Gender diferences in the establishment of Social Relations

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Abstract

This thesis has as main objective the creation of autonomous agents, able to establish relationships with other autonomous agents using an innovative approach.

This approach contains a social role model, planning responses to actions according to the gender of the agent, popularity and the relationship between the agents.

The model is intended to be applied in a scenario of a holiday camp, where the user is a new student, which will be integrated in this environment with a set of sub-scenarios associated. These sub-scenarios include situations regarding the staging of a play, and a group of autonomous agents.

Keywords: Autonomous Agents, Intelligent Agents, Agent's Gender, Social Agents, Emotional Episodes, Popularity, Interactive Story

1   Introduction

Creating systems with emotional virtual agents has been a topic that has been explored successfully in various applications (FearNot! [1], Traveller [2]). However many of these systems have not explored the existence of behaviors according to the gender of the characters who claimed to represent.

When it comes to establishing relationships it is necessary to take into account that there are different levels, levels that depend on several factors. The fact that we identify ourselves with someone else, or that of our expectations about his own actions, are the factors that contribute the most to the establishment of those relationships [3].

The main problem that we want to study is how to create stronger social relationships between a user and emotional agents. According to the study done by Alen Wood, "people tend to accept behaviors according to what is expected" [3], behaviors according the expectations (stereotypes), allowing, the creation of stronger relationships with people from which derive these types of behavior, and as such the developed hypothesis plans to simulate social behavior according to gender stereotypes.

By   including the gender of   an agent in a model of this kind, can influence the types of emotions (happiness, sadness, anger), which are generated [4], that lead to emotions that are designed as prototypes, that result from

repetitive experiences (episodes) which are seized by the agent [5]. These episodes that will be taken into account, focus mainly on the difference between men and women, because socially, certain behaviors guide individuals, helping to take psychological and behavioral characteristics about stereotypes, highlighting certain differences between gender differences between different individuals, such as competitiveness and rationality to the male gender, and the sensitivity and affection to females [6] [7].

2 Background

Increasingly, gender differences are considered as social constructions [4], leading to various kinds of stereotyped views of an individual in a society.

The studies on this subject have been developed focusing on the role of man and woman in society, parallel to the new requirements that have occurred in society in relation to cultural values, causing inequalities between men and women are reduced [5] mainly with respect to stereotypes towards women.

This has a great importance because, as each individual has their gender from birth, whether express or implied, allows the individual to want to be part of a group and seek approval in that group, promoting the identity of its kind.

When we talk in terms of gender there is a large discrepancy between how each individual faces a competitive challenge, and the male subjects are more prone to cooperation in a group if there are other groups to compete, while the female gender individuals are not affected so easily by competitive events [8].

Another fact to be noted while analyzing the discrepancy behavior is the popularity of an agent. This feature indicates the ability of an individual to make friends and how you feel involved and desired in group activities [9].

The behavior of an individual with a high popularity depends largely on agent gender, in the case of females tend to only communicate with individuals who have higher popularity, unlike boys who do not have this problem and act regardless of the degree of popularity of the others, although they act in order to obtain a male image with other students [10], whereas if the popularity is low, a female gender of the individual will try to seek their inclusion in a group and the boys don't [11].

The ability of an agent to establish different types of friendship and respond in different ways depending on these established relationships, gender and popularity, makes the simulation more realistic as such, and with attention to the purpose of my work, were taken into account all these aspects.

3 Implementation

The model that was used in the development of this model is essentially based on FATIMA Modular model, take into account all the research done in order to extend this model to a more specific model, enabling the creation of social behavior according to gender that seeks to represent.

There are several factors that can influence the desirability of an event, in particular emotional state, popularity and gender parameters associated with each of these agents, which allows different types of important assignments for each of the possible events.

An agent when it receive a perception there is a generation of emotional evaluation, after this assessment will generate an emotion that will affect the emotional state of the agent, which will lead to a resolution in accordance with their social objectives, generating actions.

3.1 Gender parameters

When it comes to the calculation of the desirability of an event is also taken into account the gender stereotypes that we want to model and is also taken into account each of the following gender parameters:

3.1.1 Competitive Importance (CI)

The CI parameter designates the importance that is given to competitive events by the agent. The values vary according to table 1.

Competitive Importance (CI)	
Male Gender	Female Gender
0.5 < IC < 1.0	0.1 < IC < 0.4

Table 1. - CI variation according to gender.

3.1.2 Popularity Importance(PI)

In the case of PI parameter designates the will of an agent to state before another agent. This parameter represents the stereotype of male competitiveness agents. Values range according to table 2.

