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Augmented anthropology

Interstitial anthropology in the limits of humanity

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Abstract. This paper introduces augmented anthropology, a new field of research that combines machine anthropology and conventional anthropology. Augmented anthropology uses robots as avatars, AI, and 3D virtual spaces to create an interactive environment to study and understand human behaviour. By leveraging technology, augmented anthropology is able to study humans and nonhumans in a more detailed and precise manner than traditional anthropological methods. This paper will discuss the advantages and potential applications of augmented anthropology, as well as the ethical considerations relating to authorship that must be taken into account. Furthermore, it will outline the potential for augmented anthropology to revolutionise the field of anthropology and to provide new insights into the complexities of what it is to be human.

Keywords: Machine anthropology, augmented anthropology, mixed reality, robot ethnography

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1. INTRODUCTION

This paper will explore and speculate on the one hand if and how robots could gather data and perform anthropological studies, and on the other hand how humans would react to a robot ethnographer. The argument of the paper is that elements of robot ethnographies already exist, and they are articulated in most of the ethnographic studies today, either explicitly or implicitly. Thus, the future thus will not necessarily be a question of the nature of ethnography (robotic vs. human) but that of the degree of integration or disintegration of the human-machine interaction in the process of (anthropological) knowledge creation.

The aim of this intellectual endeavour is to offer both a theoretical framework and practical solutions for current or future foreseeable situations in which the type of data produced is predominantly ethnographic and partially or integrally interpreted by technological means. A good starting point is first to acknowledge that current knowledge production about humans and their environment is already always robotic, that is, it is a result of the integrated relationship we have with technology. We need to recognise also that our failure to understand technology as part of us, the tendency transparent in metaphors such as "symbiosis with technology", leads to architectures of alienation that plague our relationship to ourselves and breaks important networking links within the nested systems in which we live.

Subsequently, what may 'robot ethnography' or 'robo-ethnography' refer to? And would a 'machine anthropology' follow in its trail? Is this machine anthropology already augmented anthropology? To what extent and with what applicability and consequences?

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In order to answer these questions, this article will start by positioning ethnography in relation with both its practices and its technologies, while analysing the intersection and the transformative power of ethnography over data. It will continue by expanding on the concept of machine anthropology as the possibility of a discourse on human life generated through and powered by automated systems. The possible applicability, risks, and challenges of robo-ethnography and machine anthropology will be discussed prior to the concluding argument of the article: how we think about our the relationships with technology are influenced by the place we allocate to technology in human life. An effective ways to mitigate risks and fear of technology is to understand and relate to technology as integrated part of humanity, and not as a separate autonomous entity, despite its massive computing capacity. The means to achieving this will open up for discussion in the future.

2. FROM BIG DATA TO THICK DATA

Ethnography is as much a set of methods of collection and production of qualitative, quantitative, and historical data about human activity that are subsequently rearranged into interpretive discourses that offer a deeper understanding and, in some cases, actionable strategies (depending on the scope of the ethnography) as it is the corpus of these data itself. Just like anything else, ethnography may vary in its detail, value, and quality depending on many factors, notwithstanding its scope. Are we setting up "rapid ethnography" in order to quickly understand a circumscribed phenomenon or occurrence (usually used for institutional ethnography), or are we engaging in a long term ethnographic project targeting complex cultural phenomena? The answer to this question influences the design of the ethnography, as well as its field experience and results. Irrespective of this, the latter constitute fragments of anthropological thought, more or less integrated in anthropology's field of knowledge. Anthropology thus could be considered as the assembly of interpretive knowledge produced by and containing the ethnographic data. Of course, this is a reductive working definition, and it does not have the pretence to do justice to a complex discipline with a rich and controversial history.

Thick data is the qualitative data that anthropologists produce. Inside thick data you can find observations, feelings or reactions, and also the intentions, the usual data that we produce doing ethnography. These data can also be produced during remote ethnography using video streaming or cameras and microphones.

As this thick data aims to understand people's intentions, their stories, context and perspectives, it is quite difficult for a robot to process, since it is not something that you we analyse using pure mathematics and computer algorithm techniques. Similarly, we cannot use statistics since thick data is significantly smaller (in terms of people involved in) than big data. In order to be able to do machine anthropology is important to be able to collect and process this thick data, understand people's emotions, desires and intentions, with depth of meaning and also use big data to produce quality ethnographic data that provides us with the holistic anthropology perspective. Nowadays, robots can detect patterns present in big data, but anthropologists are the ones that can understand the meaning of those patterns (Nichter, 2021, p. 7).

In augmented anthropology, thick data and big data are mixed and augmented. Augmented anthropology can obtain and produce a huge amount of data through sensors, projections, analysis, or the interaction of this augmentation with the "physical reality". Playing with thick data is the holy grail of this paradigm. How can we swim in these thick data from the machines, from the "real world" and interact with the multi-environment in which augmented anthropology is performed depending on the thick data, whilst avoiding biases introduced by wrong big data extrapolations and understanding the

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meaning of the big data produced? The transition from robots reacting to big data to robots and people dancing among ethnographic data is the first rite of passage that must take place to achieve the first step of augmented anthropology.

