haunted by cybernetics that it often prefers to ignore its old demons.

3 Human-computer Interaction and AI: The Turing Test as a "Communication Game"

Considering the centrality of communication in the theoretical frameworks that underpinned the emergence of AI, from cybernetics to information theory, it is surprising how little space is given to the problem of communication in the most authoritative histories of the field (e.g. Crevier 1993; McCorduck 1979). This was probably a consequence of the disciplinary distinction that emerged in the 1970s and 1980s but was also applied retrospectively to the early development of AI: the separation between AI and human-computer interaction (HCI). In most discussions among experts in the field as well as in the general public, AI was mainly conceived as having to do with the definition of intelligence. The fact that intelligence is strongly related to communication – as cybernetics but also much of the psychological literature (Boden 2006; Bateson 2000) suggest – was not usually given sufficient attention. The problem of communication between humans and machines was mainly restricted to a separate discipline

within computer science, HCI, which aimed at improving the processes of interaction and communication between users and computers (Grudin 2006).

Nevertheless, the extent to which this separation is arbitrary is evident not only in the contemporary diffusion of communicative AI systems, from voice assistants to companion robots and chatbots, but also in the early history of AI. Let us look for instance at the Turing Test, proposed by British polymath Alan Turing (1950). In his thought experiment, Turing imagined that a computer would be programmed to engage in conversation with a human user through written communication; the machine would have passed the Turing Test if able to trick the user into believing it was not a computer program but a "real" human. While the Turing Test has been mainly discussed as a problem regarding the definition of intelligence (Shieber 2004), one may more accurately describe it as a problem of communication (Gunkel 2018). In fact, the test does not measure the machine's cognitive ability per se, but rather the perception that human users have of it. In this sense, the Turing Test for the first time made clear that AI is a matter of communication.

In designing the test, Turing felt the need to include actual details about how humans and machines would engage in communication. In 1950, when Turing published his paper, computers were mostly calculating tools and interactions between human users and computers were minimal (Ceruzzi 2003); he therefore imagined a system of human-machine communication that did not exist at the time. To ensure the validity of the Turing Test, the interrogator needed to communicate with both human and computer players without receiving any hints about their identity other than the contents of their messages. Communications between humans and computers in the test were thus meant to be anonymous and disembodied (Enns 2019). In the absence of video displays and even input and output devices such as the electronic keyboard, Turing imagined that the answers to the judge's inputs "should be written, or better so, typewritten," the ideal arrangement being "to have a teleprinter communicating between the two rooms" (Turing 1950, 434). Turing's solution shows an acute sense of the role of technical media in communication, considering how telegraphic transmission and the typewriter mechanized the written word, making it independent from its author (Gitelman 1999; Kittler 1999). The Turing Test's model of technological mediation allowed computers and human actors to participate in the experiment as pure content, or to use a term familiar to communication theory, as pure information. In this sense, the Turing Test was not so much, or not only, an "Imitation Game," as Turing initially labelled it, but also and perhaps especially a "Communication Game" (Natale 2021).

In spite of all the arbitrary distinctions between AI and the areas of computer sciences that engage directly with the problem of communication, such as Human-

Computer Interaction and Computer-Mediated Communication, Turing's intuition that AI was also a matter of communication resonates in the subsequent evolution of the field. In laboratories and research centers across the US, Europe, Russia, and Japan, the goal to create "intelligent" machines went together with the objective of implementing interactive systems ensuring wider and more functional engagement with computers. This was openly acknowledged by computer scientists of the time, who considered human-machine systems within the remit of AI. MIT's AI pioneer Marvin Minsky, for instance, apologized in a 1961 paper for the fact that:

> we have discussed here only work concerned with more or less self-contained problem solving programs. But as this is written, we are at last beginning to see vigorous activity in the direction of constructing usable time-sharing or multiprogramming computing systems. With these systems, it will at last become economical to match human beings in real time with really large machines. (. . .) In the years to come, we expect that these man-machine systems will share, and perhaps for a time be dominant, in our advance toward the development of 'artificial intelligence'. (Minsky 1961, 28)

Notwithstanding Minsky's prediction, it is only recently that the centrality of communication in AI has become fully evident to computer scientists as well as to communication and media scholars (Guzman and Lewis 2019; Gunkel 2020). Yet, the history of AI shows that the division between AI and human-computer interaction is the fruit of a retrospective partition rather than an organizing principle useful to understanding the evolution of the field. As practical AI systems were developed and implemented, researchers and developers were forced to face the reality that the social and cultural dynamics foregrounding human communication also inform the outcomes of AI (Suchman 2007). The commitment to the dream of creating thinking machines could never be fully separated from the question of what happens when "intelligent" systems enter into communication with human users (Natale 2021).

