

"Interaction" in a "Hybrid Society": A Terminological Footnote

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Abstract. The aim of this paper is to substitute sociologically more pertinent explanations for the popular sociology notions of "interaction" and "hybrid society". The scope and implications of these notions are discussed from a perspective of microsociology as applied to distributed artificial intelligence. The authors argue that only a precise use of the terms in specific disciplinary contexts is conducive to an adequate understanding of the studied subject-matter. The term "hybrid society" overstates the social consequences of the phenomena it sets out to describe and should not be used even in an everyday language context. The term "interaction" should be used in the sociological sense of the word and not as what is in effect a synonym for the new media term "navigation". Finally, it is suggested that the term "multiagent environment" is better suited to the discussions of agent interactions from a microsociological perspective than the term "multiagent systems".

1 Introduction

The term "interaction" appears to be one of the key terms in the numerous current applications of digital technology in different fields. For example, the entire field of what is referred to as "new media" (encompassing all its commercial, artistic, educational and science aspects) is usually defined as being "digital" and "interactive". The term has also been increasingly used with regard to the multiagent systems.

Connected with both "multiagent systems" and "interaction" is also the notion of "hybrid society" or "hybrid man-machine society", used in popular treatments of the subject and mentioned as such by Müller et al [6] in an introductory article on the Socionics project.

The aim of this article is to substitute sociologically more pertinent explanations for popular sociology use of the notions of "interaction" and "hybrid society", as applied to what is usually referred to as "multiagent systems" and to what the authors have elsewhere referred to as "multiagent environments" ([8], [10]).

It is our opinion that special attention should be devoted to the discussion of the term "interaction" in this context, not only within the framework of a workshop devoted to "Modelling artificial agents and hybrid organizations". A precise sociological account of the term "interaction" is in order here because the elements of social agency that come into view in multiagent systems extend far beyond the scope of the term "interaction" as used in new media.

The "interactions" that take place in multiagent systems cannot be taken to be synonymous with the term "navigation" (i.e. they do not represent a series of predictable software responses to the user's actions). Therefore, they require an explanation from a disciplinary perspective that can adequately account for their two-way character and the elements of social agency that they clearly reveal, regardless of the character of the agents involved (human agents or artificial agents).

Obviously, in what is referred to as "multiagent systems" there can appear two basic types of "interaction" between agents: a human agent - artificial agent interaction and an artificial agent - artificial agent interaction. Variations of the basic types are possible (e.g. human agent - human agent interaction via an artificial agent). Also, human agent - human agent interactions taking place in a "virtual environment" could be listed separately, because they could be felt to be somewhat different from the usual human agent - human agent interactions.

In the discussion of the allegedly emerging "hybrid society", interactions including human agents and artificial agents would obviously seem to be the most relevant ones. However, even in the case of interactions taking place exclusively among autonomous agents in artificial environments, such as the interactions described in Servant/Master scenarios [4], or the interactions of animated electronic puppets called Woggles [1], there appear elements clearly transcending the use of the term "interaction" as synonymous with "navigation". In these interactions, agents cease being merely actants and become actors in the sociological sense of the word [8]. Developments like these are bound to exert an influence on the human user, regardless of the fact that he or she do not always directly participate in them.

The status of autonomous agents as social actors in what has been tentatively described as "hybrid society" is perhaps even more obvious in the cases of interaction between human agents and artificial agents, such as the human agent and the purely textual agent ("cat Lyotard") interactions described in [2], and artificial agent ("Erin the bartender") and human agents ("bar clients") interactions described in [5].

However, from the point of view of sociology, "hybrid society" is an imprecise term, which itself warrants a brief terminological discussion. In this paper, the authors plead for a non-metaphorical use of such terms and for conceptual clarity conducive to a more profound understanding of social agency taking place in interactions in multiagents systems.

2 Interaction" or "Navigation"?

The term "interaction" is one of the key terms in sociology, and assumes a special significance in microsociological approaches such as symbolic interactionism. In contrast to the popular use of the term, which actually describes what is alternatively referred to as "navigation" in the field of new media, social interaction presupposes a reciprocal relationship, i.e. at least two people acting in relation to one another in a social context.