3. AUGMENTED ANTHROPOLOGY

It is imperative to dive deeper into the concept of augmented anthropology, shedding light on its nuanced definition and implications. Augmented anthropology can be understood as a dynamic and interdisciplinary field that blends the realms of human anthropology and virtual entities within the context of augmented reality. By augmenting anthropology, we are indeed augmenting the limits to processes of what it means 'to human' (Hasse, 2022, p. 146), we are expanding the boundaries of the construction of humanity. This implies to acknowledging how we set the boundaries of the technological aspect.

Augmented reality (AR) intricately weaves virtual elements into our tangible reality, effectively blurring the lines between the physical and the digital. Crucially, the term "virtual" does not equate to the non-real; rather, it signifies a layer of existence that coexists and interacts with our physical surroundings. Consequently, augmented anthropology harnesses the power of AR technology to introduce virtual and nonhuman components into the anthropological landscape, enriching our understanding of human culture, behaviour, and existence. It is the next step of Machine Anthropology, which designates possible images of humanity through the sensorial and analytic apparatus of the future global technological network (Balasescu, 2020, p. 1). It is deeply influenced by AI, particularly considering that AI is extremely biased by the human concepts of *artificial* and *intelligence* and thus the concept of *knowledge* as a result of an idealised humanity.

This innovative approach operates within the interstitial spaces of humanity, pushing the boundaries of traditional anthropological discourse. Historically, anthropology revolved around the concepts of *human* and *culture*, grounded in a shared perception of reality and the limits of human identity. However, augmented anthropology embarks on a journey to transcend these conventional confines.

The transition from a *real* or *one-dimensional* anthropology, constrained to the physical world, to an anthropology that navigates diverse dimensions inhabited by varied entities, dismantles age-old dichotomies. It necessitates the recognition that humans are not solely biological beings but also intricate amalgamations of machinery and algorithms (Balasescu, 2020; Ingold, 2000). In this expanded paradigm, the interactions between humans, machines, and alternate dimensions intertwine, revealing the interconnectedness of these seemingly distinct facets.

Importantly, augmented anthropology underscores that technology, robots, and artificial intelligence are not foreign entities detached from human existence; rather, they serve as extensions of ourselves. This conceptual shift challenges preconceived notions and underscores the symbiotic relationship between humanity and its technological creations.

Through augmented anthropology, the boundaries of human identity are dynamically redefined, reshaping the very essence of what it means *to human*. By transcending these boundaries, we engage in a profound exploration of the multifaceted dimensions that contribute to the human experience, ultimately enriching our understanding of the intricate web of existence. Augmented anthropology serves as a natural progression from the realm of machine anthropology, which utilised the sensory and analytical capabilities of the emerging global technological network to probe the depths of human

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identity and culture. Augmented anthropology mixes virtual and nonhuman entities with human anthropology in the scene. The concept inherits the technological "mixed reality" paradigm, where *real* and *non-real* entities are mixed in the same landscape.

Artificial intelligence (AI) plays a pivotal role in shaping augmented anthropology, as it is inherently influenced by human concepts of *artificial* and *intelligence*. Understanding consciousness, a product of idealised humanity, is deeply ingrained in the development of AI systems. Therefore, augmented anthropology seeks to address and transcend these biases, fostering a holistic perspective that encompasses both human and nonhuman agents.

In essence, augmented anthropology is a paradigm-shifting endeavour that merges the virtual and the tangible, the human and the nonhuman, thereby unravelling new dimensions of anthropological exploration. It expands the horizons of human understanding, challenging traditional boundaries, and fostering a more inclusive and interconnected vision of what it truly means to be human.

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4. SHARING SPACES

The new paradigm of anthropology by augmentation is all about sharing spaces. Sharing spaces between *humans* and *nonhumans* between *real* and *virtual* (but also *real*) things, whilst attempting to avoid anthropocentric dichotomies.

Augmented anthropology also needs to consider the possibility of developing its studies without the use of "physical" machines (despite the fact that they run on a physical medium) but using that ontological entity known as an algorithm. Robots are the working class of AI (Balasescu, 2020, p. 4), are the embodiment of AI, and given that this paper is not focused on a virtual ethnography but on physical and virtual – but not unreal – ethnography, we are going to focus on robots as the agents of this augmented anthropology.

The problem starts when we assume robots and humans as different ontological entities in a separate landscape. The line where we draw the limit as a boundary shall be understood as Heidegger's concept of boundary: "A boundary is not that at which something stops, but, as the Greeks recognised, the boundary is that from which something *begins its essential unfolding*" (Heidegger, 1978, p. 332). By understanding the boundaries of humanity, we can understand the essential aspect of humanity as machines. Another problem in this machinery landscape is the nostalgic idea of humanity, taking nostalgia as not only a longing for the past, but a vision for the future.

