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Beyond Simulations: Serious Games for Training Interpersonal Skills in Law Enforcement

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***Abstract*—Serious games can be used to improve people's social awareness by letting them experience difficult social situations and learn from these experiences. However, we assert that, when moving beyond the strict realism that social simulations offer, techniques from role play may be used that offer more possibilities for feedback and reflection. We discuss the design of two such serious games for interpersonal skills training in the domain of law enforcement. These games feature intelligent virtual agents with which trainees have to interact across different scenarios to improve their social awareness. By interacting with the virtual agents, trainees experience how their behaviour influences the course of the intervention and its outcomes. We discuss how we intend to improve the learning experience in these serious games by including meta-techniques from role play. We close by describing the current and future implementations of our serious games.**

***Index Terms*—Social simulation, serious games, role playing games, meta-techniques.**

I. Introduction

In both interviews and street interventions, police officers strive to get witnesses, suspects and civilians to cooperate. Regrettably, people are not always open to this. Therefore, police officers are taught how to get them to assume a more receptive stance. Our long-term goal is the development of serious game prototypes in collaboration with the Dutch police so that these games assist in the training curriculum of police trainees by letting them practice with such interactions. The first of these is *POINTER* (POlice INTERview game), in which trainees train their interviewing skills with crime suspects; the second is *LOITER* (LOItering Teenagers, an Emergent Role-play), which lets trainees enact street interventions with loitering juveniles.

In this paper, we describe the *status quo* of our research efforts toward these serious games. Of prime importance to the attainment of social awareness is insight into the thought processes that drive people. Therefore, we are building a cognitive model based on a corpus of police interviews to determine the factors underlying people's behaviour (described in Section III). We use this model to inform the behaviour of the virtual agents that enact the roles of suspects and juveniles in our games. In Section IV, we discuss the relations between social simulations and serious games. We explain how we sacrifice the realism usually found in social simulations in the design of POINTER and LOITER to provide more explicit feedback and moments of reflection. We elaborate on the work involved in implementing these games in more detail in Section V. We wrap up by discussing future research directions in Section VI.

II. Related Work

There are several research projects in which social interaction between human and virtual agents has been researched for educational purposes and serious games. The negotiation training systems of [1] revolve around US military training for peace missions in the Middle-East. Their *Stability and Support Operations* system features extensive modelling of the emotions of virtual characters, letting them appraise and cope with user actions. An application called *FearNot!* was designed as a virtual drama for anti-bullying education [2]. This system is also based on virtual characters that can appraise and cope with user actions, but adopts an unscripted emergent narrative approach to let users have freedom of choice. Focusing on 'bad news' conversations between employees and managers, the serious game *deLearyous* models the interpersonal relations between the two interaction parties [3]. In deLearyous, virtual characters base their behaviour on their attitude towards the user. As a result, users (the managers) are required to learn how to behave to not let the virtual employees erupt in tears or anger. *JUST-TALK* is a prototype training application designed to help police officers interact with mentally ill people [4]. As in the previous systems, the focus of JUST-TALK is on the realism of the simulation. Unlike our games, the above systems do not directly address the importance of feedback and moments of reflection to stimulate learning.

III. Towards a Cognitive Model for Social Interaction

We strive to use theories and concepts from social psychology to inform the behaviour of our agents in order to create a cognitive model that is both believable and explainable. Using a data-driven approach, we have investigated which theories and concepts are relevant to describe the interaction in a police interview [5]. Using an annotated corpus of enacted police

interviews (from actual police training) we were able to link theories and concepts to the observed interactions. We found that we could describe the majority of the interactions between police officers and suspects in concepts from three theories, namely those of *interpersonal stance*, *face*, and *rapport* [6]–[8]. The theory of interpersonal stance describes how people assume a certain stance toward the other when they interact. Leary uses the orthogonal dimensions of dominance and togetherness to explain how different combinations of these dimensions lead to stances and how people are influenced by stances of others [6]. The notion of face boils down to the needs for approval and autonomy a person has. For example, when a suspect is questioned about his whereabouts on a particular day, this may be unwelcome to the suspect, because he feels that his freedom is being restricted by the police officer [7]. Rapport revolves around the bond two people share: when they are attentive and coordinated to each other, they will feel as if they are 'in sync' [8]. To be able to describe all interactions in the corpus, we used the meta-concepts of *information* and *strategy* to cover actions related to lying or withholding information, and using explicit strategies.

