CONCEPTUALIZING DIGITAL REALITY THROUGH METAPHORS: SEMIOTIC AND INTERDISCIPLINARY PERSPECTIVE

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Metaphors have always played a fundamental role in conceptualizing digital realities. Their everyday use, however, makes them challenging to recognize, as they have solidified in our shared imagination. This crystallization is precisely what enables a community of interpreters to attach meaning to a signifier, allowing mutual understanding.

Commonly, we tend to think first of the metaphors which support human-machine interaction, i.e., WIMP metaphors that allowed for the passage from textual CLI (Command Line Interfaces) to GUIs (Graphical User Interfaces). Such two communicative entities, the human and the machinic ones, speaking mutually incomprehensible languages, have relied on strategies of process concealment and intention formulation. As media theorist Marianne Boomen notes, the long-standing tradition of UI design

has standardized various strategies for de-presenting computational complexity, as can be seen, for instance, in skeuomorphic aesthetics. Boomen references N. Katherine Hayles' concept of material metaphor, involving metaphors where transference occurs not between different words or concepts but between words, symbols, and physical artefacts (Hayles 2002: 22). These metaphors played a crucial role in popularizing groundbreaking technological innovations which were otherwise difficult to commercialize in their "native" engineering terminology. They facilitated the domestication of digital technologies in the media ecology of the 1990s, performing metaphor's primary role of transferring meaning from familiar domains to emerging domains lacking an established semantic space.

It can be argued that metaphors and intersemiotic translations among interfaces have always played a pivotal role since the breaks of referentiality between the symbolic and the real generated by the digital as a paradigm for the representation of electric states (Siegert 2018).

The role of metaphors in graphical user interfaces focuses on one of the main functions of metaphor in communication, that of facilitating the transfer of information, i.e. acting as a container for a concept. In modern Athens, the vehicles of mass transportation are called "metaphorai". To go to work or come home, one takes a "metaphor" – a bus or a train. Stories can also take this noble name: every day, they traverse and organize places; they select and link them together; and they make sentences and itineraries out of them. In this regard, they are spatial trajectories (De Certeau 1984: 115). However, the function of metaphor goes far beyond the pragmatic simplification that the translation and packaging of a concept provides for. Also, as Eco remarked (1984), the discourse on metaphor would require a reflection on rhetoric and the multimodality of language in general. In a general sense, it is possible to say that the metaphor in the contest of human interaction machine plays the function that tradition has always entrusted to this rhetorical figure: the cognitive function.

As we know, Lakoff and Johnson have proposed that three types of metaphors be thought of. They are based on the relationship they maintain with structural, orientational, and ontological.

First, structural metaphors represent cases where one concept is organized through another. In the context of digital realities, the most evident example are spatial entity metaphors. Fictional narratives have played a key role in shaping our collective technological imagination, from cyberspace to the metaverse. Similarly, media studies have, over the years, introduced conceptual tools in metaphorical terms: from the "universal library" to

"virtual squares", from "digital semiospheres" (Hartley, Ibrus, and Ojamaa 2021) to "platfospheres" (Bankov 2020), to describe, respectively, knowledge workers, virtual communities, and the cultural and political dynamics within digital spaces. In the same vein, several spatial conceptualizations of computing, from the filter bubble to the digital panopticon, have also been advanced in recent years by media criticism to question the mode of functioning of algorithmic and automatized media.

Moreover, metaphors for digital realities are not only about static entities but also about processes. From expressions which evoke the sphere of human labor, such as "server farms" or "data mining," to those that describe human-machine interaction in terms of aquatic practices – from the idea of "surfing the web" to that of "streaming" – it is possible to collect different kinds of expressions through which digital uses are thought of.