Here it is important to think of AI as Thrift's and French's concept of software: an organism with passion for inscription (Thrift and French, 2002, p. 311). Following this idea, AI cannot be considered only as a text, domesticating its generative otherness, intentionally forgetting the shifting boundaries that define "objects" (Oyama et al., 2000). Software, AI, expresses different times, that of its production and all the subsequent moments in which it takes shape. Therefore, AI appears as a space, a landscape, an in-between, an interstitial landscape between everyday landscapes. Through robots, the life cycle of the software organism unfolds, whose generative and relational processes are the *locus* and embodiment of previous histories (Ramirez-Goicoechea, 2014, p. 6).

In this spatial inscription, robots are agents, actors and producers of space and experiences, as well as products, as they are in continuous co-creation with their relational network. However, as we are taking Thrift and French's concept of software, we first need to define what a "software" or, more specifically, an "algorithm" is.

The word "algorithm" has a controversy surrounding its origin (Coelho, 2018). Some sources indicate that it derives from the Latin "*algorithmus*", which in turn comes from the Greek "*arithmos*", while others associate it with the Persian mathematician Al-Juarismi. In any case, the conception of the term arose from the mathematical need to name a set of discrete and finite rules or instructions for solving a problem.

This conception of an algorithm is applicable to many everyday things, from a cooking recipe to washing machine instructions. Therefore, we need to refine this definition further to bring it closer to machines that embody our algorithms that will allow augmented anthropology: robots.

The algorithms running on robots have been written by individuals in a specific computational language. In the case of robots, they are commonly written in high-level languages such as Java, Swift, Python, or C#;[1] however, the range of available languages is extensive. Therefore, algorithms in this context are sets of finite, ordered instructions for an electronic device to execute and solve a problem.

Applying this definition of an algorithm yields three direct implications. The first is that algorithms, as such, are social constructs (Seaver, 2019, p. 413), although paradoxically they tend to be considered universal and impartial (Cañedo Rodríguez and Allen-Perkins, 2023, p. 4), much like mathematics. The second implication is that algorithms arise from the need to solve a problem. The last implication is their performative nature (Cañedo Rodríguez and Allen-Perkins, 2023, p. 4), as the algorithm is executed, taking shape in the process.

The concept of an "algorithm" undergoes a profound transformation in people's daily lives, moving away from the traditional notion of finite instructions that solve problems. Instead of a universal mathematical concept, the algorithm takes on the quality of what Peter Sloterdijk calls "foam" in his work "Spheres" (2004). These foams represent multifocal and dynamic entities that adapt and change as they share membranes with other spheres. It is a concept characterised by its diversity, connectivity, and irregularity, reflecting the complexity of underlying social constructs. Through this reinterpretation of the algorithm, the technology encompassed in this work becomes foams of relationships (Widmer and Klauser, 2020), memories, and experiences.

The idea of understanding certain phenomena related to algorithms as "assemblages" (Deleuze and Guattari, 1988), supports and enriches this notion of Sloterdijk's foams. These assemblages are heterogeneous, in constant processes of creation and reconfiguration. Like foams, they are territorial in the sense that they are anchored in specific cultural contexts but are also relational, as they thrive on interactions among individuals and diverse cultures. They are inherently diverse, reflecting the multiplicity of constructs and experiences converging in algorithmic agency.

We are particularly interested in analysing the three implications of algorithms in this work, given their political dimension as performative social constructs and the potential applications promised by augmented anthropology. In some cases, throughout this document, we will use the word "algorithm" to simplify the set of algorithms at play in augmented anthropology.

The spatial inscription as foams and assemblages of the robo-ethnographers plays also a key role when interacting with the participants. Not only in the spatial dimension, but also in the temporary scale where it unfolds its essence. In short, it is about sharing and "understanding" this "personal and social space" (Garcia-Salguero et al., 2019).

As in mixed reality, in augmented anthropology we are creating a landscape of different entities, both human and nonhuman performing ethnography and anthropology study. This landscape is created

[1]We will assume that the language used is abstract within augmented anthropology, although the study of the influence of each specific language on the algorithms produced advances our understanding of their scope and agency, a topic that can be investigated in future research.

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by overlapping different dimensions and landscapes, also from different perspectives, which is why we call this paradigm *augmented*, because it allows us to expand the boundaries to be recognised as *human* and the boundaries of the landscape.

5. UNCANNY VALLEY IN AUGMENTED ANTHROPOLOGY

In the first chapter of "The Nuer", Evans-Pritchard explains how difficult it was to get into the Nuer-land life for a white man. How we perceive people through their phenotypical traits is very similar to how we may react to the physical appearance of a robot.

In this sense, the so-called Uncanny Valley is well known, which states that the more a robot resembles a human, until that robot is identical to a human, or very nearly, the more we are uneasy about its presence. There are numerous studies in favour and against this effect.