Currently, we are building and evaluating a computational model that relates the mentioned theories to each other. We carried out an evaluation experiment in which we let participants interact with our model in an abstract way. We explained that they would interact with one of three virtual suspect *personas* of which we gave descriptions, and that their goal was to discover which of the three suspects communicated with them. They were able to interact with a virtual suspect in a turn-based fashion. First, participants indicated what kind of utterance they wished to perform by setting parameters related to the theories such as stance, rapport, and type of question. Then, we let the model interpret this combination of parameters by calculating how that utterance would influence the mental state of the persona. This persona subsequently responded with a set of parameters at the same level of abstraction as the input of the participants. Then, the participants had to interpret these parameters and create a new utterance based on this interpretation. This continued until the participants wished to guess which persona they were interacting with. Preliminary results indicate that the majority of participants correctly determined their interaction partners.

IV. Design Possibilities for Serious Games

Social simulations try to offer strict representations of situations they are intended to model. In their current training curriculum, police trainees practice with professional actors to simulate and experience possible scenarios. We regard such simulations as a form of role play and see several possibilities for the design of serious games based on role playing games. We believe that the design of serious games only depends to certain degree on the domain for which they are intended. The learning goals are the most important factor when designing serious games and must first be determined. In our case, the overarching learning goal is that police officers should have social awareness: they should be able to explain how their behaviour influences that of others and *vice versa*. The computational model we described in the previous section should help trainees understand why people behave as they do. It is through our serious games that trainees then learn how this model functions. Ultimately, in order to secure and strengthen the knowledge they have gained from an experience with a simulation or a game, it is vital that trainees reflect on their behaviour [9]. Of course, experiential learning can be achieved in simulations, yet simulations by themselves lack methods for explicit feedback and reflection. Police officers in training already use after-action-reviews to discuss how interactions played out, but for our serious game we plan to take the idea of role play a step further.

A. Beyond Simulation, Towards Learning

We assert that the extent to which a serious game reflects the situations from the domain can be varied. In other words, the realisation of the role play can be more loose or imaginary than strict as in a simulation [10]. This means that the created scenarios may be less realistic—even metaphoric. Nonetheless, the important point is that the model underlying the interaction with the game should remain the same. Tipping the scales towards either fantasy or realism in the design of serious games has advantages as well as drawbacks in both cases. These advantages and drawbacks relate to the capability to reflect on the experience and possible inhibition in the behaviour of players. To let players reflect on what has happened in the game, they need to transfer the knowledge gained from their experience to knowledge related to the real world. When opting for realism in a serious game, the gap that needs to be bridged between the simulated world and the real world to transfer the attained knowledge is smaller than when the simulated world less closely represents the real world. On the other hand, this distance from the real world is at the same time an advantage of less realistic scenarios. This is the case because players are more free to do what they want—not because of the possibly larger amount of actions they can perform in the game, but because they may be less inhibited by the design of the system. For example, when police trainees practice using a 'strict' simulation, as in the enacted interviews from the previous section, they will feel the need to do everything correctly. Serious games allow for experimentation as they may put less pressure to perform on the trainees. The crux lies in the actual design of serious games so that they still provide a challenge and convey their learning goals. To assist us in the design process, we have created a hierarchy of learning goals that our games should support [11], based on Bloom's revised Taxonomy of Learning Objectives [12]. Below, we explain how we intend to use two techniques to support the attainment of these learning goals in our serious games.

