Culture Is Not What You Think It Is: Diversifying the Foundations of Cultural Robotics

Mark L. Ornelas, Gary B. Smith, and Masoumeh Mansouri

Abstract— **Culture is a fundamental constituent of the human social environment, and as human-robot interactions are becoming more common, roboticists are increasingly examining how culture intersects with robotics. However, the current treatment of culture in the robotics literature is largely limited to the definition of culture as national culture. This is problematic for a number of reasons: it ignores subcultures and cultural dynamicity, it excludes refugees and stateless persons, and is often simplified to nationality, which fails to isolate culture from politics and economics. We propose to widen the understanding of culture within robotics to encompass the emergent nature of culture and the wide range of definitions of culture within the social sciences.**

I. INTRODUCTION

The concept of culture and what constitutes it can be interpreted in many different ways. Some immediately think of languages or countries, others may use it to refer to books or films. Many academics have attempted to formulate the concept of culture. The book "Redefining Culture" [1] lists 313 definitions from different disciplines ranging from psychology, linguistics, anthropology and political science to philosophy, to name only a few. However, when it comes to introducing "cultural thinking" to social robotics, this concept is commonly reduced to one and only one interpretation: nationality. This paper argues against this and proposes several alternative avenues for research at the intersection of culture and robotics.

In a recent review article, Lin et al [2] analysed 50 studies on the intersection of culture and social robotics, where culture was understood as "culture as national culture — values, norms, and practices that are undertaken by a country". Although it was the authors' intention to focus on this particular interpretation of culture, to the best of our knowledge, there is almost no other work in social robotics looking at culture from a different view. In general, we can look at culture within robotics from two important perspectives: culture in specific interactions, and the interplay between culture and robotics at a wider scale. Within specific interactions, the primary concerns of roboticists centre on the leverage of cultural knowledge in the production of intelligent behaviour in interactions with humans. At a wider scale, the key concerns are the impact of culture on perceptions of robots, trust, and the reciprocal impact robots have on the cultural environment in which they are situated. The current definitions and assumptions of culture presently used in robotics are problematic from both of these perspectives.

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M. L. Ornelas. is with the University of Cincinnati, OH, USA and affiliated with the School of Computer Science, University of Birmingham, UK (e-mail: ornelamk@mail.uc.edu)

G. B. Smith is with the Edinburgh Centre for Robotics, Heriot-Watt University and the University of Edinburgh, Scotland, (e-mail: s0946969@sms.ed.ac.uk)

M. Mansouri is with the School of Computer Science, University of Birmingham, UK, (e-mail: m.mansouri@bham.ac.uk)

II. WHAT IS WRONG WITH CULTURE AS A NATIONALITY

A. Culture is often erroneously equated with nationality

A common theme in social robotics papers that reference culture is the investigation of perceptions of social acceptability and trust of robots. Many authors rightly identify culture as a key factor influencing perceptions of robots. To investigate this authors typically include in their experiments participants with a variety of nationalities, assuming that this is sufficient to show the influence of culture. Underlying this is the tacit definition of culture as nationality.

Even if we accept a definition of culture as national culture, the above move is still unconvincing. Supposing that including participants with different nationalities illustrates the influence of culture on experimental results assumes that culture is the only causally efficacious component of belonging to a certain nationality. In fact, the interactions that a person with a certain nationality has with a robot can be influenced by factors aside from culture. For example, the economic and political circumstances in a particular country. In essence, equating culture with nationality fails to isolate culture as a contributing factor in perceptions of robots.

B. Ignoring subculture and dynamicity

The current emphasis on national culture also ignores subcultures. Subcultures are groups that off-shoot from a larger group and form a more specific identity within the broader group. For example, England has a national English culture, but Manchester has a specific city culture that differentiates it from Leeds, Newcastle, or Bristol. Even within Manchester, other specific cultures arise, such as the cultural norms and chants that distinguish Manchester United from Manchester City football supporters. Within each subgroup a sub-culture develops with its own norms, rituals, language, attitudes, and customs.