To discuss this in depth, perhaps we should first define what it means to be human-like, to resemble humans. Whether this includes only physical appearance or also behaviour, which can vary diametrically depending on the contextual culture of the subject. In any case, it is clear that the robot's appearance and behaviour play a key role in the production of ethnographic data through machines.

Taking the robot as technological, a domain separate from the human domain, starts from the premise that technology is alien to us, when it is nothing more than an expression of culture. This implies that technology is an extension of the human, that the human is eminently technological or machine-like. So, in order to understand the processes of agmented anthropology, it is obviously necessary to understand on an ontogenic level why we produce this separation between humans and machines.

This ontology is purely relational; we generate robotic otherness through the generally unequal relationships we have with machines. As Latour's actor-network theory explains, approaching robots as nodes in a set of pre-existing networks (1996, p. 8), as actors and not the bearers of a symbolic projection (Latour and Zadunaisky, 2008, p. 26), we can strip robots of their purely technological essence and bring them into a heterogeneous branch of a rhizome and turn them into participants in the course of action. In this way, we can understand that robots and humans are not separate entities, but are in a process of constant co-creation (Balasescu, 2020, p. 3); *humans* and *nonhumans* merge (Hasse, 2022, p. 146). Robots and machines also generate images and narratives about what it is to be human. In the words of technology philosopher Don Ihde, we create our technologies and our biases, but in putting them to use, technologies reinvent us as well (Ihde, 2012, p. 243).

As robots are part of the narratives about what it is to be human, they are extremely influenced by gender. Gender appears during the interaction between humans and robots. It can appear in two ways, as a driver of the interaction, since it can vary on the gender of the human who conducts that interaction but also in the sense that we can associate a gender to the robot. In this way, the gender that we perceive is a key part of the uncanny valley process. Robots that are not gendered, are perceived in different way that robots that are gendered in a binary way between male and female. W also have the problem of the lack of women in technology domains (Sorenson et al., 2019, p. 215), which means that robots are mainly built by men, so Uncanny Valley and all the processes that involve the *human* perception of the technological domain are biased by genderification. The same type of analysis is valid for racialisation of robots. While in many representations the "generic robot" appears to be white, race suddenly becomes hyper-relevant in the case of sex robots. This is an entirely different topic, but it is perhaps important to constantly be aware of intersectionality and bias when we relate to robots, both as users and as ethnographers.

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6. APPLICABILITIES

Now that we have presented how augmented anthropology can be developed, the question arises as to how and where it can be applied.

We are going to discuss through this section different scenarios where augmented anthropology can be applied.

6.1. Haptic or avatar ethnography

Haptic ethnography means to perform ethnography through a physical entity remotely, while that entity is resembling us and experiencing what we should be experiencing. We can assume that our knowledge of the world can only come from some form of perception (Ingold, 2000, p. 243). Haptic ethnography is a paramount example of the use of augmented anthropology. This way we augment the capabilities of environment perception through sensors, actuators or vision.

Haptic ethnography leads in avatar anthropology, anthropology developed by using a robotic avatar. A robot that appears as us in the field. Haptic ethnography is the major point of interest of this augmented anthropology, it not only combines the human with the nonhuman, but allows us to embody the nonhuman through telepresence. Remotely operating a robot, feeling what our avatar feels, sounds like a science fiction movie but it is indeed a real option for the near future.

How can we perceive the environment? Light and sound are the undersides of the experiences of seeing and hearing (Ingold, 2000, p. 245). This gives us the clue that in order to carry out this haptic anthropology, the fundamental part of telepresence is not to replicate sounds or lights, but to be able to transfer the experiences of perception.

Avatar anthropology enables the anthropologist to feel those everyday embodied experiences of hearing, seeing, touching and feeling, conjunctions of sensation and emotion that cannot arise without the physicality of the body through a robotic interface. The ethnographer embodies the experiences of the robot (Paterson, 2009, p. 768). Kianesthesia, the sense of movement, proprioception, the sense of bodily position, the vestibular system, the sense of balance through haptic sensors in fusion along with visual perception allow us to obtain, the visceral information, the thick data that we discussed earlier.

6.2. Space exploration, polar missions and nuclear radiation risk areas

The adaptation to the environment – cold, arid, jungle or high-altitude climates – of our species has been carried out fundamentally through culture, starting from adaptation as a continuous adjustment of internal relationships to external ones, highlighting the maintenance of balance between living beings and their environment. Prosser offers a definition of adaptation appropriate to the project of human settlement in space:

> The ability to live in an environment not occupied by the ancestors indicates that adaptive evolution has occurred. The essence of evolution is the production and replication of adaptive diversity.
>
> (Prosser, 1986)

These first extraterrestrial populations will be made up of scientific, technological, engineering, wealthy, high-ranking politicians and business-people and, in general, people from countries of the

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so-called "developed" world. This first scientific population will have to evolve. The changes would largely place humans and evolution at the centre of human space settlement, moving away from technocracy and toward a space settlement paradigm based on evolutionary and adaptive principles that have served for long-term success in many terrestrial life forms (Smith, 2019). Thus, taking into account that in this medium term it will not be the *human* anthropologists who will participate in the first trips and that, according to ISECG (ISECG, 2020), the first stage of exploration will be dominated by robots, it makes sense to think that the first ethnographies will be conducted in a augmented mode with data produced in a delocalised way and localised data produced by robots. In this sense, it makes sense to wonder whether machines will ever feel that otherness and need to reassert their identity in the same way that humans do (Balasescu, 2020, p. 4).