B. Techniques for Improving Learning in Serious Games

In our serious games, we do not opt for maximum realism or fantasy, but for a balance between the two. To do so, we take inspiration from techniques used in improvisational

theatre (improv) and live action role play (larp) [10], [13]. This is not merely an attempt to 'gamify' a social simulation by adding some simple game mechanics to the whole. Instead, we combine techniques from various fields together during the design process of POINTER and LOITER, with feedback from the Dutch police.

We take the point of view that when a simulation or role play is carried out, the people involved in these events have two different roles: that of the actor, who has knowledge about the simulation, and that of the character, who is being simulated by the actor. Both in improv and role plays, this distinction between *in-character* (IC) and *out-of-character* (OOC) roles can be utilized by the players. For example, a player may know, OOC, that another character has deceived his character—but this player's character may not know. The player can then use this OOC knowledge to steer the play IC in a certain direction.

In the design of our serious games, we expand the distinction between in-character and out-of-character by looking at so-called *meta-techniques* used in larp [11]. These are techniques with which players can communicate OOC information—information that would normally not be available to them IC. Effectively, these techniques impinge upon the otherwise simulated nature of larp as they can not take place in-character. An examples of such a meta-technique is the *inner voice*, which lets players speak out their IC thoughts so that the other players get insight into how these players feel. *Act breaks* can serve as intermissions during a larp in which the IC play is paused and the players discuss OOC what has happened and what may happen in the play. With the help of such meta-techniques, players of a larp can 'deepen' a larp by exploring the feelings and motivations of their characters.

As explained above, reflection and feedback on their actions constitute a large part of the learning process for trainees. Therefore, when police trainees practice their skills with actors, their experience is evaluated during an after-action review. We choose a similar approach in our serious games by implementing meta-techniques that offer moments for reflection and feedback during gameplay. In our games, when players interact with virtual characters, we will enable these characters to express their thoughts to players in the form of comic-like 'thought bubbles', alike to the inner voice technique. Such information would assist players in determining the attitude and feelings of characters as a supplement to the signals they read from the nonverbal behaviour and utterances of characters. We are also exploring how act breaks can be implemented. For example, at set points during gameplay, the interaction can be paused to give players and characters the opportunity to ask each other questions. These questions include asking the reasons for certain actions or inquiring about the feelings of either the characters or players at specific points in the interaction.

Key in implementing these techniques is the decision when they should be used. As in all games, there needs to be a balance between the challenge of the game and the skill level of the player. Therefore, we propose to monitor the progress of players during the game and provide them with help in the form of the above meta-techniques when they seem not to be up to the challenge. For example, when players keep acting aggressively in an interaction with the effect being that a virtual character does not cooperate, this character may use a thought bubble to give feedback on why the interaction is unsuccessful. Alternatively, an act break may be used to have a more in-depth discussion as to what went wrong. Both techniques may also be used together to reinforce each other. For example, if a character shows a thought bubble during gameplay to provide feedback, it can explain its thoughts in more detail during a subsequent act break.

Aside from providing feedback and reflection, we are investigating ways to let the virtual characters adapt their behaviour to help players achieve their learning goals. This adaptation reflects the methods used in improv and role play as well: the virtual characters are able to adapt their behaviour to the learning goals of players. For example, if it turns out that a player has difficulties to negotiate with withdrawn people, the virtual characters can choose to behave more withdrawn, providing the player with the possibility to gain more experience with such interactions.