Popularity Importance (PI)	
Male Gender	Female Gender
0.5 < PI < 1.0	0.1 < PI < 0.4

Table 2. - PI variation according to gender.

3.1.3 Importance of the Popularity of Others (IPO)

In the case of IPO parameter designates the importance that the popularity of another agent has for the agent. The values vary according to table 3, allowing females agents take into account more easily popularity of an agent that another individual.

Importance of the Popularity of Others (IPO)	
Male Gender	Female Gender
0.1 < IPO < 0.4	0.5 < IPO < 1.0

Table 3. - IIO variation according to gender.

While it is intended to model behavior according to male and female stereotypes, it is important to remember that not all elements of a given population (male or female) behave the same way. Thus, for a greater variability in the behavior obtained (while respecting the behavior according to the stereotype like), they will be used random values for each kind of parameters (and the distribution of these different values according to gender assigned to the agent).

3.2 Desirability

The desirability is calculate according to equation 1.

Desirability(Ev) = selfEva(Ev) + otherEva (Target(Ev),Ev)   (1)

In relation to this event in the equation is taken into account the type of event, which can be differentiated between cooperative and competitive, that classification is done manually for each domain of the event, moreover, is taken into account every time the target of this event.

$$\text{competitive? (Event)} = \begin{cases} 1, \text{if the event is competitive} \\ 0, \text{if the event is cooperative} \end{cases} (2)$$

The selEva(Ev) (function 3) is a function, where the factors are related to the individual. This function allows the calculation of the importance of an event to the agent.

selfEva(Ev)=mood+competitive?(Event)   x CI   (3)

In addition to the consideration of the type of event (competitive or cooperative), the mood indicates the emotional state of the agent at a given time.

The otherEva(Other, Event) function (Equation 4) represents aspects of other agents that are taken into account when calculating the desirability of an event.

otherEva (Other, Ev) = PI x Popularity (Other) + sign (Ev) x Popularity (Other)   (4)

Given the PI is easy to realize that agents that seek to demonstrate the males stereotypes are more likely to deal with agents with high popularity, so that they can manifest against these agents.

The event sign (equation 5) allows agents to avoid competitive events with high popularity agents, but try cooperative events with these agents.

$$\text{sign(Event)} = \begin{cases} -1, & \text{if the event is competitive} \\ +1, & \text{if the event is cooperative} \end{cases} (5)$$

As the calculation of the desirability of an event, calculation of an objective urgency is equal.

3.3 Social Relations Component

In developing this model was taken into account that the gender of an agent can influence the type of relationship and the type of actions that are taken, such as the social objectives and knowledge of existing social relations in a given time.

In this model an event is not perceived directly as negative or positive, but only after the emotional appraisal of an event, which takes into account aspects such as the relation between two agents and the gender of each other. Whenever a new emotion is caused by another agent, is added to the emotional state, the social component analyzes the type, valence and intensity of that emotion and updates the ratio according to the level of relationship between both agents. This relationship of an agent is always calculated by the gender of the person concerned:

Relationship(target,em)$_{t+1}$=Relationship(target)$_t$+EIxValence(em)xIntensity(em)
          (6)

As it comes to emotion, as in FAtiMA Modular model, there are two functions associated with it, the valence and intensity. The valence indicates whether an emotion is positive or

negative and intensity, as the name implies, is the intensity of the emotion.

The IE is a variable (Table 4), which influences the relationship according to gender, thus allowing an emotion have a greater impact in a relationships of agents representing female stereotypes.

Emotional Importance (EI)	
Male Gender	Female Gender
0.1 < EI < 0.4	0.5 < EI< 1.0

Table 4. - EI variation according to gender

3.4 Popularity

In the model used popularity is modeled from the social relationship of affiliation, which is how an entity "likes" another. The popularity of a given agent is calculated as the average value the relationships of the other agents with this agent, as shown in equation 7.

$$\text{Popularity(self)}_{t+1} = \frac{\sum_0^n \text{Relationship(n)}}{\text{number of relationships}} \quad (7)$$

So that if an agent take action to create a negative emotion in another individual (valence is negative) will negatively influence the relationship you have with this person and later its popularity.

Every time an agent meets someone new, he creates a model that is based on the Theory of Mind (ToM), that designate the ability to attribute mental states of another, like beliefs, desires and knowledge. When an agent tends to gauge the popularity of another is taken into the Tom models from the agents who maintain a relationship with that agent.

4 Study case

4.1 Scenarios with this model of social behavior

After all the research done, the scenario that was chosen to analyze was the arrival of a student to a holiday camp, in this case the user will play the role of Jorden. This scenario was designed to be able to demonstrate clearly two aspects, namely the competitiveness of certain events and the popularity of agents, using gender stereotypes.

