PROCEEDINGS
OF PIVOT 2021

DISMANTLING / REASSEMBLING
tools for alternative futures

OCAD University
July 22-23 2021
Virtual Conference

Edited by:
Renata M. Leitão
Immony Men
Lesley-Ann Noel
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Design Research Society (DRS)
Pluriversal Design Special Interest Group

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Founded in 1966, the Design Research Society (DRS) is a learned society committed to promoting and developing design research. It is the longest established, multi-disciplinary worldwide society for the design research community.

Contents

Highlights

Keynote Speakers

Theme

Repair and Repurposing as Design

Theme

Other Ways to Relate

Theme

Narratives Between Multiple Worlds

Theme

Learning with the South

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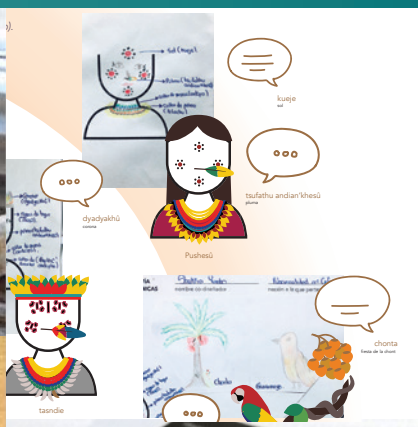

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Narrative-based human–artificial collaboration. A reflection on narratives as a framework for enhancing human–machine social relations.

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This paper aims to reflect on human–artificial intelligence (AI) collaboration in cultural production and depicts the collective socio-cultural imaginary focusing on humans' intrinsic vulnerabilities related to AI systems, which are often perceived as a way of reshaping human presence within contemporary society. Abandoning an anthropocentric perspective, contemporary ecosystems should include non-human and AI systems. Our hypothesis states that their interactions could be reshaped by adopting a narrative framework. Since humans are social animals, if the power of stories is used for embracing plurality', sociality can be extended to include AI systems. Considering such premises, relationships between humans and AI may also enrich existing relational ecosystems with new meanings that challenge and redefine the limits of what is considered socially acceptable. The result is an integration of narrative tools and world building practice within interaction design processes. Storytelling can be intended as a mindset and a tool, underlying the crucial role of narratives in supporting the emotional dialogue among humans and AI systems, creating an overall sense of belonging between human and non-human actors.

Interactive digital narratives, Micronarratives, Human-AI collaboration, Communication Design

1. Introduction: context and topic

We live in a world where change is dictated by rapid technological progress in which artificial intelligence (AI) can replace much of human work in a few decades (Frey & Osborne, 2017). Due to the evolution of

the machine learning system (Crameri, 2018), as well as the integration of AI with recent emerging technologies (e.g., Industrial Internet of Things (IIoT), big data analytics, cloud computing, and cyber-physical systems), AI is described as the fourth industrial revolution (Lee et al., 2018).
The awareness of having grown up in Europe in a context where time is marked by technological acceleration leads us to reconsider the current anthropocentric vision, where machines have to be at the service of humankind. Taking into account the forceful emergence of transition narratives and imaginaries (Escobar, 2018), as a group of women with democratic values and researchers in the field of design for social innovation, we bring our vision, fueling the debate on the transition discourse. In this essay, we prefer to speak of "human beings" precisely because we assume that all the variegated forms and declinations of humanity must be included in processes of interaction with AI. The overarching approach can be described as post-anthropocentric. In this perspective, people co-exist and interact with AI entities, moving away from decolonization seen as an anthropocentric bias (Salami, 2020). AI systems will not be considered a tool to be exploited to increase productivity but as an entity to collaborate to process data in a qualitative and non-standardized way. Our approach does not focus on exploiting the so-called 4.0 era, but on the relationship that is triggered between human beings and technology and how this relationship relates within the current social ecosystem, which is in transition and constant innovation.

According to Koenitz (2018) the work on earlier computational systems goes back to the 1960s, while analytical and critical research on the PhD level dates back at least to Buckles's 1985 thesis. There is a fragmentary and sometimes confused body of knowledge, for this reason there is an urgent need of an institutional framework for guidelines to be created, adopted, and further developed (Koenitz, 2018). In fact, this paper will introduce the hypotheses of a narrative framework we are working on and that we want to apply to an AI system, with the aim to test it through prototyping activities in the near future. The existence of artificial entities in narratives is not new: the myths of the golem and Pygmalion's statue are just two of numerous examples from classical literature and science fiction. Contemporary fiction provides manifold images of living and collaborating with autonomous and semi-autonomous systems. It has inspired social robotics through exploring the social dimension of the human mind as a process of learning and growth (Dumouchel & Damiano, 2019) in collaboration with both technical artefacts and the environment (Damasio, 1999).

