

Greetings Generation in Video Role Playing Games

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Abstract

We present first results of our project on the generation of contextually adequate greeting exchanges in video role playing games. To make greeting exchanges computable, an analysis of the factors influencing greeting behavior as well as the factors influencing greeting exchanges is given. Based on the politeness model proposed by Brown & Levinson (1987) we develop a simple algorithm for the generation of greeting exchanges. An evaluation, comparing dialog from the video role playing game *Skyrim* to dialog determined by our algorithm, shows that our algorithm is able to generate greeting exchanges that are contextually more adequate than those featured by *Skyrim*.

1 Introduction

Though there has been a steep rise in interest in video games during the past decade, both culturally as well as commercial, little has been done in getting language technology involved in game development. There is a huge contrast between the steep development of almost every other aspect of game development and the usage of language technology. To our knowledge there is not one game of one of the major game companies that uses sophisticated NLG-methods for the generation of contextually adequate utterances. Modern games feature rich voice acting, but often lack realistic conversational situations. Voice acting, which became standard in commercial productions around the year 2000, hampered usage of language technology for quite some time, since e.g. speech synthesis did not reach sufficient quality and therefore would hurt immersion. Since then not only quality of synthesis systems has increased, but synthesis-like voice acting has also been used in successful productions (e.g. Portal 1 & 2).

There is some work in the NLG community on NLG in games (e.g., Koller et al. 2004; Khosmood and Walker 2010), but an intimate cooperation between game design and NLG does not exist on a commercial level. Research in the fields of NLG & game design is e.g. conducted at Expressive Intelligence Studio at UC Santa Cruz, with current projects (e.g. SpyFeet) focussing on combining NLG methods and computational dialog management in simple role playing games (Reed et al. 2011).

By nature of their modern design, video games, especially of the role playing genre, provide detailed information on the spatial and social environment, the agent types, their behavior and motivation, the progress on and steps in certain goals etc., so that context-related language generation should be a feasible task.

In our paper, we show by means of an apparently simple generation task, viz. the generation of greetings in greeting exchange situations, how more appropriate linguistic expressions can be generated if context features are taken into account. Our examples will be taken from the video role playing game *The Elder Scrolls V: Skyrim*, which shall henceforth simply be referenced as *Skyrim*.

2 Video Role Playing Games (VRPGs)

Video games involve two kinds of players or agents, respectively: player characters are agents acting in the virtual game environment on behalf of and controlled by the player, and non-player characters (NPCs) are agents controlled by the game software. Both agents interact with each other by non-verbal and verbal means, the latter typically realized by the selection of canned text from an agent-dependent discourse tree.

The ultimate goal of a video game is immersion: the player should get emotionally involved with the environment, the NPCs and his charac-

ter. Text presented in video games is vital to the immersion process. Form and content of the texts presented depend on the player types and the story telling method.

The essential features of VRPGs are the high number of appearing NPCs, their multifaceted models (skills, attributes, "karma", etc.), a branching story line and the possibility to take different approaches to solve problems, many of the former being conversational. As a result, in VRPGs conversations mostly take place directly within the games virtual environment (as opposed to cutscenes in many action games, i.e. episodes the player is not able to control), which leads to the high immersion factor of the genre.

2.1 Text in Video Games

Game texts are the major component in telling and driving a game's story. In most recent games they are fully voice acted. Game texts can either be categorized as storytelling text, written documents appearing in the game, or dialog, which can be further categorized as either scripted or interactive dialog. The latter is mostly featured in games of the branching storytelling type like VRPGs. These games make rich use of interactive dialogue and use it to fuel their story. Players have multiple choices in dialogs and are able to use different verbal approaches to solve conversational problems. Nevertheless all possible dialog lines are still pre-written during development – there is just a lot more of them. According to web sources *Skyrim* comprises more than 60,000 dialog lines.

This demonstrates that game developers must use an enormous amount of text that will be presented in the different episodes of a story. However, there is little variation within these texts to keep development costs down. As a result, conversations may get an inappropriate character by means of an iterated use of one and the same text unit in subsequent scenes, or the constant, inappropriate avoidance of ingame variables that would bloat the number of dialog lines (e.g. gender of agents).

In *Skyrim* this leads to constant skipping of real conversation openers and real passing greetings. As our evaluation below shows, even a minimalistic greeting exchange will be perceived as more appropriate and therefore improve immersion.

3 Greeting Exchanges

Greeting exchanges are social practices that agents in VRPGs should be able to master. According to Firth (1972) the aim of a greeting exchange is to establish or reestablish social relations in case of conversation openers, or in case of passing greetings – if the agents are strangers – guaranteeing a safe passage. Both may also serve acknowledgement of a different allocation of status.

Politeness is a central aspect of every type of greeting exchange. Greeting exchanges as adjacency pairs comprise a linguistic, a sociolinguistic, and an anthropological aspect (Williams 2001). Some of the variables influencing form and content of a greeting exchange are:

- Attention of player and agents (e.g. are the agents facing each other?)
- Time since last encounter between the two parties (e.g. *Skyrim*'s NPCs do not make a difference between the character leaving for five minutes and leaving for days)
- Gender as social variable (e.g. in the society in question, is a woman supposed to greet first?)
- Physical variables: time of the day, physical distance, noisiness of surroundings, crowdedness of the immediate environment. E.g., the last three variables influence whether a verbal or a gestural greeting should be performed.

