

The evolution of the human-machine relationship in the era of intelligent communication: from tools to symbiosis

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Abstract

In this context where intelligent communication has achieved high penetration rate, human beings' relationship with media technology is being changed profoundly from all aspects. As for communication aspect, this essay aims at discussing the evolution of the relation between man and machine, from "tool" to "symbiosis", considering their history in terms of logic and drives. It recognizes and compares four main types of such relation: tool, cooperation, integration, and symbiosis, distinguishing the different degrees of power ownership, modes of interaction, agency, and trust. Based on that, the paper discusses possible problems in symbiosis – such as tech dependence, subject melting, algorithmic black boxes, and accountability vacuums—and suggests parallel solutions in the form of a reconfiguration of communication literacy as well as institutional adaptation. We contend that in intelligent communications settings, people and computers will be more fused and interdependent with each other. As McLuhan anticipated, every prosthesis involves a loss; therefore, symbiosis is never an end but rather an endless contest between stimulation and anaesthesia." By examining this trend, we can approach how to cope with the future communication environment more wisely as well as reach a healthier coexistence among humans and machines.

Keywords

Smart communication; Human-technology relation; Instrumental rationality; Technological symbiosis; Subjectivity of communication.

1. Introduction

To a large extent, then, the story of human communication is also one of changing relations with communications technologies. Beginning from face-to-face communication within oral cultures, to the time-space distortions of writing, to the public sphere made possible by print media, to the "global village" created through electronic media—each new communications technology has renegotiated the bond between human beings and their instruments. Yet past technological transitions tended to have one key premise in common: technology is a tool that humans invent and control, serving human communicative purposes. In the age of smart communications, that assumption is disrupted by new technologies – AI, big data, algorithmic recommendation, generative content, smart speakers— are not merely tools that obey commands. They have some autonomy, flexibility, and interactivity: they learn from the users' preferences to produce news pieces, have a natural converse, and can affect human feelings, opinions, and behaviors. It will become evident that it is for this reason that the relation between man and machine has fundamentally changed: machines have entered "common life," not so much tools as agents.

Building on this idea of McLuhan's, if "media are extensions of man," then intelligent media are extensions beyond just our sense organs—they will be extensions of how we make decisions, how we create new things. But McLuhan also cautioned that there is a danger of "amputation"—the point at which some extension puts numbness into whatever faculty it is replacing in

humans. It is this tension between extension and amputation that leads us to the transition from tool to symbiosis. Bruno Latour's Actor Network Theory (ANT) completes the picture even more: Machines are no longer only mediators who carry our human intention untouched; they turn into "mediators" which modify, translate and distort the meaning of the communicative act in itself.

2. Historical logic and drivers of the evolution of human-machine relationships

The evolution of human-machine relationships is not an overnight change but is closely tied to technological iteration, social needs, and the deepening of human self-awareness [1]. In terms of developmental stages, we can identify a trajectory from tool-oriented, to interaction-oriented, and finally to symbiosis-oriented.

The first is "tool age". The representative of this stage is the initial computer: machine is only a tool and humans give it absolutely commanding through programming language, and machines were very procedural. For example in communication: word processing programs and databases represent the era.

The second phase is the "interactive age." With the rise of PCs and the internet [2], technologies like graphical user interfaces, mouse clicks, and hyperlinks made human-computer interaction more visual. People began to "converse" with machines through operations, and machines responded accordingly. Portal websites and search engines are typical examples [3].

The third stage is "smart epoch". In today's AI epoch, machine will not wait for orders anymore. It perceives the world actively, learn from the behaviour of users, forecast demands and in part autonomously decide or create. From a McLuhanesque point of view, this is the point where things change qualitatively: previous tools extended certain physical or sensorial functions (e.g. the wheel extended the foot, writing extended the eye); intelligent machines, on the other hand, extend cognitive and even emotional capacities – perhaps amputating human agency when uncontrolled. The idea of "pharmacology" offered by Bernard Stiegler is particularly salient here: every technology is at once poison and cure; intelligent communication technologies can cure information overload but they also poison human autonomy and attention; symbiosis needs to learn the proper dose.