Sociological theories built around that term claim that the purpose of interaction is to have the other participant affected by it in some way. Interactions result in changes in both actors taking part in them. This is clearly not the case in "interactions" describing in effect a simple "navigation" of the human user through a new media product (a web-site or a CD-ROM, DVD, HMD). This popular use of the term "interaction" presupposes a contact between the human user and the machine (i.e. a software program), but both parties are obviously not affected by this contact in the same way. The software programs utilized in these everyday "interactions" remain completely unaffected by them: the program always responds to commands in the same way. Whatever changes in the perception of the social world result from these "interactions" always happen only on the side of the human user (i.e. only one participant in interaction is affected by them). This is what distinguishes the popular use of the term "interaction" from a sociological understanding of social interaction.¹

This distinction is highly important to note with regard to the multiagent systems, because what takes place in certain interactions between human agents and artificial autonomous agents, as well as between exclusively artificial (autonomous) agents, is "interaction" in the full sociological sense of the term. The behaviorally animated autonomous agents Otto and Gregor described in the Servant/Master scenarios [4], as well as the textual autonomous agent cat Lyotard interacting with the human user ([2]) base their actions and modify their behavior (social agency) in relation to the information extrapolated from the actions of the other participant in the interaction. The reciprocal relationship influences their attitudes, expectations and actions. The autonomous agents in the Servant/Master interaction change their social status ("servant" becomes "master" and vice versa), the cat Lyotard changes its attitude toward the human user. In both cases, the change is based on what the other participant in the interaction does. Furthermore, the participants in the interaction

¹ In a recent article on "interactive art", a noted designer and programmer Andrew Stern has remarked that a great deal of what is referred to by such term is in effect "push button" art, i.e. art of the "click this, see that" kind, in which "the audience's input essentially triggers a pre-recorded piece of media to be displayed." Stern further claims that "[s]uch works have interactivity with no autonomy - essentially *reactivity*." [9] A deeper form of interactivity in a computer-based artwork can only be achieved "when artists combine the computer's capabilities of real-time autonomy and reactivity", i.e. "[b]y making the computer *listen* to the audience (the first half of reactivity), *think* about what it heard (autonomy), and then *speak* its thoughts back to the audience (the second half of reactivity)." This essentially parallels our distinction between the notion of "interaction" as "navigation" and the notion of "interaction" which comes closer to the sociological understanding of social interaction.

clearly possess the ability to understand what they are doing while they are doing it, which according to Giddens [3] is the basis for the constitution of social life.

The fact that the autonomous agents participating in these interactions are software agents programmed to emulate human behavior does not change the intrinsically social quality of the relationships emerging in them. This quality is further enhanced by the fact that autonomous agents, as opposed to software programs assisting the user's navigation in new media products, possess learning capabilities. When reset, a program that assists our navigation responds exactly in the same way as it had before it was reset. An autonomous agent, on the other hand, enters new interactions modified by what happened in previous interactions.

It is beyond doubt that even the experience of a simple navigation through a web-site or a DVD (referred to as "interaction" in popular use) affects the human user and his/her values, attitudes and cultural practices. These in turn influence his/her perception of the social world and are put to use in those contexts where interactions indeed take place. Perhaps it is in this sense that those who speak about "hybrid man-machine society" use the term. However, as has been said, "interaction" in the sociological sense of the word requires reciprocal actions of the two participants, i.e. can be defined as such only if the second participant also understands it in such a way that his/her actions complement the partner's and help achieve a common goal (which can be described as "social communication").

Interactions of this kind happen in the cases mentioned above (Servant/Master scenarios, cat Lyotard - human user interaction, artificial bartender - human bar clients interactions). Still, not even the latter two, which include both human and artificial elements, would warrant the use of the label "hybrid society". What we are dealing with here are individual interactions (in the sociological sense of the word) taking place in isolated environments in which there appear elementary social relations. Only a large-scale extension and accumulation of these relations (i.e. the construction of a complex network of relations) could lead up to the emergence of "society" in the full-fledged sociological sense of the word.

3 Hybrid Society" or "Hybrid Multiagent Environments"?

The terms "hybrid society" and "hybrid community" seem to be used in everyday language as wide descriptive terms applied to societies or communities composed of different cultures and/or races. Neither of the terms are used as technical terms in sociology.²

In contrast with this, the adjective "hybrid" figures prominently in computer science terminology, ranging from the historical use of the term "hybrid computer" to the recent introduction of the term "hybrid agent".³

² In the context of theoretical sociology, the term "society" itself is felt to be too general. It acquires a precise meaning only in relation to specific individual sociological theories or approaches. Since neither classical nor contemporary theorists make use of the term "hybrid society", it seems fair to say that it is at present not used as a technical term in the discipline.

³ According to the tenth edition of Merriam-Webster's Collegiate Dictionary, the term "hybrid computer" was introduced into American English in 1968 to denote "a computer system

The fact that the adjective "hybrid" is put next to the noun "society" in order to describe a "man-machine society" is indicative of the need to account for processes that are felt to be a significant influence on present-day social life. However, the popular sociology character of this use of the term also testifies to the fact that sociological explanations of computer-related phenomena lag behind the pace of the current technological development.