Upon arriving at the summer camp, you know Tom, who is the character responsible for leading this holiday camp and have only informative purpose to the user. It will inform the user that every year at the summer camp there are theater performances, and this year will perform the "3 Little Pigs".

In the scenario exists 4 others characters, Oakley, Hayden, Casey and Alex (Figure 1). The character Tom will ask the user to choose the role that the he wants to take from the available ("Little pig 1", "Little pig 2," "Little Pig 3 "" Big Bad Wolf "). The choice of paper will manifest much of cooperative and competitive behaviors existing in the simulation, for example, agents that try to act according to male stereotypes will try to compete with others who wants the same role.

Fig. 1. – Holiday Camp Scenario.

4.2 Names and physical differences

When developing this simulation, it was taken attention to the choice of names for each of the existing characters, choosing names that do not represent any particular genre, based on a study by Baby Names in 1000 [12]. Not allowing the start to associate that name to a gender, just associate the genre to clothing, boys are dressed with pants, and girls with skirts, as shown in figure 2.
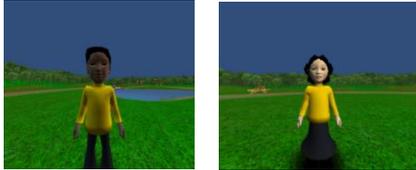

Fig. 2. – Differences in the dress

4.3 Possible actions from the user

After all the agents and the user choose the role, will get a set of 4 turns, in which Tom, character responsible for leading the competition, asking every time, which agent the user wants to criticize or praise, and after this action, the character that was targeted, will respond positively or negatively according to the type of action previously taken by the user. After this action, each other character present in the scenario will play a similar role and will take action according to the gender they are representing. Some of the actions are quite similar to the theater scenario present in the MDT game [13].

4.4 Simulation

Taking into account all that has been mentioned above, the most important in this thesis is to evaluate the user experience in terms of getting strong relationships with agents around him.

This type of scenario can have multiple types of alternatives that can be evaluated, namely gender associated with an agent, which can be modified to create more complex experiences but at the same time, more enriching. Aspects that were explored:

• All actors in the scene act randomly regardless of gender and assigned roles;

• Agents on the scene have genders exchanged with their appearances.

And the inclusion of these types of scenarios would allow further analysis of the results and a greater understanding of what the user thought and understood this difference, waiting for the outcome of the scenario where the agents are consistent with their gender is greater for these behave as expected [5].

When presenting the introductory phase, Tom will ask the user which version you want from the three, and that is where will the division between each of the sub-scenarios particularly in terms of behavior. Version 1 correspond to the example where agents act according to the clothes they wear, the version 2 which corresponds to the example where the agents act not being in agreement with the clothes they wear and version 3, where the behavior is totally random.

During the development of the survey was taken into account not only the gaming experience, but the likeability of a character (how much a user liked

the character – Goodspeed Questionnaire [14]) and the believability of the character (if the character behaved as expected). Other relevant aspects were taken into account were: the user's gender and the role they had chosen, which could impact both on the responses.

Statistical tests were applied to all results.

Before each of the statistical analysis were verified if all the data were parametric or not (whether the data followed a normal distribution or not). The all data were applied normal Shapiro-Wilk test and its significance was not more than 5% ($p = 0$), so it was concluded that all data follows a non-normal distribution as such data were considered non-parametric.

The study results will be demonstrated in this chapter divided according to each of the characters.

5   Results

After analyzing the results by versions, it was made a statistical analysis taking into account all versions of the simulation. The chosen statistical test was the Kruskal-Wallis (non-parametric data).

Considering the significance is 0 in all the examples also demonstrates that the differences between samples, in particular versions are significant, demonstrating that are not simply random data changes, but actual differences in each of the versions.

In order to facilitate analysis was applied to each of the data the likeability of the characters, the Cronbach's alpha, in order to estimate the reliability of this part of the survey for each of the

characters, and in all the results the alpha exceed 0.9, so they were considered consistent.

After the reliability of data for calculating the likeability for each survey is created a new entry with the average of the likeability of each of the characters and that will be analyzed in each of the characters.

5.1.1   Believability

Through the statistical studies of the characters was easy to understand that in terms of realistic behavior all the characters were well implemented, using as the example the character Casey (figure 3), version 1, where the agent represented the stereotypes regarding female gender were considered more realistic than in version 2, which the character acts representing stereotypes regarding male gender, behaviors that weren't according to what the user was expecting, since the character was wearing a skirt.
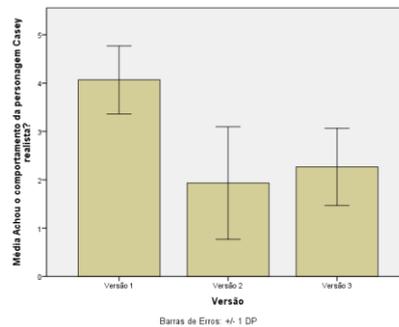

Fig. 3. – Believability of the character Casey.