Finally, the category of structural metaphors includes theoretical formulations that go under the name of media ecology, a paradigm which lies at the foundations of a thought made up of "turns", "evolutions", and "hybridization". Authors such as Carlos Scolari (2012) or Michele Cometa (2024), for example, have recognized and theorized the contemporary tendency to think of the media and their history in biological and ecological terms by re-actualizing interdisciplinary framework by authors such as Vernadsky or von Uexküll. Whole sub-disciplines, such as ecosemiotics (Maran), have posed their basis on these rhetorical assumptions as well.

However, while the epistemology of media ecology has never really taken root in university programs, the bio/eco-logical metaphor has become one of the mostly adopted in discourses on digital culture to describe user experience. Just think of the idea of info-obesity or the counterpart, the digital diet or detox, to virality as a form of contagion.

Secondly, unlike structural metaphors, orientative metaphors organize a set of concepts with respect to spatial orientations such as up-down, front-back, on-off, center-periphery and near-far. On the one hand, it was the software and interface studies which, to integrate with a humanistic perspective the study of complex computational systems, advanced and contributed to the standardization of a mostly vertical topology of these. Nake, for example, suggested that everything that comes out of the computer exists as both a sensibly perceptible surface (Oberfläche) and symbolically manipulable subface (Unterfläche) (Nake 2008). This argument aligned with Manovich's concept of the digital image as a product of algorithmic manipulation and computation, highlighting the distinction between the visible surface and the underlying code or data (Manovich 2001).

This topology between the superior and the inferior has become foundational in media studies, adhering to a semisymbolic logic where that which is deep is often understood as invisible. It is only a few years ago, just before the hype for generative artificial intelligence, reflection driven by the desire to decode for deep learning, the invisible side of Artificial Intelligence. The concept of Deep Time by Siegfried Zielinski follows a similar logic, questing into the hidden layers of media development. On the other hand, not below the interface but above, we find the cloud computing metaphors or the idea of virtual economy traveling instantaneously through the air or "skyway" (Hu 2015). Here, one might again question whether metaphors of cloudiness and fluidity truly represent the "visible" – yet soft – aspects (and hiding counterparts) of an otherwise invisible and weighty material reality (this notion aligns with certain techno-semiotic perspectives on media rhetoric, which tend toward erasing the material dimension of media; cf. Gomez Mejia 2014). As Jonathan Crary describes in sombre tones in his latest book, this reality brings substantial environmental consequences.

Vertical topologies aside, the biological metaphors already mentioned – which obviously include contemporary formulations based on the model of the semiosphere – have also provided a framework for thinking about dynamic processes of crossing between internal and external. This category includes the different topographies of internet spaces and communities which live in or have lived there, from those based on the rhizomatic model of the network (Volli; Bory), to that of the semiosphere (Thibault), in order to arrive at the more properly geographical and mathematical models that have relied on data visualization (Dodge & Kitchin 2001; Reyes 2017). A good representative of this position is Prensky (2001), according to whom the digital semiosphere is inhabited by two main subcultures and to illustrate this concept he uses the now famous metaphorical binomial: digital natives VS digital emigrants.

However, such a case seems to represent already a shift toward the third kind of metaphor proposed by Lakoff and Johnson, i.e., ontological which attaches the properties of objects and substances to concepts. Indeed, personification metaphors are the main example of this category. Since the early days of the Internet, we acquired the habit of interacting not with machines but with different forms of life such as mouses, (anti) viruses, bugs, spam and thumbnails, that populate environments made of windows, ports, clouds, kernels, engines, platforms and so on (Pasquinelli 2008; Thomas 2013).

Nevertheless, translating a computational process in a kind of "person" is not just a structuring operation but a very transferring of functions to a

cultural type. In the analysis of The AI Creation Meme, Singler 2020 highlighted the importance of the religious theme in the representation of human-AI interaction. At the same time, similar analyses in the same direction have highlighted how contemporary strategies AI anthropomorphism and personification raise ethical questions, mainly related to gender and ethnic equality.