The authors of this paper are of the opinion that only a precise use of the terms in specific disciplinary contexts is conducive to an adequate understanding of the studied subject-matter. At the present level of development, the term "hybrid society" simply overstates the social consequences of the phenomena it sets out to describe and should therefore not be used even in a non-technical, everyday language context.

Instead of metaphorically expanding the social aspects of human agent - artificial agent interactions to the level of complexity warranted by the term "society", the researchers should come up with precise, non-metaphorical descriptions of the contexts in which interactions take place, as well as take great pains to adequately describe the character of social agency that comes to light in them.

It goes without saying that the discipline of sociology is theoretically best equipped to deal with this task. However, within the disciplinary framework of sociology, it is also important to choose the methodological perspective best suited to the nature of the task. In the case of trying to account for the social consequences of human agent - artificial agent interactions at the present level of their development, a microsociological perspective seems to be the only logical choice. It enables the researchers to concentrate on the social exchanges taking places in individual interactions without the need to (prematurely) account for as complex a structure as the whole of a society.⁴

This methodological choice entails a terminological adaptation not directly related to the terms "interaction" and "hybrid society", but necessary for a required non-metaphorical description of the contexts in which the studied interactions take place. These contexts are presently routinely referred to as "multiagent systems". We suggest that the terms "multiagent environment" and "hybrid multiagent environment" would be better suited for the purposes of a microsociological approach to the subject-matter.

In the term "multiagent system", the word "system" is used in its technical sense, to denote "a set of interdependent elements or parts that can be thought of as a whole". As such it is obviously applicable to simple "wholes" consisting of a definite number of "elements or parts". In a sociological context, the use of the same word ("system") presupposes a highly complex structure including a large number of rather

consisting of a combination of analog and digital computer systems" (1996, 567). "Hybrid agents" are "those whose constitution is a combination of two or more agent *philosophies* within a singular agent. These philosophies include a mobile philosophy, an interface agent philosophy, collaborative agent philosophy, etc." [7]. In both cases, the adjective "hybrid" successfully conveys the composite (two-part) origin of the phenomena it describes. The application of this adjective to the social phenomena is, among other things, problematic because society is always too complex to be viewed as an entity consisting of two elements.

⁴ Another methodological possibility would be the application of micro-macro approaches, which starting from social agency also tackle the issues of structure.

"intangible" elements ranging from norms, values, and attitudes to institutions and cultural practices. The use of the term intended to describe such a complex whole is not warranted by the present social consequences of agent interactions. In addition to this, in sociological theory, the term "system" is typical of the macrosociological approaches in which the system and its functioning are more important than individuals. As such, these approaches obviously cannot adequately describe the social aspects of agent interactions, in which the system is only fragmentarily present. It should be added that the word "environment" which we suggest be substituted for the word "system" in the term "multiagent system" is by no means characteristic of microsociological approaches. We use it only to denote the physical environment in which interactions take place. However, taken in this sense, the word "environment" is at least not at odds with the microsociological perspective: it is in a concrete, physical environment that a common "definition of the situation" (W.I.Thomas) takes place, regardless of whether this happens between two artificial agents, or between a human agent and an artificial agent.

The term "hybrid multiagent environment" can be used when one wants to stress the participation of a human agent and an artificial agent in an interaction. These interactions merge computer-generated and human environments (via an electronic device) into a unified "multiagent environment" whose composite origin warrants the use of the adjective "hybrid". The elements of a "hybrid" experience intuited by the users of the term "hybrid society" can therefore come to the fore without erroneously entailing the notion of a developed social structure.

4 Conclusions

In this paper, we have discussed the scope and implications of the popular sociology notions of "interaction" and "hybrid society" from the methodological perspective of microsociology as applied to distributed artificial intelligence. We have tried to substitute the sociologically more pertinent explanations for these notions and concluded that the term "hybrid society" should not be used even in an everyday language context. We have also concluded that the term "interaction" should be used in the sociological sense of the word to denote a reciprocal relationship forming between the actors, and not as what is in effect a synonym for the new media term "navigation".

In the closing section of the paper, we have suggested that the term "multiagent environment" is better suited to the discussion of agent interactions from a microsociological perspective than the term "multiagent systems". We have also suggested that the term "hybrid multiagent environment" could be used when one wants to stress the participation of a human agent and an artificial agent in an interaction.

We have engaged in this terminological discussion because we believe that only a precise use of the terms in specific disciplinary contexts is conducive to an adequate understanding of the studied subject-matter. Our starting point in this paper was the disciplinary perspective of sociology, which we feel has a lot to contribute not only to the study of how computer-generated phenomena affect humans and human society,

but also to what is sometimes perceived as the strictly technical issues in the field of multiagent systems. The complexity of what has taken place in DAI contexts over the last decade is such that it rules out any sort of methodological simplification.

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