Space travel implies rethinking humanity. If technological development is considered intrinsic to humanity, cases such as Artificial Intelligences creating Artificial Intelligences (Ananthaswamy, 2022) could give rise to a meta-humanity. It would seem convenient to say that these second AIs would be created by humans because they are the ones who created the first AIs, as a sort of divine simile with the Human Being as the ultimate creator.

One of the likely scenarios is that in the medium term ethnographic data will be produced by robots and AI. This, in addition to rethinking humanity, also implies rethinking Anthropology as a discipline and including robots within this "*anthro*", leading to a need to turn robots into intelligent agents with no ontological difference from astronauts (Ocón et al., 2022, p. 5).

Following the "*Ubuntu*", we would have "members" of a community created from the community relationship itself, regardless of their organic status. In a certain way the "*Ubuntu*" implicitly bears that relational ontology that allows us not to essentialise robots as technological or artificial entities alien to humanity.

In a similar way to space exploration, augmented anthropology can be applied to study nuclear situations, scientific polar missions and other far-side scenarios.

During scientific polar missions, ethnography can help us to understand and plan how the scientist perform their activities and how they interact with each other. Some of the scientist that enrol in these missions, experience episodes of anxiety. Augmented ethnography can help us to manage not only the human resources but also their health and safety while adding value to our understanding of what we need to explore polar missions.

Nuclear scenarios are a new challenge for anthropologist since the risk of nuclear radiation prevents humans from investigating these places. As in space exploration, studying life at radiation spots requires performing augmented ethnography.

Through augmented anthropology, ethnographers are able to access to radiation risk places without a real risk to the ethnographer and also other agents involved in the study. In addition, augmented anthropology can help us in our work to understand a nuclear winter from the anthropology perspective (Bumsted, 1984).

6.3. War

Integrating augmented anthropology within the realm of warfare necessitates the implementation of innovative strategies, finely attuned to the exigencies of conflict (Callahan, 2015). This progressive approach introduces avatars as versatile instruments, effectively curbing the associated risks and financial burdens inherent in anthropological investigations amid the turbulence of war.

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Augmented anthropology, as a visionary paradigm, unfurls its wings to encompass a realm of unprecedented possibility. Through the incorporation of avatars, researchers navigate uncharted terrain, transcending the conventional boundaries of direct engagement to simulate intricate battlefield scenarios. This digital theater becomes a crucible of exploration, a place where the choreography of warfare unfolds without the harrowing crescendo of actual combat, offering fertile ground for dissecting the tapestry of war's dynamics.

However, augmented anthropology is not confined to the corporeal domain of warfare; it delves into the very essence of human experience. Its lens penetrates the psychological, social, and cultural strata of conflict, unveiling the enigmatic forces that drive people to wear the mantle of a soldier and engage in the crucible of combat. As the virtual tapestry weaves, anthropologists explore the labyrinthine corridors of the human psyche, unravelling the threads of coping mechanisms and resilience that soldiers weave in the aftermath of battle.

Moreover, the advent of avatar robots heralds an era of unbounded exploration. These emissaries of the digital realm traverse the landscapes of diverse cultures and societies, capturing the echoes of war's impact and the diverse ways in which communities grapple with its aftermath. These avatars, unencumbered by the limitations of physical form, traverse this realm of immersion, providing researchers with a kaleidoscopic view into the multifaceted dimensions of war's imprint on both individuals and societies.

6.4. Ethnography in context of social anxiety

Many studies prove that people with social anxiety disorders often feel more comfortable in presence of robots rather than humans (Nomura et al., 2020; Suzuki et al., 2021). It can be influenced by the fact stated before that Uncanny Valley is a process related to gender and also related to a common narrative of what is to be human.

Some people tend to be more comfortable approaching robots than approaching humans. Humans, as machines, tend to get lost in grand narratives by getting lost in liminal cases, which can cause us to lose perspective on different forms of behaviour and emotion expression in contexts of social anxiety.

Robots can provide a more objective and less intrusive form of data collection due to the apparently lack of emotion. Robots can be programmed to ask questions and collect data in a less-biased manner (of course considering the biases introduced by programmers), while people may be influenced by their own personal biases and preconceived notions. Robots can also be used to collect data in a more private setting, which can be important for people who are dealing with social anxiety. Robots can also be used as avatars to seize its capabilities and ensure that the people with social anxiety disorders are comfortable.