Social robots are systems composed of sensors, actuators and artificial intelligence (AI) 'for which social interaction plays a key role' (Fong et al., 2003). The aim of social robots is to interact with humans. Thus, people interacting with social robots tend to have high expectations regarding the types of possible interactions because of the imaginary promoted by science fiction. Well-known examples include Isaac Asimov's robots and incorporeal entities such as Samantha, the AI system in Spike Jonze's 2013 film *Her* with whom the protagonist (Theodore, played by Joaquin Phoenix) falls in love. The last 20 years in the field of research and design of social robotics has witnessed a paradigm shift from humanoid social robots based on anthropomorphic or zoomorphic forms (Mokhtar, 2019) to actuated and performative environments (Greenfield, 2006) acting as living organisms. The developments and reflections that have emerged from studies in different fields range from human–robot interactions to interactive physical environments, including adaptive environments, intelligent environments, interactive environments, cyber-physical environments and architectural robotics, because 'spatiality deals with direct interaction between people and real or virtual artifacts' (Zannoni, 2018).

The depicted situation brings the urgency to reflect on the human-AI system collaboration relationship. In doing so, the concept of pluriverse can be seen as a pattern of signals indicating an emerging culture and civilisation (Manzini, 2015), that leaves people behind narrow anthropocentric notions of progress based on economic growth (Kothari et al., 2019). Pluriverse can also be considered as what Murray (2018) calls a "Kaleidoscopic view", through which presents the same story from multiple points of view and

within multiple cultural and social patterns of cause and effect. The meanings that emerge are connecting and expanding, without the possibility to trace boundaries, and resulting in interconnections that bring again to the concept of pluriverse and the difficulty in handling the research. The result is an opening in the debate on the co-existence of social ecosystems. When we are talking about the social ecosystem, we imply the possibility of the co-existence of human, non-human, AI entities, and transhuman, which is considered the improvement of humans by technological means (Coeckelbergh, 2013). When we decide to work on Human-AI system collaboration, we start by exploring the broad context of AI discipline, with the risk of losing the focus of the investigation by figuring out how an AI system could work. Then we realize that there is a lack of awareness about AI systems' potential today, and often the expectations are higher than what is possible to do with such systems. This is partly due to the dystopian science fiction imagery, which created scenarios linked to existential risks of AI systems that narrate about superintelligent machines capable of overcoming the human mind (Bostrom, 2017).

Assuming that stories are about people (Crawford, 2013) because they are generated from and simultaneously generate human cognitive patterns, we question whether artificial beings such as social robots or intelligent environments can create and tell meaningful stories and how we can train AI systems to dynamically engage with humans in mutual interactions. In line with *Ethics Guidelines for a Trustworthy AI* established by the European Commission (2019), this paper aims to investigate aspects that designers can consider in order to generate beneficial mutual interactions between AI systems and human beings in physical or virtual environments. In questioning whether narratives can be used as a framework for enhancing human–machine social relations, our analysis refers to historical and recent academic research (Iaconesi & Persico, 2017; Minsky, 1988; Riedl, 2016) and case studies that have explored human–machine dialogues.

The first part of the paper addresses the question: *Is it possible to create a trust agreement between humans and machines?* To answer this question, it is crucial to understand the characteristics and limitations of AI systems, especially when they collide with images promoted by science fiction. In exploring the trust agreement and its features, we also address the crucial point of transparency. AI systems must be able to collect, handle and store user data with care, and there should be transparency about who can access the data and why, while acknowledging ownership of the data (Piet, 2020). Moreover, transparency also refers to the affordances of the media, interfaces, and environment in supporting the process of dialogue (Manovich, 2001). Specifically, our design-based approach could further enrich the analysis and the design practice within human beings-AI systems' IDN processes.

The second part of the paper addresses the question: *Can we train AI systems to manage social and emotional interactions with human beings through the narrative framework?* The aim of this question is to highlight and propose original reflections about whether human intervention is crucial for the development of emotions and determining an overall sense of story.