Not only practical developments in the field but also in the popular imagination conceived AI as indivisible from the problem of developing socially meaningful communications between machines and humans. Science fiction is often dismissed as detrimental to a proper understanding of AI, especially because many fictional explorations of AI give excessive emphasis to the problem of consciousness, which is irrelevant to the most practical achievements of AI. Yet, as Luke Goode (2018) recently argued, popular culture and the circulation of "evocative stories" have been instrumental to facilitating public engagement with many important questions related to a complex, technical subject such as AI. In fact, as the next section conveys, popular media's engagement with AI has often provided a powerful invitation to return over and over to the spirit of the Turing Test – intended first and foremost as a "Communication Game."

4 Narratives, Science Fiction, and the Media Imaginaries of AI

As noted above, thinkers and scientists have been often fascinated with the imaginary of "thinking machines." As scholars from media and technology studies, but also from film and literary studies, have aptly shown, science and fiction have maintained a mutual and complex relationship in this regard, which precedes even the formulation of the Turing Test (see Cave et al. 2020). Despite the clear difference between the scientific method and the realms of fiction and imaginary, the history of AI cannot be separated from the history of media and communication research also because AI has always been narrated, imagined, and presented by and through media narratives, and especially in science fiction (SF) narratives. Importantly, the same emphasis on the role of communication that characterizes AI history is also a crucial feature of the fictional imaginaries through which AI was represented and constructed in the realm of popular culture.

Think, for instance, of the persistence in the imaginary of old characters and machines like the *Mechanical Turk* of Wolfgang von Kempelen, the fake chess automaton created in the eighteenth century whose name has been used by Amazon to market its famous crowdsourcing platform. Or the persistence of a SF classic in the social imaginary: *HAL 9000*, the cruel AI imagined by Arthur C. Clarke and made famous by Stanley Kubrick in his masterpiece *2001 A Space Odyssey* (1968) – whose creation benefited from the insights of AI pioneer Marvin Minsky, who acted as advisor for the film (Broussard 2018). Almost 30 years after the release of the movie, the red eye of *HAL 9000* was used to advertise the famous human-machine challenge between the chess world champion Garry Kasparov and IBM's *Deep Blue*.

Like the flashing eyes of Fritz Lang's robot in *Metropolis* (1927) or the insensitive eyes of the androids in *Blade Runner* (Scott 1982), HAL 9000's red eye symbolically captures one of the most relevant debates on AI: the potentials but also the risks evoked by the rise of a future intelligent, or even super-intelligent, artificial being (Bostrom 2012). Such concerns, extensively addressed in SF literature, recently led to the creation of research centers such as Cambridge University's Center for the Study of Existential Risk founded by Nick Bostrom and Stuart Russell, among others, in order to prevent "unexpected catastrophic consequences" due to the potential birth of a super AI.

Within SF, critical and anticipatory reflections on the emergence of intelligent machines date back at least to the mid-nineteenth century, when the novelist Simon Butler wrote a famous piece entitled *Darwin among the Machines*. Merging one of the most famous theories in the history of science, the Darwinist

theory, with speculative thinking, Butler warned the readers about a future in which machines would dominate humankind:

> The upshot is simply a question of time, but that the time will come when the machines will hold the real supremacy over the world and its inhabitants is what no person of a truly philosophic mind can for a moment question. (Butler 1863, 185)

Notwithstanding the fear of dystopian futures, if we look at the best known and most persisting representations of AI in SF, the imaginary embedded in such narratives diverges sharply from the actual developments of intelligent systems – paying more attention for instance to the problem of consciousness or to general or strong AI, which has been until now almost irrelevant to the practical development of AI. However, the imaginary of AI entailed in SF has been quite perceptive in focusing on, besides the risks entailed in a strong future AI, the construction of new forms of sociability between humans and machines, and especially on the role of communication in building such relations. Turing's intuition that AI was a matter of communication, in fact, also resonates in SF literature and especially in SF cinema. A long series of variations on the Turing Test theme permeates SF movies contributing to the landscape of the possible ways in which intelligence, but also forms of consciousness and vitality, might be recognized in an intelligent artefact. For instance, it is when robot Number 5 laughs at a stupid joke that the scientist in the movie *Short Circuit* (Badham 1986) realizes his invention is alive. In *Her*, one of the most successful recent movies on AI directed by Spike Jonze (2013), the construction of a human-AI relationship is completely based on oral communication and storytelling. Samantha, the intelligent assistant who eventually becomes the partner of the protagonist, is pure communication and her identity evolves throughout the constant dialogue with the human and by means of a self-narration of her mutual experience with her material partner.