5.2 Likeability

Considering the likeability of a character, all users liked more agents who followed cooperative behaviors, characters who acted according to stereotypes regarding female gender, in the case of Hayden (skirt), version 1 (figure 4), and in the case of Oakley (pants), version 2 (figure 5).
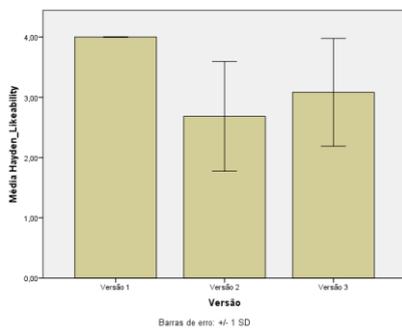

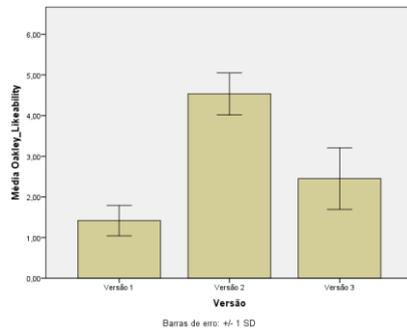**Fig. 4.** –Likeability of the character Hayden.

Fig. 5. Likeability of the character Oakley

But as we can see the users didn't accept well the acting according to male stereotypes, competitive behaviors (Figure 4 – version 2 and Figure 5 – version 1).

5.3 Gender

All the characters were achieve according to gender, like it could be seen in figure 6, for the case of Casey.
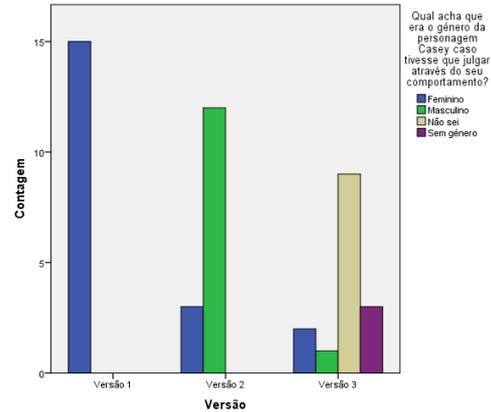

Fig. 6. – Gender of the character Casey.

5.4 Case Study Conclusions

One of the most important conclusion taken from this simulation is that the users themselves act according to its kind, namely, the boys always began by criticizing the characters containing the same type and the same role, while girls were trying to "gain confidence" of the others characters.

There were some mistakes, as the fact that the roles of choices in some scenarios have influenced the analysis of certain character, but don't influence largely the survey results.

Another interesting idea of some justifications over the investigations was the failure to consider certain male characters, not to defend the other female characters, and moreover, the female exhibitionism, which would be interesting ideas to explore but would need certain supports theorists that

weren't found at least in research carried out.

As expected could conclude generally that behaviors ranging in accordance with the expected gender are considered realistic and predictable by the users. Unfortunately, agents that behaved according male stereotypes didn't get high values of likeability. We believe that this may be due to the fact competitiveness wasn't accepted well in this particular scenario, since the agents eventually compete directly with the user. As future work, we think in the possibility of create a scenario where agents can compete, but not directly with the user.

Another fact that also was concluded is that behaviors that represent competitiveness are not accepted by users, as can be seen in the analysis of "likeability" of each of the characters trying to represent stereotypes regarding male gender.

6   Conclusions and Future Work

Overall it was an analysis that despite being quite complex and involve certain ethical issues that are not accepted by most people, are realities that exist in today's society, and without having notion, we deal with them and accept them as realistic and normal behavior, as can be verified with the results of the case study.

Despite being a mostly well done experience there were certain factors that could have contributed to a better achieved simulation and can be considered in future work.

Regarding the developed simulation, the behavior according to females stereotypes was favored in the development of this scenario, as a mainly cooperative behavior, users gave a higher value to the "likeability" of a character that represents female stereotypes, taken this into account it could be interesting to involve a scenario where the user was part of a team, so that certain agents wishing to represent males stereotypes, who were part of the user team, would create cooperative links with the user, but at the same time compete with the elements of the other team.

Another case that could be seen in future work, was a simulation similar to the current, but the agents present in the scenario would share the same clothes and only changed their appearance, as would be interesting to see the reaction of users to this scenario.

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