Ultimately, this category includes the idea of virtual reality as a space in which to immerse oneself. As pointed out by the theoretical average Murray, immersion is a metaphorical term derived from the physical experience of being submerged in water, and we seek the same feeling from a psychologically immersive experience that we do from a plunge in the ocean or swimming pool (Murray 2001: 98–99).

Hence, the function of metaphors is not only to illustrate properties of objects or facilitate their comprehension. Rather, "human conceptual categories have properties that are a result of imaginative processes (metaphor, metonymy, mental imagery) that do not mirror nature" (Lakoff 1987: 371) and things as they are.

In this regard, it is important to bear in mind how metaphors contain a semio-political dimension, that is, provide speakers with (non-a-ideological) interpretative patterns. We have already seen that in the case of cloud metaphors concealing material sides of technology. However, the examples could go much further. As Wendy Chun argued, "software has become a metaphor for the mind, for culture, for ideology, for biology, and for the economy. […] [It is] a powerful metaphor for everything we believe is invisible yet generates visible effects, from genetics to the invisible hand of the market, from ideology to culture" (Chun 2005: 2). In such a perspective, it could be possible to refer to Bogost idea of procedural rhetorics as a way to creating, explaining, or understanding (i.e., interpreting and translating) processes, or to Galloway's definition of algorithm in terms of an allegory of a certain behaviour. In particular, the author argued, video games are, at their structural core, in direct synchronization with the political realities of the information age. This does not mean – necessarily – that language is a deterministic technique, i.e. the cultural metaphors crystallized in the imaginary determine an interpretation, even if certainly in part this is true. Staying within the boundaries of digital realities it is sufficient to state that not only a representative entity but a process – an algorithm, a behaviour, a video game – participate in the production of the real and become at the same time an explanatory model of the world increasingly widespread and an increasingly commonly accepted metaphor of a different reality (Giuliana 2024: 22).

Metaphors, in this perspective, are not innocent artefacts. They also provide a specific understanding of the relationship between the user and reality. According to Hillis, for example, cyberspace and VR are both metaphors and figurations of the promise of an escape from history with a capital H. Cyberspace not only suggest that an ideal existence is one that is technologically mediated, it also continues and intensifies a long-standing project to alter, via the use of technology, subjectivity and the meaning of what it is to be human (Hillis 1999: xvii).

It is precisely in this function of metaphors that lies the interest in semiotics and cognitive studies, that is to say in their power to support encyclopaedic categorizations.

Nevertheless, as metaphors fulfil cognitive functions both towards the outside and the inside, they play a central role to define also what the very cognition is (and what is in relation to artificial intelligence and digital realities). For several years this theme has been inflaming the so-called digital humanities and the philosophy of technology. They are both engaged in the dual task of rejecting the analogy between the human mind and the computer (starting from the insights of Dreyfus and Winograd & Flores) and, at the same time, to justify the persistence of psycho-cognitive approaches to human-machine interaction design, which ultimately keep the user safe from the uncanny valley.

Nowadays that screen-based technologies have become pervasive, acknowledging the cultural meanings of these metaphors, crystallized in the technological imagination, is an imperative move for distancing oneself from the artefact. They operate something like a reverse conceptualization of reality, something that is already in place in the different generations of users. The content of the original metaphors becomes the foundational reality for semantic prototypes. This is when the first "mouse" you encounter is a computer mouse, long before you have grasped the functions of your own memory, you are begging your parents for a console with more memory, or you are reimagining "freezing" as your computer repeatedly stalls – ironically, because the air is too hot for its processor, and so on.

Something like a derivative paradox of this complex semantic situation occurs in the field of education, where digital literacy is increasingly committed to promoting a critical and demystifying reading of the user experience. Digital immigrants teach digital natives how to make it in a digitally dominated socio-economic reality. The communication problem is obvious, but it seems to be only on the surface of a deeper clash of worldviews, where there is a divergence in the fundamental values and even in the structure of temporality.