As stressed before, the fields of HCI, natural language processing and human-machine interaction have been at the heart of the research on intelligent artefacts. Today, although the dream of the man-computer symbiosis formulated by Joseph Licklider (1960) is far from being realized, recent studies show how fields like HCI, especially in the last three decades, tend to refer to SF to think, predict, and imagine the future of AI. For instance, in their compelling analysis of a dataset based on proceedings and scientific publications, Jordan et al. (2018) show how the growing use of SF references in scientific papers indicates that SF stories, movies or shows are actually inspiring novel Human-Computer Interaction research.

In addition to their contribution to scientific thinking, popular narratives on AI have deeply shaped the way in which AI is promoted and presented to the public. Once a new AI prototype is ready or publicly testable, its shape, language,

modes of interactions and even its discourses are usually inspired by sci-fi literature, cinema, and popular stories. Consider, for instance, the vocal assistants that recently crossed the threshold of individuals. Alexa, Siri and Google Home tend to replicate in their format the "characters" of movies and series like *Her* or *Black Mirror*, starting from the genderization of the (mostly) female voices programmed in their software. All the examples from SF literature and movies listed in this paragraph show how fictional narratives have deeply influenced the development of real AI, the way in which AI products are designed and promoted, and finally how scholarship has been addressing and thinking the topic in contemporary research. Hence, the history of AI cannot be separated from the history of the imaginaries of AI and from the way in which the mass media have historically built and spread a common ground made of literary *topos*, figures and ethical dilemmas that shaped the scientific and technological debate around AI as related to the problem of communication.

5 Not Just for Play: Games as Testbeds for Communication between Humans and Machines

Besides SF, public events and spectacles have also played key roles in the history of AI. In particular, gaming has been one of the most powerful means to communicate and familiarize AI with the general public. It is not by chance that the Turing Test is also called the Imitation Game. As the long tradition in the social theory of games has aptly shown, play is one of the most distinctive features of humankind. Furthermore, play and gaming can be seen as particular forms of communication between different agents, or, following Gregory Bateson's definition, they provide humans and living beings with a specific form of meta-communication (2000).

From the *Mechanical Turk* to more recent chess and GO players like *Deep Blue* and *AlphaGo*, from the conversation chatbot *Eliza* to *Watson* – the program capable of beating human contestants on the TV quiz Jeopardy! – to the humanoid robot *Sophia* that recently joked with Jimmy Fallon on his famous talk show, intelligent prototypes, programs, and machines have often been created with the goal to imitate, or in some cases surpass, human features in a gameplay situation. This is probably one of the most underestimated aspects of the relationship between AI, the media and communication research: the role of playfulness and forms of meta-communication not so much in the interaction between human and machines *per se*, as in the promotional and narrative strategies adopted by the AI industry and scientists to integrate and make AI products familiar in

everyday life. Games and playful activities have been essential to the development of digital media at large, and AI constitutes no exception. But games, even more than scientific experiments, have historically played the function of the social and psychological means to test the acceptance, integration, and familiarization of machines in human life. It is not by chance that leading companies like IBM and Google DeepMind used board games to present their most advanced AIs. Over time, public demonstrations and media narratives on intelligent artificial players have contributed to reach a twofold goal: on the one hand, AI companies have shown the potential and the marvelous capabilities of their artefacts for exploiting the potential of the digital sublime; on the other, these actors profited from a neutral and non-harmful environment to show how humans and machines can weave a mutual, positive, and co-productive relationship (Bory 2019). The history of human-machine communication through gaming is thus an essential part of the history of communication research. It is a history made up both of communication and metacommunication in which humans act "as if" machines are their peers, and in which machines act "as if" they are really experiencing the emotions and playfulness of the game they are playing; the beauty entailed in a genius move on the chessboard, or the funny sense of a joke. The history of AI is thus also a history of how intelligent artefacts communicate and induce emotional reactions and feelings through interaction.

Turing himself intuited this not only when he proposed the "Imitation Game" (as the Turing Test was originally called) but even earlier, when he suggested chess as a potential testbed for AI. In a lecture to the London Mathematical Society in 1947, he contended that "the machine must be allowed to have contact with human beings in order that it may adapt itself to their standards. The game of chess may perhaps be rather suitable for this purpose, as the moves of the machine's opponent will automatically provide this contact" (Turing 2004, 394). Turing's words indicate more than an interest in demonstrating the potential of AI. The development of "machine intelligence" required pathways for the computer to enter into contact with human beings and hence adapt to them, and games were the first means envisioned by Turing to create this contact. Years later, in 1953, beside the famous question "Can a machine think?" it is precisely in a paper on "digital computers applied to games" that Turing further asked: "could one make a machine which would have feelings like you and I do?" (Turing 1953, 1). Today, like at the outset of the AI era, games were envisioned as imaginative spaces to explore the implications of the encounters between AI and communication.