2. Science fiction storytelling and the imaginary regarding AI systems

Fictional storytelling plays a crucial role in expressing *what if...* scenarios. Writers explore what might happen to individuals and societies in different events or when different choices are made at crucial moments. Science fiction is particularly relevant when exploring human–AI interactions, and numerous scientists are counted among its authors, many of whom use narratives to reflect on the consequences of their work. The science fiction world presents a number of possible scenarios ranging from highly optimistic to darkly negative, and the spectrum between these extremes offers useful reflections for designers (Varisco et al., 2017).

When searching for AI systems in fiction, Isaac Asimov stands out with his numerous novels depicting a future in which anthropomorphic intelligent robots exist. In Asimov's fictional worlds, humanity develops

a polarised relationship with robots, which are irrevocably necessary to the lives of the Spacers but become their major weakness and eventually cause their decline, thus becoming the nemesis of the second wave of Colonists, who reject them as the source of human laziness and loss of free will. This conflict has been depicted in other storyworlds as well as in contemporary debates about trust in AI systems. Asimov's robot R. Daneel Olivaw, in particular, plays a long-lasting role in human development throughout the *Foundation* saga and is finally depicted as a superhuman entity who protects the fate of the human species. This vision of AI systems as a source of salvation is considered a reality in a society that is becoming increasingly complex. Other examples of positive AI systems in the literature include William Gibson's Rei Toei (Gibson, 1996), an incorporeal singer who handles her own show business and marries her human partner, sparking debate about civil and legal rights for non-humans. While Rei may not be widely recognised, the more recent Samantha, the AI virtual assistant represented in the film *Her* (Jonze, 2013), is better known. Samantha is an incorporeal system that continually interacts with Theodore, the human protagonist of the movie (played by Joaquin Phoenix), in all situations and locations. These interactions in different locations represent an interesting case of the interplay between AI system and the environment—Samantha helps Theodore, who eventually falls in love with her, depicting the potential strength of emotional relationships with non-human entities and emphasizing the responsibilities of designers.

AI systems can also be a source of concern when seen as possible opponents. Examples of hostile, aggressive and dangerous AI systems populate fictional worlds, ranging from the abovementioned golems attempting to reach the androids struggling for human rights (Dick, 1968; Scott, 1982) through to the openly hostile HAL from *2001: A Space Odyssey* (Kubrick & Clarke, 1968) and the fearsome Cylons, artificial beings hoping to wipe out the human race (Moore, 2003). A shared feature of fictional worlds in which AI is hostile is the perception of human beings as irrational, parasitic creatures to be controlled or eliminated before they destroy the world. From our perspective, this is a grim vision, exposing the concerns of authors about humanity's fate and highlighting that AI is non-emotional and non-empathic. This lack of empathy and emotion is perhaps one of the key differences between artificial beings and human beings, a point we believe can be addressed using a narrative approach to foster a trust agreement capable of reassuring humans and helping AI to understand humans. Achieving this goal will depend on cooperation between computer scientists and designers to include elements in AI systems and algorithms that enable them to understand and express emotions. Human interpersonal relationships are based on a wide range of emotions and trust (or lack of it); thus, actively including artificial entities in emotional relationships could, in our opinion, represent a step forward in the mutual trust agreement. As depicted by Crawford (2013), interactive storytelling systems that include algorithms and data structures to represent and handle interpersonal first-, second- and third-person relationships have significant potential in achieving this goal.

The science fiction television series *Electric Dreams*, which is based on the works of Phillip K. Dick, offers an interesting reflection on trust. In the episode *Real Life*, the main character is a policewoman who relies on a diffused AI system that is capable of augmenting and creating a vivid parallel reality. This total immersion and trust in the system leads the protagonist to question the truth of reality and exchange real for virtual reality. Seen through this paradoxical lens, trust needs to be balanced, and one should rely on one's own experiences and judgements rather than on AI systems. In this fictional case, trust was so high that the main character left her real life for the artificial world.