The change is driven by a number of factors. The first driver is technology-based. Growth in computational capacity has been exponential, massive accumulation of big data, and breakthroughs on deep learning have made the machine move from "deterministic system" to "probabilistic system," to understand unstructured data and provide pattern recognition capabilities as well as content creation. Second, demand drivers: In this era of information overload, humans' cognitive limitations generate a pressing need that demands machines to filter, summarize, and pre-structure information. User needs for personalized, real-time, context-aware communication further drive technologies towards "being smarter" and "more human". Third, social diffusion is accelerated by capital and institutional drivers [4]. The combination of big tech platform's business models and national AI strategies has brought intelligent communications to the center stage of our societies. Finally, cultural factors are not to be ignored either: the emergence of digital natives has turned a life with technologies into the norm, softening psychologically the distinction between human and machine and laying down the cultural groundwork for more intimate human-machine relationships. As Sherry Turkle found through her work with studying human-robot interaction, people begin to find comfort in treating machines as "enough," reveals something of an ontological shift about the nature of relationships themselves, one that is just as much a product of affective openness as it is of technological capacity [5].

3. Main forms of human-machine relationship in intelligent communication

Based on the degree of technological embedding and depth of interaction, the human-machine relationship in the intelligent communication era can be summarized into four main forms.

3.1. Tool-based Relationship: Machines as Auxiliary Means for Content Production and Distribution

This is the oldest, and still common version: machines are “tools” for humans. Journalism, robot writing (e.g. financial/sports reporting) is typical – humans write the template, robots put in numbers etc. Content distribution: human-oriented but computerized, although it may be a complicated optimization process, the goal of which (e.g., click-through rate or dwell-time) can be defined by humans; and Human-over-Machine. The “intelligence” of a machine resides in its efficiency and accuracy, but what that machine does depends on human beings. Here too, as Joseph Weizenbaum famously warned after inventing the ELIZA chatbot, humans are strongly disposed toward ascribing agency to even very simple conversation programs—an inclination which predicts the stronger anthropomorphism of subsequent phases.

3.2. Collaborative Relationship: Human-Computer Collaboration for Complex Communication Tasks

And as machines' abilities develop enough to be able to do so, then they become “partners”, doing things that neither could on its own achieve. So for deep reporting, journalists exploit the power of big data in order to find clues and confirm facts; in videoproduction, they can rely on artificial intelligence for editing, effects or subtitles. While people design concepts and storylines. Social media campaigns involve AIs assessing the mood of a crowd while people create content strategy [6]. Collaboration has specialization: machine uses data-processing, fast computation and pattern recognition; humans take care of value judgment, creativity, emotions, ethics etc. The relation is not anymore the use-and-be-used one but shows some sort of parity. This is what Latour would call an actant “hybrid”: the reporter and the algorithm create something together, which can't really be said to belong to one or the other of them, replies to this modernist purification of separating human subject and machine object.

3.3. Embedded Relationship: Deep Integration of Machines into Daily Communication Practices

Embedded relation is the situation where smart communication technology pervades into our public lives, and starts “invisibly” interfere with different communications practice [7]. Virtual assistant such as Siri or Xiao Ai become a hub for families' information, supporting natural language-based services (e.g., query answering, device control, and schedule management). Big data-based personalized recommendation systems constantly show up in the news, videos, shops or social networks that change people's information environment and consumption preference without our notice. Even emotion companions (e.g., Replika) invades users' intimate emotional spaces. Embeddedness means internalisation of the technologies, and habitual usage. Technology is not “used” anymore; it becomes their everyday habitat and its influence is even more imperceptible and deep. The most potent media are those which have become ‘invisible’ environments”, as argued by McLuhan. Intelligent agents embedded in this way therefore can be most influential just at the moment we do not notice them, making the amputation effect more difficult to detect and resist.