In *Skyrim*, instantiations of these variables are available during runtime because they are tracked for various other functions of the game engine, but only gender ("*Hello master / mistress*") and distance (passing greetings will only occur in the immediate vicinity of the player character) are actually utilized for greeting purposes. Also the necessary variables underlying the politeness effect of a greeting are implicitly given in a game; e.g. in *Skyrim* the player will encounter kings as well as peasants, and the sum of her deeds for certain factions are also tracked.

4 Computing Greeting Exchanges

Brown & Levinson's (1987) well-known politeness model uses the concepts of negative and positive face to explain polite behavior. The negative face comprises the want of every agent that his actions be unimpeded by others. The positive

| Trait | Par. | Value | Motivation |
|---------|----------|-------|--|
| shy | α | 1.2 | misinterprets social distance |
| | β | 1.3 | afraid of authority |
| | γ | 1.8 | fears social impositions more than anything else |
| uncouth | α | 0.2 | unaware of social distance |
| | β | 1.6 | does recognize and respect power |
| | γ | 0.2 | does not mind the impositions of the FTA |

Table 1: Values of α -, β - and γ -parameters for shy and uncouth stereotypes

face is the want of every agent that his wants be desirable to at least some others. Face threatening acts (FTAs) threaten the positive and/or the negative face of the addressee and/or the speaker. Politeness is just a verbal or non-verbal means to attenuate the FTA. According to Brown & Levinson (1987) the weight W_x of a FTA x is calculated as follows:

$$W_x = D(S, H) + P(H, S) + R_x$$

where D is the social distance between speaker S and hearer H , P is the relative power the hearer has over the speaker, and R_x is the ranking of the impositions of a particular FTA x .

In *Skyrim* the background information for the generation of appropriate greetings is available in the course of the game, but the software makes very limited use of the variables at its disposal. Time since the last encounter is not taken into account as well as attention: Characters might have been gone for days of ingame time and will hear the same phrases as if they just left the room. The character is also addressed by NPCs while they are passing behind his back or sometimes while talking to other NPCs. This is clearly impolite greeting behavior that is not licensed by urgency and rudeness as an agent’s trait, since this affects all NPCs.

More information available could be used to calculate the social distance D and power P . The social distance could be calculated by taking into account the interacting agent’s ethnicities, their profession, social skills etc., while relative power could be calculated through factors like rank in or standing with an organisation.

Finally and most importantly personal influences are implemented by the use of parameters which simply adjust the impact of the social variables:

$$W_x = \alpha \times D(S, H) + \beta \times P(H, S) + \gamma \times R_x$$

This allows for easy contrasting between character types. If we assume that a ”normal” greeting behavior is based on a value of 1 for each of α , β and γ , we assume exemplary values for the parameters for stereotypical *shy* and *uncouth* as seen in Table 1.

As a result, our method not only generates different greetings w.r.t. different instantiations of the physical and social variables, but also different greetings for different agent types. Our algorithm outlined in Table 2 generates a simple passing greeting exchange or a simple conversation opener.

We assume that for every pair of agents (character and NPC) there is a Question Under Discussion (QUD) stack of information that has not yet been resolved (see, e.g., Djalali et al. 2011). A QUD-model for short-term discourse history can also be utilized to lock the NPC in a certain conversational state (urgent quests), therefore giving access to the notion of urgency which mitigates the impact of impolite behavior, e.g. skipping greeting exchanges, and also helps to keep discourse coherent.

Besides the QUD stack we assume a database which keeps record of the discourse history beyond the QUD-stack. Elements resolved (popped from the stack) are stored in the database. This database also helps to keep track of relations between the two agents and directly affects the social distance component. Relative power is untouched. The database also keeps track of agent-specific information like faction, rank, and others as well as agent-pair specific data, like time since last encounter.

Since we do not have access to *Skyrim*’s source code, our algorithm has not been implemented yet. However, given greetings from *Skyrim*, the outlined algorithm can be used to determine modified greetings whose quality has been evaluated by players. For example, when entering an alchemist’s store the following example dialog might occur in *Skyrim* (**A** being the alchemist, **P** being the player character):

- A:** You look rather pale. Could be Ataxia. It’s quite a problem back home in Cyrodiil.
P: [not realized]
P: [initiates conversation; not realized]
A: Pardon me, but do I detect a case of the Rattles? I’ve got something for that.