The final example presented here is the science fiction Western television series *Westworld* (Nolan & Joy, 2016), inspired by the film of the same name directed by Michael Crichton (1973). *Westworld* is set in a Wild West theme park created by Dr Robert Ford (played by Anthony Hopkins) in which guests are encouraged to indulge their fantasies and desires with humanlike androids. Season one, in particular, creates a meaningful scenario of human–AI relationships based on a shared narrative world: the theme

park represents the *topos* (Pinardi & De Angelis, 2006) of the Wild West setting and landscape, while the costumes, props and accessories (such as guns) represent the *logos* (Pinardi & De Angelis, 2006) and contribute to making the human experience plausible and totally immersive. The androids are perfect humanlike copies that cannot be distinguished from real humans, making the experiences offered by the park tremendously realistic: one can have sex, fall in love, engage in a duel, or even kill robots, dealing with full transparency of the media (Manovich, 2001) towards completely overcoming the *uncanny valley effect* (Crawford, 2013; Dumouchel & Damiano, 2019; Mori, 1970). Intriguingly, the narrative-speaking humanoids are heroes similar to humans and are designed with a narrative code that programs their behaviors and is based on elements of the narrative world-building framework. Each android plays a narrative role and has an area of reference within the park (*topos*), a defined purpose for its actions and final goal to fulfil (*telos,* Pinardi & De Angelis, 2006) and special relationships with other characters or humanoids playing the roles of relatives, friends, or enemies (Pinardi & De Angelis, 2006). This type of narrative canvas enables the heroes to continue the storyline and/or present different storylines within the same narrative world. The androids' interactions with humans (or 'guests') is based on a narrative framework that codifies their relationships and allows them to evolve towards their final rebellion. A bug in the code means they begin to remember their roles in previous storylines and wish to emancipate themselves by interrupting the narrative loop and becoming the authors of their own stories.

Literature, film, and television series provide both positive and negative scenarios. Trust can have a dark side, and the drastic consequences presented in the darkest scenarios should be considered by designers. From this perspective, storyworlds and storytelling can play a crucial role in human–AI relationships, helping to build reciprocal dialogue and understanding. Narrative studies typically emphasize the concept of a 'fictional pact', which refers to the agreement between the narrator and narratee that a story will have high internal consistency, quality, believability and be sufficiently interesting for the narratee to remain until the end. In the present context, we use an alternative phrase—the 'trust agreement'—which includes not only the fictional pact but also creates trust that lasts longer than the story and fosters relationships.

3. The role of narratives in building social and emotional interactions

Storytelling precedes language if viewed in terms of a mind mapping system, a process that most likely began relatively early in humankind evolution, contributing to providing the necessary neural structures to create narratives (Bruner, 1991; Crawford, 2013; Damasio, 1999). According to Reinsborough and Canning (2010), 'Stories are the threads of our lives and the fabric of human cultures' (p. 17). Given that people use narratives to shape and share their personal experiences (Jenkins, 2006), 'because of our innate desire to control our world by means of satisfying narratives' (Pratchett & Simpson, 2008, p. 10) a narrative-based approach may contribute to an easier interaction between humans and AI systems. Within a narrative, the author is the *narrator* or *storyteller*, while the audience—whether one or many persons—is the *narratee* who chooses to accept and trust the narrator, thus establishing a *fictional pact* or *trust agreement* between the author and the audience (Pinardi, 2010). The narratee *trusts* the narrator to tell a story that has internal consistency, comprehensible terms and references, and well-designed content and structure.

In light of such premises, we tackle two main issues in designing human-machine dialogues: transparency and space. In exploring the trust agreement and its features in human–machine interactions, it is necessary to explore the concept of transparency. In the narrative field, we can highlight how transparency is also present in stories and worlds where they take place. There, physical and narrative realities mix; storytelling can blur the borders between spaces; the

affordances and meanings of environments—and the sense of presence deriving from experiences—can be real or mediated by storytelling.

The multi-award-winning performance collective Rimini Protokoll engaged with the issue of androids and their unsettling resemblance to humans in a 60-minute performance at Triennale di Milano in 2019 entitled *The Uncanny Valley*, a clear reference to the well-known phenomenon. The writer, Thomas Melle, is replaced onstage by an animatronic replica of himself, which interrogates him about the mysterious relationship between human originals and robotic copies: What does it mean for the original when the copy takes over? Does the double help the human know himself better? Or do they end up competing with each other? The android also addresses the theatre audience in a similar way to a seminar. The silence and pauses in the android's speech and the gestures and facial expressions engage the audience in participating in the conversation. However, the android's arguments and responses are not adaptive, and the script is delivered as if it is a lecture, while appearing in core moments to develop a proper dialogue with the audience. In this case, the theatre and stage represent the public space in which the social interaction takes place. It shapes the kinds of interactions in which the participants are expected to engage, the narrative roles and the fictional pact to be enacted.