3.4. Symbiotic Relationship: Humans and Intelligent Agents Adapt to and Shape Each Other

This may be where human and machine evolution is heading. Symbiosis is not about tools, or collaboration, or even embedding. It means that both are mutually, dynamic, long-term process of adaptation and construction between humans and machines. On the one hand, humans “tame” machines through continued use, feedback data, and even code, so that machines are more suitable for people’s needs and values. On the other hand, “anti-domestication” is also obvious: recommender systems condition human’s mental space and aesthetic taste; generative AI changes the way we write, and how we think when we do so; social robots change our feelings and how we relate to others. The characteristic mark of symbiosis is mutual constitution: human beings and machines shape each other in their interaction, dissolving the simple subject-object binary. It is not “humans with machines”, anymore than it is “machines for humans”, but rather “humans and machines as communicators”. In McLuhan’s terms, then, symbiosis refers to a situation wherein the extension and amputation are no longer sequential but simultaneous and dialectical: the machine both extends human possibility and continually threatens to amputate human agency—and it is in this tension that we find the symbiotic condition. Whether this tension produces an increase or decrease of human capacity will depend upon conscious mediation.

4. From Tools to Symbiosis: Key Dimensions of Evolution

Symbiosis is the product of a structural change in at least four respects:

4.1. Transfer of Control: From Human-Led to Human-Machine Co-governance

In the relationship based on tools, everything is under human control; machines perform programs that are issued to them. In collaboration and in embeddedness, machines develop “dynamic capabilities” in certain areas such as sorting or producing. In symbiosis, “human control” is transformed into ongoing “human-machine negotiation.” For instance, in automated driving where most of the work is done by a system while the driver keeps supervision and emergency takeover. In AI-supported medical diagnosis, it is recommended by the system and decided by the doctor. The control transfer means no human “disempowerment”, but redistribution and dispersion of power[8].

4.2. Interactive Mode Upgrade: From Directive to Dialogic and Contextual

Traditional human-computer interaction is “input-output”: you tell the machine what to do. In intelligent communication, interaction becomes more “personified” and “scenario-based” [9]. Natural language processing allows everyday conversation instead of complex code. Machines provide feedback based on location, time, past experiences, and mood. From “I say, you listen” to “you ask, I answer” to “I understand you,” the upgrade increasingly approximates human social interaction.

4.3. Subjectivity Reconstruction: Machine Transformation from “User” to “Quasi-Actor”

This is the most philosophical level. Machines used to be just objects: their “behavior” was an extension of our own behavior. But now – especially with generative AI and automated decisionmaking – they seem to have some kind of “subjectivity.” The poems, images, and decisions they “make” are not just command outputs. Social robots can like and comment to influence public opinion. Machines also make decisions for people in credit evaluation or recruitment. It is these “quasi-actors” that compel us to question the subject of communication itself, i.e., may there be any other subject than man as subject of communication?, and in which way could we speak about machines being “actors”? This calls into question some basic tenets

of Western humanism. The vocabulary comes from actor-network theory, as formulated by Latour: An “actor” is anything that makes a difference in the course of action, regardless of if it is conscious, intentional and human. In that practical sense, intelligent agents are already actors; the issue is not if they are, but rather, how do we make them responsible?

4.4. Evolution of Trust Mechanisms: From Functional Trust to System Trust and Human-Machine Trust

In the tool age, trust in machines was instrumental trust: if a machine did its job well, then it could be trusted – this is trust through prediction and reliability. As machines become autonomous, trust is harder. People move their trust away from individual functionalities and into the whole system – system trust, in which trusted actors include developers, and management, and applicable policies and procedures. Within symbiosis we get human-to-human like trust in machine use: Trust is not just functional but emotional. Machines can be seen to be “well-meaning” and “trustworthy.” The shift oils use, but also makes us vulnerable to deception or manipulation by being overly trusting. In her work on “fake intimacy”, Turkle finds many people prefer engaging with artificial intelligence since they are less messy than humans and provide unqualified positive attention. This tendency may result in a form of dependency which at the same time becomes deeper and more perilous – deeper since it satisfies some unfulfilled affective demands, more perilous, since there is no corresponding duty to us.

5. Challenges and coping strategies under symbiotic relationships

Although symbiosis promises productive human-machine collaboration, it also raises serious challenges requiring theoretical and practical responses.