Several media scholars, for example, have argued that the metaphorical idea of media as prothesis of human cognition was becoming a sad reality since the cultural explosion of the Web in the 90s. In pessimistic tones, they argued that digital culture, especially among digital natives, was marked by a significant decline in cognitive abilities such as focus, memory, and reasoning. On the contrary, others have argued that cognition is, by its very "nature," inclined to extend itself into technical artifacts – that cognition, in essence, consists of the entire system of human cognitive organs, including the body and technologies, therefore suggesting that adopting overly apocalyptic attitudes might be misplaced.

The question to be asked therefore concerns both the semiotic nature of worldviews and the socio-economic dynamics of production of those – since, in large part, we are talking about commercial products. This is the direction in which the most critical speeches have moved, for example, attributing the semiotic pollution to large multinationals, and especially to the continuous software and hardware upgrades to keep the hype alive for a product category (Chun 2016).

This seems to be, in the end, the most common perspective today. It is a perspective which allows us to overcome technological determinism and, at the same time, to keep thinking about the forms of cultural forces that express in shared language forgings and updates.

We are happy to open our collection of papers with "The Blue Brain Metaphor for AI" by **Bent Sørensen** and **Martin Thellefsen** which explores the cultural and semiotic implications of the "blue brain" metaphor commonly used in visual representations of artificial intelligence (AI). The authors analyze how this metaphor serves as visual shorthand for human-like cognition and intelligence in AI, capitalizing on the symbolic association between the human brain and computational systems.

They argue that the metaphor positions AI within a socio-cultural "encyclopaedia," a term borrowed from Umberto Eco, which organizes collective cultural knowledge and interpretive frameworks. This encyclopedia shapes how society interprets metaphors and symbols, particularly in complex areas like AI. The "blue brain" imagery, frequently used by stakeholders (like tech companies, media, and educational institutions), is identified as a powerful tool for conveying AI's cognitive potential and its human-like qualities, while also invoking trustworthiness through the color blue.

The authors discuss how the previously mentioned metaphors such as "the computer is a brain" and "the brain is a computer" create a basis for public understanding of AI, fostering a perception of AI as a parallel to human intelligence. This anthropomorphization may make AI appear less intimi-

dating but can also lead to misunderstandings about AI's capabilities, such as its supposed autonomy and cognitive depth. By analyzing this metaphor through Eco's framework, Sørensen and Thellefsen examine its dual function as both a familiar image and a source of potential misinterpretation.

The paper concludes by highlighting the role of the "blue brain" metaphor in framing societal attitudes toward AI. They include ethical concerns, potential biases, and implications for human agency, suggesting that this metaphor will continue to shape discourse around AI's future development and integration into society.

The paper "Conceptualizing Visual Metaphors in High Tech Product Advertising" by **Sevim Taneva** examines how visual metaphors in advertising impact consumer perception, particularly in high-tech product ads. The study is grounded in a theoretical framework of metaphorical expressions and includes an empirical analysis of metaphor usage. Conducted through an online survey of 301 Bulgarian respondents, the study covered multiple high-tech sub-industries, such as audio, cybersecurity, financial services, telecommunications, and computer technology, and analyzed consumer responses to various visual metaphors used in these advertisements.

The findings reveal that visual metaphors in advertisements can be powerful tools for evoking emotional responses, engaging curiosity, and shaping brand perception. However, comprehension varies significantly, with abstract metaphors often misunderstood. Around 41–64% of respondents reported difficulty in understanding the metaphors, particularly those for complex products like digital security and computer technology, supporting the hypothesis that abstract metaphors pose interpretation challenges.

The study highlights the need for consumer research in metaphor-based advertising, in order to ensure clarity and alignment with brand messaging. Effective metaphorical advertising can enhance the ad's Empathy, Persuasion, Impact, and Communication (EPIC) metrics, but only if metaphors resonate with the target audience. Findings also suggest that abstract metaphors can reinforce brand identity but require careful consideration to avoid misinterpretation.

