You Are Who You Hang Out With: Agents With Dynamic Identity

(Extended Abstract)

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ABSTRACT

The presence of others as well as several other context's factors have an affect on the way someone is going to perceive oneself. Whether as unique and distinctive individual, or as part of a group with shared interests among its members, the perception of group membership is going to determine if one's behaviour is going to be influenced by one's personal identity or social identity. When a social identity is salient, people tend to cooperate more with members of their group, even when the group's goals differ from their own personal goals. In this paper, we introduce Dynamic Identity Model for Agents that provides agents with an adaptive identity and behaviour that is adjustable to the social context.

Categories and Subject Descriptors

I.2.0 [**Artificial Intelligence**]: General—*cognitive simulation*

General Terms

Human Factors, Design, Theory

Keywords

context-situated agents, dynamic identity, identity, socially intelligent agents, social identity

1. INTRODUCTION

One of the current focal points in building believable agents, has been the development of the agent's identity. Because of its influence in thoughts, feelings and behaviours, many researchers have been exploring the way it can impact the agent's processes and reactions. Two of the most common perspectives is through the implementation of personalities and more recently, culture's traits. While these approaches provide some consistent agent's behaviour, personality-driven or culture-based agents' identity remains unchanged across different social contexts, whereas in real life identity is not unchangeable and free of influences [8]. Instead, a person's

identity is dynamic as the expression of their individuality is dependent on the social situation the individual is in [3].

One of the most studied factors that have an impact on how a person perceives oneself, is the presence of in-group or out-group members. When people refer themselves as "Me" and "I" their expressed self is being defined by one's personal identity. When referring themselves as "We" or others as "You all", their social identity has become salient [5]. When the latter happens, there is a shift of a person's own motives and values from self-interest to group interests.

In virtual worlds, several scenarios can require agents to adapt their identity to their current social context. In that direction, we propose the Dynamic Identity Model for Agents.

2. DYNAMIC IDENTITY MODEL

The Dynamic Identity Model for Agents (DIMA) aims at providing agents with a dynamic identity that is adaptive to the social situation, while at the same time, influence by it.

According to this approach, instead of showing a fixed personality, the agent features a sub-set of characteristics that represents the part of the self that is currently salient on the agent. So in the model each **agent** has a **salient identity** that filters the characteristics that will determine the agent's decision; and a set of known **social groups** with the prototypical characteristics that defines each one of them.

In DIMA the agent is not only going to be able to express its individual identity, but also, for each social group an agent belongs, the agent will hold a social identity that can be expressed if the situation leads to it. As such, the agent's **salient identity** can have two different levels: it can be **social**, if an agent's group memberships becomes salient trough inter-group differentiation, or it can be **personal** when no social identity is salient. In order to represent these levels, both social and personal identities are defined by a set of characteristics - a representation of the agent's attributes that are going to be taken into consideration on the agent's decisions.

Each **characteristic** is defined in DIMA by a value, a measurable attribute, and can be one of the two types: explicit or implicit.

The **social context** the agent is in will have a great influence on how the agent will perceive itself and others. It will increase the likelihood of the agent behave according to its personal identity or to its social identity, and will also determine which type of identity is going to be salient. Several important social and cognitive factors are known to influ-

ence an identity salience [1, 2, 6, 4]. In DIMA, we represent these factors with a **theme**. Because our current focus is the presence of in-group and out-group members, the social context is also going to be defined by the set of **agents present**.

While looking at each other agents' characteristics which the theme defines as relevant, the agent calculates and perceives if it is in the presence of members with which it shares the same social group (**in-group**) or not (**out-group**). If the agent perceives itself as in presence of only in-group members, its identity is going to be determined by its personal identity. If the agent is in the presence of out-group members, its identity can be determined by a social identity.

According to [5, 7, 8], the salience of a particular social identity is determined by the interaction between how accessible in memory that social identity is to an individual (accessibility), and how well it fits the social context (fit) (see equation 1).

$$Salience_{(Social\ Identity)} = Fit * Accessibility \qquad (1)$$

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The **fit** between a social identity and the context the agent is situated is composed by two aspects: comparative fit and normative fit. Comparative fit is defined by the principles of the Meta-Contrast theory [7], which states that:

> "any collection of people will tend to be categorized into distinct groups to the degree that intra-group differences are perceived as smaller, on average, than inter group differences within the relevant comparative context", p.455, [8]

Normative fit refers to the content of that categorization and how well does it match with the characteristics of a social group from the agent's knowledge base.

In order to determine the fit of a social identity with DIMA, first the agent needs to define the social groups present in the context given the actual theme. All agents present, including the agent, are going to be clustered into categorizations, according to the relevant characteristics given by the theme. If the number of clusters is one, that means that the agent is in the presence of one social group. In this case, the agent will use its personal identity. Only in the presence of two or more groups, the agent proceeds in calculating the fit.

The process of **normative fit** informs the agent if it is in the presence of a social group that it already knows and had experience with, or if it is unfamiliar with. In case of the former, to calculate the comparative fit, the agent will use the prototypical characteristics from the social group from its knowledge base, in case of the latter it will use the prototypical characteristics from the actual group that it is in the presence of.

Calculating the **comparative fit** of a social identity (SI_i) is done according to the equation 2, where Alfa (α) and Beta (β) are weighting values for both distance and dispersion.

$$ComparativeFit_{(SI_i)} = \alpha(dist_{(SG_i, SG_o)}) + \beta(1 - disp_{(SG_i)}) \quad (2)$$

The **distance** *(dist)* between the agent's group (SG_i) and another group present in the social context (SG_o) is going to be measured by calculating the difference between the out-group prototypical characteristics and the in-group prototypical characteristics. Where the **dispersion** *(disp)* of

the agent's social group, is measured by calculating the average of absolute differences of all its members from the prototypical member of the social group. Both distance and dispersion are then normalized.

Social groups with higher fit have less clustering dispersion and higher distance from the other social groups.

Accessibility of a particular social group, reflects a person's past experience, expectations, motives, values, goals and needs [8]. Identities that have been used more times and displace more emotional valence are more accessible.

The salience of a social identity will be highest if both accessibility and fit are high. The higher a social identity, more impact will have on the agent's behaviour.

3. CONCLUSION

With DIMA is possible to create agents with a dynamic and contextual identity able to not only take in consideration themselves and others as a set of individuals but also as group members. Since social identity has a great impact in a large range of fields and settings we believe that DIMA could help in a wide variety of studies. One of the interesting applications are social dilemma situations since they present paradoxes of individual rationality where group interests are at odds with individual ones.

4. ACKNOWLEDGEMENTS

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