6.5. Metaverse

Within the ever-evolving landscape of augmented anthropology, a fascinating avenue emerges at the crossroads of culture, technology, and virtual reality: avatar-based ethnography in the metaverse. The metaverse, a sprawling expanse of interconnected virtual realms, offers a captivating arena for anthropologists to delve into the intricacies of human behavior, social dynamics, and identity formation within digital frontiers.

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This innovative approach to ethnographic research takes shape through the embodiment of virtual avatars, digital manifestations that serve as extensions of human presence and agency. Unlike traditional ethnography, where the researcher is an observer of physical interactions, avatar-based ethnography navigates a realm where these interactions unfold within the ethereal confines of immersive 3D spaces. This transition from the physical to the virtual realm introduces a profound shift, challenging anthropologists to adapt their methodologies to the digital intricacies of the metaverse.

In the metaverse, avatars become the vessels through which anthropologists venture into uncharted sociocultural territories. These avatars enable researchers not only to observe the inhabitants of virtual worlds but also to actively engage in dialogues, activities, and experiences that mirror real-world interactions. This immersive participation presents a unique lens through which to glean insights into the cultural norms, social hierarchies, and communicative nuances that shape the metaverse's tapestry.

As anthropologists embody avatars and traverse this expansive digital landscape, they encounter a diverse array of identities, each meticulously crafted by metaverse denizens. Some avatars faithfully mirror their creators' real-world personas, while others diverge significantly, granting individuals the freedom to experiment with new facets of their identity. This fluidity challenges researchers to dissect the complex interplay between self-perception, identity projection, and the influence of virtual environments.

Avatar-based ethnography in the metaverse thus represents an evolution of traditional anthropological methods, a convergence of the tangible and the digital. It invites us to reimagine the boundaries of cultural exploration, prompting profound questions about the nature of human interaction, the malleability of identity, and the impact of technology on society. As anthropologists traverse the intricate terrain of the metaverse, they illuminate the multifaceted relationships that interlace humanity, culture, and virtual existence.

6.6. Education

In the realm of education, the integration of augmented anthropology has the potential to substantially elevate the learning journey, offering students multifaceted engagement with culturally enriched contexts and scenarios. This immersive approach has the power to ignite curiosity and deepen comprehension by allowing learners to virtually traverse historical epochs, vibrant cultures, and intricate social dynamics. Yet, in this pursuit, ethical considerations loom large.

A paramount ethical concern revolves around the protection of privacy and the safeguarding of data integrity. As the augmented experience relies on personal information for tailoring educational content, a robust framework must be established to ensure the confidential and responsible handling of sensitive student data. Striking the right balance between customisation and privacy preservation will be critical in gaining trust and promoting the responsible use of augmented anthropology in education.

Moreover, an equally weighty ethical facet involves the potential consequences of technological reliance. While the augmented approach undeniably enhances engagement, it must be meticulously regulated to avert the inadvertent erosion of fundamental human connections. Balancing the dynamic allure of virtual interaction with the intrinsic value of face-to-face engagement is paramount to preventing the diminishment of students' interpersonal skills and their capacity to appreciate the unscripted intricacies of cultural diversity.

In essence, augmented anthropology in education bears the promise of transcending traditional pedagogical boundaries. By fostering a nuanced understanding of humanity's intricate tapestry and offering learners an experiential encounter with cultural narratives, this innovative approach can shape

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empathetic global citizens. Yet, to fully embrace these benefits, a vigilant commitment to ethical guidelines that prioritise privacy, data security, and a balanced technological embrace must be upheld. This way, augmented anthropology can unlock transformative educational vistas while ensuring that the essence of human connection and appreciation for cultural diversity remains unshaken.

7. ETHICAL IMPLICATIONS

In the previous sections, we have already touched upon the issues associated with the use of algorithms and robots in augmented anthropology. In this section, we will delve into these issues, aiming to understand the mediation and agency of technology, and explore the ethical implications that may arise.

First and foremost, the dilemma arises when assuming the impartiality of algorithms or technologies that mediate our anthropological endeavours (Cañedo Rodríguez and Allen-Perkins, 2023, p. 4). Alienating humanity behind technology implies attributing to it a semi-divine status, portraying it as something invisible, creative, omnipresent, and omnipotent, when, in reality, it is nothing more than the translation of human actions and social constructs into a programming language. When employing augmented anthropology, we are observing through numerous overlapping diverse lenses. It is crucial to be aware and discern the elements of the scene that are relevant to our research while also identifying any biases that may distort our results.

During the use of robotic avatars, these biases do not manifest as inherent characteristics, but can be introduced and performed as physical abilities that we can enact through the robot. For instance, systems may not be adapted for functional diversity, or there could be a lack of elements that can be used by all anthropologists.