A very important contribution is the paper "Generative Media: Sign, Metaphor, and Experience" by **Everardo Reyes** who explores the field of generative media, analyzing its development, semiotic principles, and impact on user experience. Generative media refers to content created with AI-driven systems, and the paper broadly defines "text" to include written, visual, and interactive forms. Using Roman Jakobson's communication model, Reyes examines how generative media shifts decision-making in content creation, allowing AI to play a role in message formation.

The paper outlines the evolution of generative media from early computer art in the 1960s to today's AI technologies, such as GANs (Generative Adversarial Networks) and diffusion models. The key attributes of generative media – synthetic, dynamic, digital, combinatorial, and agentic – highlight its capacity to produce diverse, responsive outputs. Reyes categorizes generative media interfaces into conversational, web-based UI, and visual programming interfaces, analyzing each from a semiotic and metaphor-based standpoint.

The study argues for a process-oriented and multidisciplinary approach to understand the cultural and communicative transformations of these technologies, emphasizing the importance of transparency and user agency. By considering generative media as both tool and collaborator, the paper encourages a nuanced understanding of the AI-driven content creation process, linking semiotics with emerging digital practices.

The paper "Semiotic Mediation for the Sustainable Digital Empowerment of Older Adults" by **Alyse Yilmaz** and **Khaldoun Zreik** investigates the use of metaphorical language and semiotic mediation in enhancing digital literacy for seniors. The study identifies metaphorical expressions, such as viewing technology as "nests of problems" or "magical" realms, which shape seniors' attitudes toward digital tools. Through qualitative observations in digital literacy training, the authors explore how these metaphors reflect underlying fears, identity concerns, and cultural barriers. They argue that empowering older adults digitally requires not only technical training but also addressing these symbolic perceptions.

The research suggests that a holistic, identity-focused approach to digital learning – integrating symbolic mediation to demystify technology – can foster meaningful engagement and social inclusion for seniors. The authors advocate for digital literacy programs which move beyond skill-building, instead enabling seniors to perceive themselves as active digital participants. The study ultimately contributes to broader efforts in digital inclusivity, aiming to promote equitable digital access and cultural relevance in the design of technology training for diverse, traditionally marginalized populations.

The paper "Metaphor of the Database: A Taste Construction" by **Karina Astrid Abdala Moreira** explores the metaphorization of databases in generating new tastes through artificial intelligence. Drawing on Lakoff's theory of metaphor and Peirce's semiotics, Abdala argues that databases do not simply store information but metaphorically shape experiences, particularly in translating sensory perceptions into digital forms. The study examines how AI tools like Sous Chef and Flavor Graph create novel gas-

tronomic experiences by digitizing chemical and sensory data to suggest new ingredient combinations. The paper emphasizes that this translation of sensory experiences into digital frameworks relies heavily on metaphor, which enables AI to replicate and innovate within the culinary domain. Through case studies, Abdala illustrates that metaphorization in databases plays a crucial role in reinterpreting human sensory experiences, raising questions about authenticity and the role of AI in creative processes like taste-making. The study highlights the semiotic significance of sensory translation, connecting cultural, cognitive, and sensory dimensions in the context of taste.

The paper "Metaphors of Subversion in Surveillance Art Photography" by **Raluca Vârlan-Bondor** examines how visual and discursive metaphors are used in contemporary surveillance art, in order to challenge traditional surveillance practices. Analyzing works by artists like Tomas van Houtryve, Hasan Elahi, and Mishka Henner, the study identifies how these artists employ visual metaphors to subvert and critique surveillance systems. Using the frameworks of social and cognitive semiotics, the paper categorizes subversive metaphorical techniques, showing how surveillance art disrupts the observer-observed dynamic, often engaging audiences in counter-narratives that provoke thought on privacy, authority, and public spaces. The study highlights that such art embodies "artistic hacktivism," thus reshaping social perceptions and urging critical reflection on surveillance culture and digital privacy.

