

A Suitable Director for the Virtual Storyteller

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ABSTRACT

The Virtual Storyteller is a story generation system currently in development at the University of Twente, which consists of multiple agents working together to create a story: emotional agents act out their roles and are guided by a director along a certain storyline. The currently used director is still very limited in its means to guide the actors. There are a lot of other actions that can be taken to ensure more interesting plots. This paper will show what means are available, and results in a design for a more suitable director.

Keywords

Story generation, virtual storytelling, narrative intelligence director, autonomous emotional agents

1. INTRODUCTION

Research for *story generation* systems has been conducted since the 70's. This interest for stories is not that strange: people are narrative animals. We surround ourselves with stories. To make sense of the world, we assimilate events in narratives to find order and meaning [Mat99].

One logical way for computers to generate stories is one that seems very close to reality: by using characters, virtual *actors*, with feelings, emotions and their very own personal goals to attain. Since these actors will have emotions and will act on their own based on their feelings and personal goals, they are called *autonomous emotional agents*. Of course, letting those actors just wander about in the virtual story world until one attains his or her goal will probably create a quite boring story. This is where the *director* comes in, who can guide the actors to create dynamic, more interesting stories.

At the University of Twente, such a system is currently in development: the Virtual Storyteller. In the latest version of the Virtual Storyteller, the director is still very limited in the means of guiding the actors. It can disallow a character's intended action, but there are more methods to ensure a proper plot [The03, Ren04]. Rensen already proposes further development of this director in his thesis about the Virtual Storyteller system [Ren04]. He mentions the possibility of letting the director introduce new characters and objects in the story world.

In this research we will look into what means there are for a director to guide the actors when needed and what possible

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actions of the director are most suitable for a story generation system with autonomous emotional characters like this one. The next problem to tackle is how to choose the most appropriate means for guidance in a specific situation. After proposing a theoretical design, we will try to say something about whether the tension of the generated story will actually be improved by letting the director take these actions.

The results of this research will not only be of interest for the Virtual Storyteller system in specific, but also for story generation systems with autonomous actors in general. The results may also be of use in *interactive drama*.

In interactive drama, the user generally takes first person perspective and has control of one of the characters in the story. The other characters are often acted out by semi-autonomous emotional agents, and all characters are guided by a director, often called *drama manager* in this context. Guiding a character controlled by a human user, without making it too obvious, is a very subtle task which is closely related to guiding autonomous emotional agents: the human user and the autonomous agents will have to be influenced indirectly where possible, without giving direct orders.

2. RELATED WORK

First an overview will be given of the developments in story generation systems. Then we will take a look at a couple of interactive drama systems, since that is the direction that seems currently more in focus and therefore is a suitable direction to search for the latest ideas for directing virtual actors.

2.1 Story Generators

In their master's theses Faas [Faa02] and Rensen [Ren04] both describe the following previously developed story generation systems.

2.1.1 *Minstrel*

Minstrel is developed by Turner in 1994¹. It tells stories about King Arthur and the round table, and each story conveys a moral. The system uses old situations to create solutions to new ones. The generated stories have a good structure, and the moral is a nice addition. Unfortunately this method does limit the number of story variations.

2.1.2 *Joseph*

The characters in *Joseph* have goals and emotions, and the system uses a model for stories [Lan97]. This system, developed by Lang in 1997, uses temporal logic for generating the stories, which adds a lot more realism, and is therefore a very important development [Fa02].

¹ S. R. Turner, *MINSTREL: a computer model of creativity and storytelling*, Ph.D. thesis; Technical Report UCLA-AI-92-04; University of California, 1992

2.1.3 The OZ project

The OZ project (1997) is the first system using real autonomous emotional actors, trying to add believability to the characters in the story [Bat92]. This project was not meant to generate stories, but is a step towards interactive drama. It does have a drama manager to direct the story into the right direction.

2.2 Interactive Drama

Most of the current theories about directors have been developed in interactive drama, where generally computer-controlled actors act out a play with a human protagonist. In this situation preferably every action has relevance to the global storyline to make it an interesting and foremost intense experience for the user [Mat00²]. Usually a director is used to guide the human and computer-controlled characters along the storyline.

2.2.1 A step away from autonomous agents

Mateas and Stern [Mat00] advocate to step away from autonomous agents, as to make it easier for the drama manager to move the story along while keeping the actions of the agents linked to the storyline. It also makes it easier for the author to set up a story, instead of just hoping some event will happen. The drama manager becomes responsible for most high-level character behavior and the characters become libraries of character-specific ways of accomplishing low-level tasks.

2.2.2 Agent's Interaction

Cavazza, Charles and Mead developed an interactive storytelling system which creates sit-com like scenarios [Cav01]. It is character-based, but the actions are not the result of the emotions of the characters, but of their behaviours. These behaviours have been captured in plans. The characters do have moods, which affect their choices in behaviour.

2.2.3 Mimesis

Mimesis [You03] uses a story-level director to create a story plan from all actions that can be performed and a specification of the goals for the end of the story. When a user, or maybe in this case an autonomous character, attempts to perform an action that conflicts with the causal constraints of the story plan this action can either be accommodated by adjusting the story plan or the director can intervene causing the action to fail to execute [Rie03].

2.2.4 IDTension

IDTension is based on focusing on narrative properties rather than on a course of events or actions. The narrative logic calculates the set of all possible actions of the characters. Then the narrative sequencer filters these actions in order to rank them from most valuable to least valuable, based on an estimation of impact to the user [Szi03]. The system has two modes: first person and automatic generation. Automatic generation removes the autonomy of the characters to act according to their own goals and emotions.

3. THE VIRTUAL STORYTELLER

The Virtual Storyteller is a story generation system with autonomous emotional agents fulfilling the roles of the actors. But how does it really work?