V. Implementations

As said above, we are designing two serious game prototypes: POINTER for interview training and LOITER for street intervention training for police officers. Until now, we have largely focused on the conceptual and technical aspects underlying these systems. Currently, we are exploring how to implement our games. The balance between realism and fantasy plays an important role in visualising the interactions. We do not choose a highly realistic appearance for our games, as this will stand at odds with the meta-techniques we wish to use. Additionally, it may evoke false expectations when players expect behaviour from very realistic looking characters that may be more complex than our cognitive model supports. Therefore, we opt to keep things simple in terms of graphical quality, but we do investigate the effects of different types of visualisations. Using AGENT, the Awareness Game Environment for Natural Training [14], we are able to let players play the same scenario with different user interfaces. The two types of interfaces we are developing have different fidelities. One is a 2D visualisation with a comic-like style and interaction through button commands, see Fig. 1. The other is a 3D visualisation with higher fidelity, see Fig 2. In an improved version, this visualisation will offer multi-modal input to attempt to stimulate the feeling of presence in the virtual world. While providing a more realistic environment in terms of graphical quality, the 3D environment is not intended to feature strictly realistic character behaviour.

To experiment with different game mechanics and concepts that we can incorporate in POINTER and LOITER, a board game called *Sequacious* was created, see Fig. 3. This was done to give an indication that a very playful system can already give rise to reflection and can be used to improve the players' awareness of social interaction. In this game, players

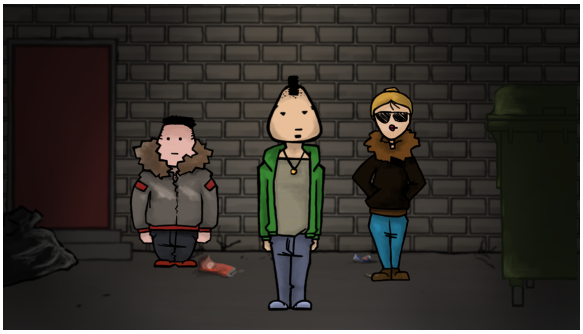

Fig. 1. The prototype 2D environment for LOITER.

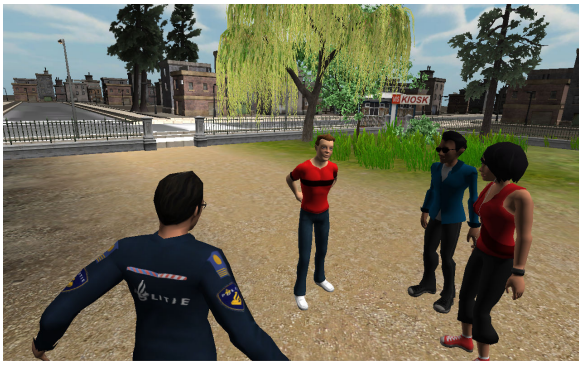

Fig. 2. A prototype 3D environment for LOITER.

(police officers in training) can experience and experiment with different ways of interacting with loitering juveniles. This can be done through letting them assume either of two roles in the game: the role that they normally play, namely that of a police officer, or the role of the group of juveniles. The game is played on a gridded board with the juveniles trying to form groups and grow in numbers and the police officer having the goal of keeping the groups of loitering juveniles as small as possible by dispersing the juveniles and stopping them from taking over control of the board. Together with more game mechanics that are related to the needs of both parties, Sequacious lets players explore this conflict. After play sessions, we observed that players were enthusiastic about the game and discussed tactics for winning the game by either side and how the gameplay could relate to the real world.

VI. Conclusions and Future Work

The approach we take in designing POINTER and LOITER, our serious games for interpersonal skills training in the domain of law enforcement, expands the possibilities of social simulation by infusing it with techniques from the fields of improv and role play. Our next step is to implement and evaluate our ideas in more detail. The serious games will not replace the teachers of the Dutch police, but serve as addenda to the training curriculum. Through evaluation and further cooperation with the Dutch police, we seek to fit our games in their curriculum and find the correct balance between fantasy and realism so that they will be accepted by the trainees. Additionally, we wish to iteratively improve the

Fig. 3. The board game Sequacious with a juvenile pawn on the far left and a police pawn next to it.

cognitive model we have created by letting players provide feedback on the virtual characters in the system themselves. Lastly, we hope to encourage other researchers to look beyond simulations by investigating other ways to design educational systems, such as serious games and techniques from the arts.

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