The focus on subcultures changes the emphasis on how large groups generally differ from one another and focuses on how individuals and groups relate to each other. Recent work on personal identity makes a similar shift where individuals report that large macro-cultures are not sufficient to explain or categorise their individual experiences.

Only recognising national culture and neglecting subculture constitutes an important knowledge gap that must be plugged if a robot is to produce behaviour that is culturally consistent with and recognises the diverse groups that live in our society.

C. Stateless persons and refugees are excluded by definition

Confounding culture and nationality not only ignores marginal cultures within a nation-state, but also fails to recognise those that fall outside of the definition of nationality, e.g., stateless persons and refugee seekers. The consequence of this exclusion is to pave the way for future social robots that serve an already privileged few.

III. Diversifying the conception of culture in robotics

Given that the assumptions made about culture in the existing literature are inadequate, what do we do about it? One way is to advance the field by considering diverse definitions of culture from a range of disciplines and including contemporary theories of social cognition, for example. Šabanović et al. [3] introduced the concept of culturally robust robots in a critical response to the use of culture in social robotics. This concept is based on the co-construction of culture and scientific practice and technology design. This paper complements the concept of co-construction by considering culture as an emergent phenomenon. In the following, we explain the concept and how it contributes to diversifying interpretations of culture.

A. Culture is an Emergent Phenomenon

When we consider definitions of culture that go beyond national culture, it becomes clear that culture is not simply a collection of facts in a knowledge base or set of norms that guide behaviour. Instead, culture is a phenomenon that emerges from interactions between agents. This is particularly apparent when we view definitions of culture through the lens of contemporary theories of cognition such as predictive processing and ecological psychology [4].

By emergence we mean a phenomenon that is composed of several members or parts that is more than the collective whole. Essentially, something emerges from the component parts that cannot be reduced to or identified by the component parts alone. We argue that culture should be thought of as an emergent phenomena, which is composed of individual members that create a collective 'culture'. This changes the view that culture is something that is easily bounded, defined, or static and rather that culture is emergent from the dynamic interactions amongst individuals and within groups as a whole. Viewing culture as an emergent phenomena can benefit cultural robotics by changing how we study cultural norms and behaviour. Instead of abstracting norms and standards away from individual members and generalising to a group, we advocate looking at the interactions among individual members themselves. This places the emphasis on looking at patterns and styles of interactions and behaviours within individuals. In addition, if we take a subculture view, researchers can investigate the development, maintenance, rejection, and replacement of cultural norms.

The change, therefore, requires a discussion of adaptive learning capabilities of new or assimilating agents. Thus, the discussion about cultural robotics changes from one about cultural standards to an investigation on adaptive, dynamic cultural learning processes.

B. Adaptive learning capability

A critical aspect to any emergent theory is that the whole is greater than the sum of the parts, and for us, this is where a difficulty presents itself. Because we view culture as more than just individuals and single interactions, the methodological challenge of investigating such a phenomena becomes apparent.

Fortunately, existing cognitive science research into social cognition has methods that can serve as templates for this research. Ecological psychology and Dynamical Systems Theory, for example, are no strangers to emergent phenomena. Both emphasise a mutually constructed, sustaining, and informing relationship between agents and other systems (other systems being their environment or other agents). Agent interactions create a dynamic, coupled relationship with the environment. Social learning is a product of repeated failed and successful couplings. Social learning is, therefore, dependent on interactions and refining behaviours in a dynamic sense, which can be scaled up to broader social interactions within specific contexts.

Our position refocuses the research problem. Currently, the field focuses on how to design human-robot interactions that are culturally consistent human-human interactions. Our approach, however, allows us to think about artificial agents as mutually informing and participating in a process of cultural learning and development, rather than importing cultural knowledge into artificial agents. This allows us to focus on how interactions and learning from each set of interactions can lead to participatory knowledge of culture. This participatory knowledge is, we argue, the key to developing cultural robotics.

IV. Outlook

Diversifying interpretations of culture in robotics lays the foundation to address the key problem of what capabilities a robot should have to support the emergence of cultural behaviour. This also opens a crucial investigation on technical (AI) approaches to implementing the capacities necessary for this emergence. This will be the core of our future research.

References

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