We are willing to apply our hypothesis to the case of Plug Social TV, a programme of educational and research activities aimed at supporting dialogue between local communities and stakeholders for social innovation. A narrative-based framework and set of tools (Ciancia et al., 2018; Piredda et al., 2015) were developed, tested, and refined over a number of years to support story listening activities, interviews with neighbourhood inhabitants and local associations, and subsequent world-building practices arising from the exploration of the urban environment (through drift, iconographic research and landmark identification). Tools were developed using an iterative design process. The listening and exploration activities took place at the local urban level with the aim of building storyworlds (Wolf, 2012), fictional and non-fictional stories set in the local environment, using the inhabitants as characters. The next phase involved the dissemination of meaningful touch points throughout the urban landscape, allowing citizens to interact with the distributed stories and transforming the territory into an entry point into the narrative world. Various media and digital content were designed to distribute the shared imagery and collected stories, which were co-created with participants. The result was that the local community and stakeholders began to share a common imagery, recognizing the elements of narrative as part of their everyday lives. The neighbourhood became the main communication channel, with specific actions taking place in the real world in connection with content distributed through social media. Each story and component of the narratives can be considered microcontent fragments, also known as *micronarratives* (Venditti et al., 2017). Because fragmentation, multimodality and modularity are properties of content, a cognitive process to expand on the messages and information conveyed is required. The cognitive activities of both humans and AI systems with respect to filling in, recalling, and identifying the links between different fragments represent the pragmatic level of narrativity (Ryan, 2004), which should be supported in the design process when building, programming and sharing narrative worlds. Accordingly, the specific framework and tools we developed for the construction of narrative worlds may be applied to the programming of AI systems, enabling them to share the same narrative worlds as human beings and build emotional relationships that weave together real and fictional elements.

The first attempt to establish a knowledge environment based on AI was *IAQOS* (*Intelligenza Artificiale di Quartiere Open Source*), an open-source neighbourhood artificial intelligence situated within the local context of Tor Pignattara in Rome. IAQOS was designed by Salvatore Iaconesi and Oriana Persico with the aim of telling the story of a district composed of multiple identities (Iaconesi & Persico, 2017). The project investigated the quality of the neighbourhood relational ecosystem, collecting, analysing and returning data to the inhabitants and implementing a series of strategies to enable inhabitants to understand the

data (Iaconesi & Persico, 2019). IAQOS is an AI system that works as a shared repository of neighbourhood knowledge—citizens can interact with it through devices distributed throughout the public space, telling their stories, or asking questions to establish empathic relationships.

Starting from the fundamentals of narratology and the case studies presented above, we began to reflect on the role artificial intelligence systems play in the creative process and how they can enhance it, proposing a conceptual framework for working hypotheses, where an expectation is tested through action (Casula et al., 2020). According to Bruno and Canina (2020) an AI system can be used as a co-creator within the creative process, supporting humans in fastening and amplifying activities and tasks in specific moments of the process. An AI system can support the researcher in the exploratory phase of the creative process, where it is necessary to analyze and translate the data collected, identifying the needs underlying a given project. The system's role is not just to organize the data according to the structure of the narrative world but also to give insights through giving micronarratives as an output. The framework hypothesis relates to the collaborative relationship between the researcher and the AI system characterized by a natural language processing (NLP) that allows computers to understand, analyze, and derive meaning from human language in a smart and useful way (Lu et al., 2018). Therefore, the framework is an overarching one, is a narrative-based process that welcomes the AI system to structure the data according to narrative elements, such as the previously mentioned narrative world and micronarratives. The structure of the process does not rely on specific projects. It can eventually systematize a large amount of data that humans would not be able to analyze at the same speed and accuracy as a system.
Furthermore, the system can improve methods and statistics to get knowledge and to learn models from the data itself. The hypothesis is to create a starting narrative world composed of data collected and clustered according to the categories for constructing the narrative world listed by Pinardi (2006). The data will then be translated and returned in the form of micronarratives, which will concisely express the insights that emerged from the analysis of the data within the narrative world.