5.1. Technology Dependency and Weakening of Human Subjectivity

When intelligent agents become part of our everyday lives “technological addiction” appears: we tend to depend more and more on the information that is provided by algorithms, may create “information cocoons” and narrow perspectives; over-use of AI for writing can reduce independent thought and expression; emotional companion AI could change the way we deal with real-life relationships. More fundamentally, when more and more decisions are made by machines rather than humans, is there going to be enough human agency, insight, and what does that mean for objectivity and subjectivity? In this context the term “amputation”, as it figures in McLuhan’s writing, makes sense: if we have cognitively extended ourselves by means of intelligent media, they can, at once, amputate what they replace themselves – if only we do not let them! We have to begin with men.” (The answer is: Begin with men.) AI communications should be used by humans, not supplanting the human free will and autonomy [10]. Education should reinforce independent thinking, judgment, and choice. Enjoy the conveniences of smart communications but do not lose yourself.

5.2. Algorithm Transparency and the Interpretability Dilemma

Trust depends on coexistence, and the foundation of trust is transparency and comprehensibility. Yet current deep learning algorithms are “black boxes” opaque to individuals. If these algorithms determine what news people see, what credit scores they receive, and whether they get job opportunities, non-transparency becomes a violation of individual rights and public welfare. Resolving this requires tripartite efforts: technically, strengthening explainable AI (XAI) for traceable and interpretable decision-making; institutionally, requiring algorithmic filing, evaluation, and auditing by law in key areas; normatively, treating algorithm transparency as a social responsibility of tech companies, not an optional decoration.

5.3. Ambiguous Boundaries of Human-Machine Responsibility and Ethical Risks

When machine as “quasi-actor” intervenes to communicate information, we no longer have an easy answer of who is responsible. If a fake news that is written and published by AI assistance harms society, who is to blame—the user, the developer, or the platform operator? What if an autonomous car encounters an emergency situation and has to make a “moral decision,” who is deciding on what basis and taking responsibility? Responsibility under symbiosis becomes distributed instead of being a linear and singular task. Solutions include setting up of an “distributed responsibility” ethics system: make clear who is responsible for what in the development, deployers, and supervisors; practice “ethics in technology,” or integrate ethics into every phase of development; and grapple with legal ideas such as “algorithmic personality” that could hold an increasingly autonomous agent accountable.

5.4. Communication Literacy and Institutional Adjustment for Symbiotic Relationships

Not only does symbiosis require technical improvements, it will necessitate evolutionary change in the social systems as well. Communication literacy needs to evolve first: traditional media literacy focused on receiving, data analysis, comprehension and mining. In smart communication environment, the literacy needs to be extended to “human-machine communication literacy”: knowing some simple AI operation principles, machine-generated contents identification, privacy protection, keeping the subjectivity of human-machine cooperation and intentionally fostering healthy relationships with smart machines. Secondly, institutions should be made adaptable. Existing laws, ethical, and governance systems primarily rely on “human subjects and tool objects.” Institutional design has to change in the face of human-computer symbiosis— including setting up a regime for personal information protection and data rights that is appropriate for an algorithmic society, “designing accountability principles for automated systems, creating transdisciplinary and transnational AI policy mechanisms, and supporting public debate in order to create a social agreement about the type of symbiosis that is desired.

6. Conclusion

From “tools” to “symbiosis”, in intelligent communications research domain, the relationship between machine and human beings changes its nature from being tools to symbiosis. It is not only the technical substitution process, but also the change of the relationship’s nature: from instrument to cooperation from integrative to symbiotic. We observe the shift in control from humans-led towards a human-machine balance; the shift of interaction from one-way command to two-way communication and contextualization; the machine’s function, which moved from actor toward user to quasi-actor; and trust itself, moving from functional to system and interpersonal.

Ultimately, the question of human-machine relations is also the question of humanity itself: What kind of people do we want to be? How much autonomy do we want to cede to machines? How do we ensure that machines work for us rather than the reverse? The answers to these questions will determine whether moving from “tools” to “symbiosis” leads toward human liberation or human loss. On the threshold of the intelligent communication era, the right to write this answer still lies in human hands.

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