Conclusion: Recalibrating AI as Part of Media and Communication History

The term intelligence comes from the Latin *intelligere* which, in turn, may come from the two terms *inter* (between) and *ligere* (to read, but also to understand). According to this definition, intelligence is the ability to tie things up, to create connections between different objects or elements. Indeed, all media can be seen as a human attempt to extend and exteriorize human intelligence so as to meaningfully interconnect different elements, including minds, bodies, natural and technical objects. Notably, through media and communication, humans have constantly interwoven and shared their thoughts and feelings with those of their peers and within their social and material environment. All media, from handwriting to the typesetter, from flying chairs to chess automata, from the first motion picture to voice assistants, can thus be seen as intelligent "artifices", thus as specific forms of AI before AI.

In this chapter, the close relationship between AI and communication has been explored by considering four key trajectories in AI history. First, we looked into the cross-history of communication theory (especially cybernetics) and AI to unveil some of the crucial crossovers – at the conceptual, personal and institutional levels – and the distinctions between cybernetics and AI. The development of cybernetics in the late 1940s and early 1950s paralleled that of another "new" field of study labelled "communication," a then-new buzzword whose success was linked to the post-war fascination with cybernetics. Second, we focused on the early histories of AI and human-computer interaction in parallel lines, looking at how artificial agents and humans have interacted over time, especially but not exclusively by means of language. This entailed demonstrating that work to develop "intelligent" systems has been done since the origins of the AI field in close relationship with work aimed at developing human-machine communication and interactive systems. Third, we highlighted how media, such as cinema and sci-fi literature, have contributed to the socio-cultural construction of the imaginary of AI. The history of AI is also characterized by a series of well-known literary fictions and mass media events. Over time, such narratives have also influenced the development and the scientific research on AI, shaping how companies and research institutions conceive, promote and present their products and innovation in this sector. Finally, we stressed how games and playful interactions have been essential to create and publicly test new forms of communication between humans and AI. This particular kind of interaction is essential to reading the history of AI also as the history of the different forms of metacommunication between humans and artificial agents by means of play and games.

Looking at different strands within the history of AI, this chapter has shown the potential of a historical approach to AI that places media and communication at the center stage. Such an approach not only promises to improve our understanding of AI's past, present, and future. It also improves the capacity of communication and media history, and of communication and media studies as a whole, to make sense of ongoing phenomena in digital and non-digital spaces.

As Guzman and Lewis (2019) recently argued, people's engagements with AI do not neatly fit within paradigms of communication theory that have mainly focused on human-human communication. The very idea of thinking machines also challenges existing conceptualizations of media as "what is in between," i.e. the channel of communication. From the feedback mechanisms of cybernetics that instilled purpose into the machine's action to the conversations imagined by Turing in 1950 and then conducted by chatbots and other technologies of communicative AI, from the fictional imagination of communicating with robots and computers to the role of games in facilitating new forms of communicative engagement with software and AI, the history of AI stimulates us to extend the concept of medium as a channel and at the same time as a participant in the communication. Integrating historical research on AI into the remits of communication and media history, in this sense, does not just help to reconsider the history of AI from a different and relevant point of view, nor does it only respond to the need of giving an account of communication technologies that are becoming more significant and widespread, such as AI voice assistants or chatbots. Perhaps even more crucially, it also provides a powerful reminder of the need to continually rethink and discuss the key concepts that underpin the study of communication.

From a historical perspective, moreover, the focus on communication works as an invitation to rewrite not only the history of AI but also its prehistory. While historians of AI have often pointed to the history of automata and to attempts to simulate life and intelligence before the computer age (Riskin 2003; Sussman 1999), reframing AI as a medium of communication means that the broader history of communication is equally relevant and important to understanding AI. In his landmark history of the concept of communication from the early Roman empire to the present, John Durham Peters (1999) shows that this can be examined as the history of people's aspiration for communication contact with others and their fears over the loss of such contact. The contemporary obsession with machines that think – or perhaps better said, that are thought to think – can be seen as part of this same history. Historicizing media and communication concepts, in this sense, challenges the idea that AI is unprecedented. The problem of how humans perceive and enter in communicative interaction with AI technologies needs to be contextualized within the wider histories of mediated communication that do

not reside exclusively in the digital age. If we really want to understand what happens when we talk with the virtual assistant on our phone or we comment on something posted by a bot on Twitter, we may need to consider these exchanges as embedded within the long history of media and communication.

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