The paper "The Mythical and Technomagic Aquatic Metaphors of Digital Aesthetics as a Semiotic Empowerment of the Female, Oneiric, and Translucent Imaginary in the Techno-Art" by **Paulo da Silva Quadros** explores the influence of mythical and "technomagic" concepts in digital aesthetics. Drawing on Michel Maffesoli's idea of technomagic, the author examines how liquid and dreamlike visuals in digital art reflect a feminization of the cultural sphere. This approach highlights how aquatic metaphors in digital art re-enchant human existence, evoking feminine archetypes and reconfiguring social relations. Through cultural semiotics, Quadros analyzes the symbolic significance of these visual metaphors in art forms like music, video, and virtual installations. The study suggests that these metaphors of fluidity and transformation empower a feminine aesthetic, reimagining digital spaces as immersive, interactive, and oneiric, thereby fostering a deeper cultural and social awareness in contemporary digital art.

The paper "Conceptualizing Digital Reality through Metaphors in Public Service Announcements: A Semiotic Perspective" by **Nataliya Lysa** examines how digital reality is presented through metaphors in public ser-

vice announcements (PSAs) using a semiotic framework. PSAs, designed to convey critical social messages, are explored as complex cultural signs created by social institutions to influence public perception. Lysa argues that as digital technology becomes increasingly embedded in daily life, it reshapes cognitive structures and meanings through digital metaphors, which play a crucial role in PSA effectiveness. The paper integrates Peirce's semiotics, in order to analyze how these metaphors enhance public engagement by merging visual, linguistic, and auditory elements, making complex messages more accessible. Through case studies, Lysa demonstrates how these digital metaphors evoke emotional responses and cultural resonance, fostering a more profound understanding of societal issues among diverse audiences.

The paper "Enhancing City Identity through Digital Metaphors" by **Konstantinos Digkas** explores how digital metaphors in social media campaigns impact city branding, particularly in attracting younger audiences. Using a multimodal analysis of Thessaloniki's recent promotional campaign "City Break off the Beaten Track," Digkas examines how digital metaphors visually and linguistically shape the city's identity. The study finds that by incorporating modern digital metaphors, cities can create more accessible, engaging, and dynamic representations that resonate with tech-savvy viewers. This approach enables cities to act as "influencers," using social media's interactive nature to enhance their visibility and appeal, ultimately redefining their digital identities to foster tourism and cultural engagement.

The last paper in the collection "Digital Realities and Metaphorical Constructs: A Multimodal Semiotic and Intermedial Analysis of *Blade Runner 2049*" by **Maria Katsaridou** and **Loukia Kostopoulou** analyzes the use of multimodal metaphors, in order to represent digital reality in film. Using Charles Forceville's theory of multimodal metaphors, the authors examine visual, auditory, and narrative elements to explore themes of identity, artificiality, and digitality in a dystopian setting. The analysis highlights how the metaphors used in the film, such as urban decay as societal collapse and memory as identity, address contemporary concerns about digitalization, artificial intelligence, and the impact of technology on human identity. The study situates *Blade Runner 2049* within the context of post-cinema and the post-media era, illustrating how hybrid media forms shape storytelling. By combining cognitive and cultural semiotics, the paper contributes to the discourse on how cinema utilizes metaphor to engage viewers in reflections on the evolving digital landscape and the boundaries between human and artificial beings.

With these considerations in mind, I am pleased to invite you to explore Issue VII of *Digital Age in Semiotics and Communication*, in the hope that it will inspire reflection, insight, and engaging dialogues on the evolving intersections of conceptualization and metaphoricity. This issue owes its realization to the invaluable support of our partners in the ERUA2 alliance and the generous funding provided by the Strategic Development Fund of New Bulgarian University.

Enjoy the journey!

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