When using these avatars, the identities assigned to the avatar can sometimes be contradictory (Latour and Zadunaisky, 2008, p. 40), potentially causing tensions in the space where the avatar embodies our actions. This can have significant repercussions, for instance, in their use in education and interactions with children or when conducting fieldwork in areas of armed conflict.

Furthermore, the exploration of space may entail a transfer of colonial dynamics to outer space. Using augmented anthropology in outer space studies involves understanding these dynamics and incorporating them into our analytical categories. Just like colonial dynamics, augmented anthropology, as a foam, will be in contact with various political and social spheres with which it must co-create, as it is inherently political.

In using augmented anthropology, it is crucial to be culturally sensitive in different settings. This means understanding and respecting the specific customs and traditions of each community. By doing so, anthropologists ensure that ethical and effective research genuinely reflects the diversity of human experiences. This emphasis on cultural sensitivity will strengthen the quality and reliability of the research outcome of augmented anthropology.

Finally, the data management carried out using both augmented anthropology through avatars or physical devices faces the same issues as its use in virtual environments like the metaverse. The vast amount of data analysed by algorithms, known as Big Data, must be handled ethically, with consent, ensuring compliance with national regulations to prevent the exposure or leakage of protected or sensitive data. In this regard, avatar-based ethnography on the metaverse or persona-communities can suffer from the same problems as augmented anthropology through “physical” robots.

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The ethical challenges and dilemmas intertwined with the field of Augmented Anthropology demand a comprehensive and meticulous examination. As such, it is imperative that we commit to a more extensive exploration of these ethical complexities in a forthcoming research endeavour. In the current context, we are establishing the fundamental principles and framework that will serve as a solid foundation for this future analysis. By doing so, we aim to pave the way for a deeper and more nuanced understanding of the ethical implications and considerations inherent in the practice of Augmented Anthropology.

8. LIMITATIONS

Certainly, there are several limitations to consider when employing Augmented Anthropology. Indeed, these limitations are closely tied to the intrinsic use of technology in augmented anthropology, which encompasses various elements such as mixed reality, robotics, avatars, the metaverse, and more. The integration of these technological components presents both exciting opportunities and significant challenges for researchers in the field. Balancing the advantages of technological advancements with the complexities they introduce is a key consideration for practitioners of augmented anthropology.

The first limitations appear when talking about access and inclusion. Not everyone may have access to the technology or infrastructure required for meaningful participation in augmented anthropology. This could lead to exclusivity and the potential exclusion of certain groups, introducing biases and potentially reinforcing existing disparities.

As introduced before, avatars and robots may inadvertently carry biases from their creators or the data used to train them. These biases can influence the research results and the way that anthropologists perceive the subjects of their study and with the inclusision with both researchers and subjects of study.

In terms of inclusion, it is also a limitation the physical engagement as Virtual avatars and robots cannot fully replicate the physical engagement and sensory experiences of traditional fieldwork. This limitation can affect the depth of understanding and cultural immersion in the research.

Regarding the technological aspect of augmented anthropology, it is crucial to consider the technical and logistical limitations that these techniques may encounter. While we've discussed working technologies so far, it would be naive to assume that this state of affairs is the norm. Technology is prone to glitches and problems that can occur intermittently, potentially rendering the produced data unreliable.

Moreover, technology may not always be readily available or could entail high costs, potentially leading to its use primarily in well-funded projects, thereby exacerbating the digital divide. Additionally, it's essential to review the legal frameworks of the territories where these technologies are intended to be used to ensure compliance with all relevant regulations and avoid legal complications.

These technical and logistical limitations underline the need for robust planning, troubleshooting mechanisms, and careful consideration of the availability and affordability of technology in augmented anthropological research. Researchers must be prepared to address and mitigate these challenges to ensure the success and validity of their projects.

In addition, we need to face the loss of authenticity and cultural sensitivity. Augmented anthropology need to face challenges in maintaining the authenticity of interactions since subjects may behave differently when they know they are interacting with avatars or robots while we need to consider the cultural sensitivity and appropriateness in these interactions.

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Collaborating across disciplines is crucial for augmented anthropology. If there is no space for interdisciplinary dialogue, limitations may arise due to a lack of perspective when applying augmented anthropology. Therefore, interdisciplinary collaboration is necessary, working with experts from different fields who can bring a dynamic approach to address the numerous challenges in this evolving field.

In augmented anthropology, it is not just about engaging in dialogue with experts from other areas; involving the public and education are crucial. Sharing information with diverse communities is essential, although it is important to recognise some limitations. Not everyone may easily understand the complexities of augmented methodologies, and resources for education can be limited. Despite these challenges, connecting with the public helps bridge gaps, encouraging a responsible integration of augmented anthropology into our communities.

Considering the environment in augmented anthropology means looking at how technology affects nature. This involves thinking about the production and disposal of electronic devices and the energy used in augmented research. When using technology in the field, it's crucial to be mindful of not disturbing local ecosystems. These environmental considerations ensure a responsible and sustainable use of technology in anthropological studies.