| | | | |
|----|--|----|--|
| 1 | <i>check for possibility of a greeting exchange:</i> | 13 | <i>if greeting character is a player character:</i> |
| 2 | • checking agent type (normal, shy, uncouth) | 14 | • generate passing greeting or conversational opener. |
| 3 | • line of sight between agents? | 15 | • present player with options to choose from. |
| 4 | • agents paying attention to e.o.? | 16 | • add greeting phrase to discourse history. |
| 5 | • distance between agents appropriate? | 17 | • check for circumstances that might reduce impact of FTA (e.g. urgency) |
| 6 | • one of agents trying to hide? | 18 | • apply politeness impact on standing and/or karma. |
| 7 | <i>gather possible and situationally fitting greeting phrases / schemes for either...</i> | 19 | <i>else if greeting character is a NPC:</i> |
| 8 | • A passing greeting or | 20 | • choose greeting according to NPCs role and model |
| 9 | • A conversation opener | 21 | • generate chosen phrase. |
| 10 | <i>look for physical modifiers that influence mode of greeting (e.g. noisiness of surrounding)</i> | 22 | • add chosen phrase to discourse history |
| 11 | <i>look for situational modifiers that override politeness calculation</i> | 22 | <i>output to player</i> |
| 12 | <i>calculate politeness with regards to agent types</i> | | |

Table 2: Proposed algorithm for greeting exchange generation.

P: [not realized]

P: [chooses from variety of conversation topics]

Utilizing our algorithm, the following dialog might unfold.

A: Good morning and welcome to my store.

P: Good morning.

A: How may I serve you?

P: [chooses from variety of conversation topics]

One can see that while the pre-written dialog lines give a lot of background information about the game world, their usage in the initial dialog stages seems a bit odd.

5 Evaluation

To evaluate the suggested method of computing greeting exchanges, we designed a questionnaire containing descriptions (in a pen & paper RPG style) of five different situations from Skyrim. These situations have been chosen because of their unfitting pragmatic realisation. For each situation, we presented a set of follow-up dialog situations which contained the original dialog from Skyrim, dialog determined by our algorithm (minus urgency, as it would allow to skip greeting exchanges) as well as by a simple approach that only took into account attention and minimalistic greetings.

We used transcripts from the original dialog to eliminate potential bias from different methods of presentation as well as to ensure that subjects would not recognize the original dialog from Skyrim. The subjects were then asked to evaluate the dialog situations according to appropriateness, politeness, social distance, relative power as well

as feeling a sense of urgency. In addition we asked the subjects for a short self-evaluation of their experience with video and role playing games as well as their experience with Skyrim. Out of seven participants two did not have any experience with video or role playing games. Two participants had played Skyrim. They evaluated the overall linguistic realisation with a score of 7 out of 9 and were able to recognize the situations as well as the dialog options from Skyrim. Table 3 shows the overall evaluation results.

| | very | medium | not |
|----------|------|--------|-----|
| Skyrim | 1.4 | 1.4 | 4.2 |
| simple | 2 | 4 | 1 |
| our alg. | 4.2 | 1.4 | 1.2 |
| Skyrim | 0.2 | 1.8 | 5 |
| simple | 1.6 | 4 | 1.4 |
| our alg. | 4.6 | 1.6 | 0.8 |

Table 3: Average no. of choices for appropriateness (above) and politeness (below)

In this setting, Skyrim’s passing greetings and conversation openers generally were perceived as much less appropriate than the alternatives presented, while greetings determined by our algorithm were perceived as the most appropriate in all scenarios by the majority of all participants. Skyrim’s greeting exchanges were also mostly associated with only little social distance and were perceived as relatively impolite. The opposite was true for greetings determined by our algorithm: in every scenario the majority of participants chose them as the most polite one.

References

- Penelope Brown and Stephen C. Levinson. 1987. *Politeness: Some universals in language usage*. Cambridge University Press, Cambridge
- Alex Djalali, David Clausen, Sven Lauer, Karl Schultz and Christopher Potts. 2011. Modeling Expert Effects and Common Ground Using Questions Under Discussion. *Proceedings of the AAI Workshop on Building Representations of Common Ground with Intelligent Agents*.
- Raymond Firth. 1972. Verbal and Bodily Rituals of Greeting and Parting. *The Interpretation of Ritual*: 1–38.
- J.S. La Fontaine (Ed.). 1972. *The Interpretation of Ritual*. Tavistock Publications, London.
- Alexander Koller, Ralph Debusmann, Malte Gabsdil and Kristina Striegnitz. 2004. Put my galakmid coin into the dispenser and kick it: Computational Linguistics and Theorem Proving in a Computer Game. *Journal of Logic, Language and Information*, 13 (2): 187–206.
- Foadad Khosmood and Marilyn Walker. 2010. Grapevine: a gossip generation system. *Proceedings of the 5th International Conference on the Foundations of Digital Games, New York, NY, USA*: 92–99.
- Aaron A. Reed, Ben Samuel, Anne Sullivan, Ricky Grant, April Grow, Justin Lazaro, Jennifer Mahal, Sri Kurniawan, Marilyn Walker and Noah Wardrip-Fruin. 2011. SpyFeet: An Exercise RPG. *Proceedings of the 6th International Conference on the Foundations of Digital Games*.
- Jesse Schell. 2008. *The Art of Game Design: A book of lenses*. Elsevier/Morgan Kaufmann, Amsterdam and Boston.
- Kenneth E. Williams. 2001. An Evaluation of Greeting Exchanges in Textbooks and Real Life Settings. *Sophia Junior College Faculty Journal*, 21:49–64.