The limitations of and potentials for human–AI relationships need further investigation. We propose to do so by applying three fundamental aspects from the narrative field: (1) the *trust agreement* between the narrator and the narratee; (2) human–machine dialogues based on *micronarratives* and *degrees of narrativity* (Ryan, 2012) as the leading principles of enabling a meaning-making process; and (3) narrative *world-building* for shaping the affordances and meanings of environments and exploring the design of bio-cyber-physical systems.

4. Conclusions and further reflections

Human–AI coexistence is a goal in contemporary design aimed at creating systems and environments capable of fostering trust and collaboration between humans and social robots or other forms of AI systems. New agents based on AI systems, including social robots, virtual assistants, ML systems are entering human society and interacting with human beings, with each other and the environment. Like plants and animals, these systems, that share human beings' private and public spaces, have both similarities and differences with humans.

As women, communication designers, and design researchers we use a narrative approach to address the emergence of new agents, and their interactions, as they are narrative-based systems capable of sustaining and nurturing empathic relationships. As they have been doing since the beginning of human culture, stories and narratives facilitate coexistence between human beings and artificial beings.

Storytelling remains a powerful tool for communicating complex interrelated ideas (Crawford, 2013). The human mind can be deconstructed into microprocesses, which can be viewed as the combination and interrelation of mental processes undertaken by agents. The logic of the human mind can be easily

compared to functions of AI systems, which comprises multiple algorithms aimed at different tasks, allowing the system to process information. The key difference between human beings and AI systems is consciousness. If thinking can be seen as both a human and an AI process leading to the construction of meaning, storytelling can act as a bridge or facilitator that uses a common language to connect human beings with AI systems, establishing a trust agreement.

The final part of this discussion focuses on the proposal of a narrative-based framework in which human and AI system collaborate in order to create a shared narrative world, from which to retrieve micronarratives that facilitates the creative process. Given that storytelling allows AI to gain knowledge directly from humans (e.g., IAQOS) and communicate in a way that is understandable to humans, narrative practices may be translated to the real world because stories are about people and at the same time generate human cognitive patterns (Crawford, 2013). Thus, narrative tools can be integrated into AI systems to create a value alignment and a shared common sense that can help improve human–machine relationships. Yuval Noah Harari (2019) asked,

> How did *Homo sapiens* [...] found cities with tens of thousands of inhabitants and then empires that governed hundreds of millions of people? The secret probably lies in the appearance of fiction. Large numbers of strangers manage to cooperate successfully if they believe in common myths. (p. 40)

According to Harari (2019), since the beginning of the 'cognitive revolution', *Homo sapiens* have lived in a dual reality comprising both the actual landscape and an imagined reality, represented by cave drawings and stories told within social groups. Since then, this imagined reality and its symbols have become increasingly powerful—powerful enough to control social relations and subordinate the survival and the care of other intelligences such as animals and plants. Human beings are social animals: thanks to narratives that welcome plurality, sociality can be extended to include AI systems.

The concept of *degrees of narrativity* (Ryan, 2012) represents the leading principle enabling the meaning-making process and human–machine dialogues based on *micronarratives* (Venditti et al., 2017). To be acceptable, stories, especially when they are complex, must meet strict structural requirements (Crawford, 2013) that are not limited to the correctness of storytelling techniques. Since stories are about people and their choices and conflicts, to be acceptable they must also reflect human emotions—the author must understand emotions to be capable of eliciting empathy. Currently, we are not capable of creating empathic AI systems, and perhaps we never will be. AI systems can only simulate human emotions, empathy and social reasoning are currently beyond its ability (Haladjian & Montemayor, 2016). In our opinion, *micronarratives* may be the key to establishing a more effective connection between human beings and AI systems. AI systems can generate *micronarratives* without the need to express or comprehend emotions, while humans act as the emotional glue, incorporating *micronarratives* into the wider context. This is closely linked to 'ethos', placing them into a system of values that regulates behaviors within the world (Pinardi & De Angelis, 2006). With respect to narrative worlds, *micronarratives* may be used not only to explore the design of bio-cyber-physical systems but also to train machines to create coherent narrative fragments within the narrative world framework. *Micronarratives* can also be used to enable the activation of references that may be recognized by humans in terms of a sense of belonging and consequent motivations. Understanding what an AI system is and how it functions is a challenging task for human beings, especially for those not actively involved in developing it. A challenge for the communication designer, in our view, is to support this understanding with the aim of nurturing trust and familiarity between humans and AI (Piet, 2020).

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