Finally, the long-term impact of augmented anthropology on the discipline and the communities studied is not yet fully understood. It is crucial to assess in an interdisciplinary way how these technologies may shape anthropology's future.

Navigating these limitations is essential for researchers in augmented anthropology to ensure the ethical and methodological integrity of their work and to contribute meaningful insights to the field.

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9. CONCLUSIONS

Augmented anthropology is proposed as a mix between conventional Anthropology and Machine Anthropology. This approach can help us to perform ethnography in many different situations as we are able to perform it now. Sharing spaces with different entities and sharing this spaces at the same time in different dimensions augments what it means to be *human* and help us anthropologist to produce thick data and add value to our ethnographies.

Anthropologist need to consider future robot life in our current studies. Augmented anthropology is an intermediate step between the current applicabilities of machine and conventional anthropology and our imaginations of the future. Robots are drawn through the collective imagination as an evolution of human intelligence and consciousness, both friend and foe. And it is through robots that a new form of anthropological knowledge can be developed. It also allows us to understand the relationship between our concept of humanity through this nostalgia for the future. In that imagined future, robots and AI resemble humans in such a way that it is difficult to distinguish whether a robot is really a *robot*.

Robots as avatars have the potential to revolutionise anthropology by providing increased accessibility, improved accuracy, and reduced cost. However, there are still technical and ethical challenges that must be addressed before robots can be used as avatars in anthropology. Further research is needed to explore its potential use and develop solutions to the challenges they present. Ultimately, robots as avatars offer a promising opportunity to expand the reach of anthropology and to further our understanding of the human experience.

A proof that the *nonhuman* is becoming more and more similar to the nostalgic idea of human is that the above paragraph was written by OpenAI's GPT-3 (Brown et al., 2020). The difficulty in distinguishing whether the previous paragraph was written by us or generated through GPT-3 leads us to the clear conclusion that what we recognise as a human being is nothing more than a product of our culture, just as it is the conception of robot or nonhuman, when we are in a process of continuous co-creation. Furthermore, robots that perform ethnography raise a considerable number of ethical questions such as discrimination, bias, or nonscientific purposes, among others. In particular, the question of the authorship of this augmented anthropology arises, since it supposes a *co-created* anthropology.

Augmented anthropology represents a transformative turn in the very identity of our discipline, as it integrates advanced technologies such as robots, avatars, virtual spaces, or mixed reality, redefining traditional person-centred approaches. This fusion transcends conventional boundaries, creating an interstitial anthropology by ushering it into the realm of the digitally augmented. It is the synergies of participant observation, engagement, and cultural interpretation mediated alongside algorithmic precision that lead us to reevaluate the anthropologist's role and promote interdisciplinary adaptability. This is how the anthropologist's identity evolves from an observer to a collaborator with machines, co-creating anthropological knowledge. As the discipline embraces technological changes, a metamorphosis occurs, adopting a hybrid identity that reflects sociocultural shifts and is nothing more than the unfolding essence of humanity.

This hybridisation allows us to preserve cultural heritage in different ways than before. Augmented anthropology not only enables the generation of more data but also facilitates the storage, reproduction, and transmission of this data in diverse manners. As anthropologists delve into the digital augmentation of human experiences, the potential to capture and immortalise various cultural legacies multiplies. The level of integration (or disintegration) with technology provides a more immersive and accessible experience, allowing individuals across terrestrial and more-than-terran (Olson, 2023) spaces to virtually engage with cultural practices that were previously distant or even at risk of extinction. Consequently, digital tools become invaluable instruments for transmitting cultural knowledge through augmented anthropology. However, this requires continuous ethical considerations to avoid distorting cultural narratives, addressing ownership issues, preventing moral harm, and resolving representation problems.

The long-term sociocultural impacts of augmented anthropology go far beyond the necessary technological advancements; they influence how communities engage with their cultural heritage. Integrating robots as avatars and augmented methodologies has the potential to reshape cultural expression and identity formation. Augmented anthropology contributes to understanding the relationship between humans and more-than-human entities. Its impacts extend not only to our discipline but also to space exploration, political sciences, education, and psychology, creating a space for interdisciplinary exploration.

Future research in augmented anthropology should maintain a persistent emphasis on ethical considerations, necessitating continual review and enhancement of ethical guidelines. Key areas of focus include addressing issues related to representation, consent, biases, potential impacts on minority groups, and potential legal challenges. Additionally, there is a call for a concurrent focus on educational initiatives involving the development of programmes and resources to equip anthropologists with essential skills for augmented anthropology. This educational emphasis extends beyond anthropologists to encompass policymakers, educators, and the public, fostering a dialogue that contributes to the advancement of augmented anthropology. Furthermore, interdisciplinary conversations among scholars, professionals, and broader communities are essential, providing spaces for open discussions

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on the ethical, methodological, and societal dimensions of augmented anthropology. This approach will ensure the responsible and ethical evolution of the field.

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