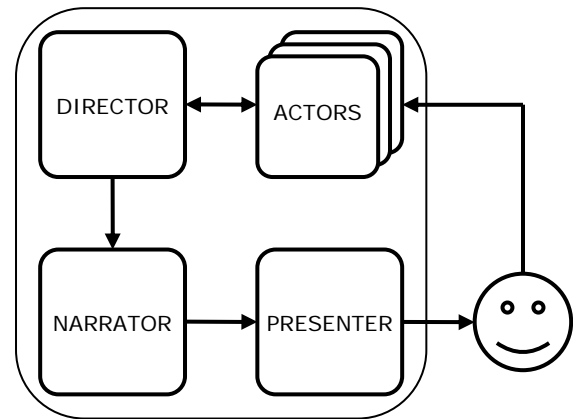


Figure 1. Architecture of the Virtual Storyteller

Globally, there is the director who creates the story and guides the actors when needed. Then there is the narrator who translates what is happening into text, which is then presented to the audience by the presenter: a cute Microsoft agent who tells the story [The04].

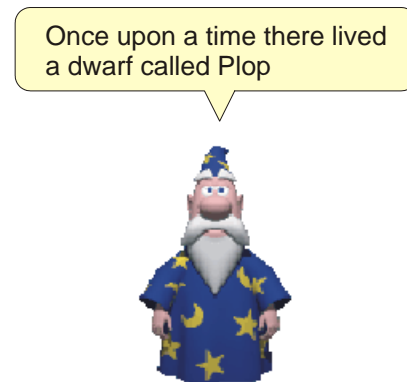


Figure 2. The Cute Presenter [Faa02]

Since this research focuses on designing a new director for the Virtual Storyteller, let us take a closer look at how the director and the actors work together in this system to generate a story.

The director selects a story from the database, creates a world model based on this story and creates the needed actors. The following has not been fully implemented yet, but ideally a story consists of four *episodes* which ensure a proper structure and story build-up, which are:

- *state of equilibrium*: a description of the world and introduction of the main characters
- *disruption of a state of equilibrium*: the initial state will be disrupted (preferably by a villain) and the mission of the hero will be introduced
- *mission of hero*: the hero will try to fulfill his mission
- *return to state of equilibrium*: and they lived happily ever after, that is, if the story ends well...

A story contains multiple different episodes to choose from. The director will choose four episodes which match with their *episodic goals*. Episodic goals are *goals* that will be given to certain actors to ensure the function of an episode will actually be fulfilled. The first episode will start, and the episodic goals will be sent to the specific actors. When an episode starts the director will give each actor a turn, round-robin, until an episodic goal has been reached.

² R. McKee, *Story: Substance, Structure, Style, and the Principles of Screenwriting*. New York, NY: HarperCollins, 1997.

An actor has knowledge about how to undertake certain actions and how to attain goals; he has beliefs about what the world looks like, what he has in his inventory, his strength, and all actions he knows have taken place in the world; he has emotions, and a personality which influences these emotions. Based on his emotions, he will select a goal, and then make a plan to attain that goal. This plan consists of a number of actions in a specific order.

When the actor has decided what action he would prefer to take, he asks the director for permission. If the director says no, he (the director) may need to take steps to change the world a bit so the story can continue, and the actor can give it another try. The features that would allow the director to add objects or characters to the world while the story is in development, has not been implemented yet in the previous version. If the director says yes, and the episode is not over yet, the world is adjusted and it will be the turn of the next actor. When the episode is over, the director will start the next episode until the story is finished.

4. THE USE OF A DIRECTOR

The goal of this research is to design a director suitable for a story generation system that works with emotional autonomous agents as actors. To create such a design we must first be aware of what it actually is a director should do.

First we will look at a job description of a real-life film director and how that translates into a definition for our story generation system.

For the Virtual Storyteller design decisions concerning the director have also been made, so the second subsection will show what responsibilities for the director they discovered.

4.1 A Job Description

A director is “the creative artist responsible for complete artistic control of all phases of a film's production; the director's role always involves interpreting the script and communicating this interpretation to the actors by directing how to act a particular role and/or scene” [Jos05].

In our setting we also have a narrator and a presenter, who take away certain responsibilities of the director, being those responsibilities for transforming the story into something that can be presented to the public, and the actual presentation itself.

Another thing that is different is that in a film the actors have to follow a script, which limits their autonomy to the way they are acting out the set actions. In the Virtual Storyteller, actors can choose what to do themselves.

So, how can we define the responsibilities of a director in this story generation system setting?

A director is the agent responsible for the ‘artistic control’ in the phase of story creation based on a given episodic setting; the director’s role involves interpreting the episodic script and communicating this interpretation to the actors by directing how to act a particular role and/or scene when necessary.

When this “directing how to act a particular role and/or scene” happens, the actors may be less autonomous, but the director needs means to guide the story to develop in a certain direction. What means the director can actually use is part of the next step in this research.

4.2 Current Director Functionality

The Virtual Storyteller description [The03] tells us that the director is first of all there to ensure a consistent plot. This means the sequence of events is natural and in accordance with

the story world. A character’s actions should also be in line with their own personality and previous actions, but that is a responsibility of the actor itself, not that of the director.

In the Virtual Storyteller system, the actors are not guided through a pre-existing plot, but they create the plot together with the director, as in improvisational theatre. Our actors unfortunately do not know anything about what would be interesting for the audience, they just try to do what they want to, according to their emotions and goals. To create plots that are more interesting to the public, the director should take steps to direct the actors, and not just let them drift in the story world.

To do this, the creators of the Virtual Storyteller [Ren04] used methods based on Blumberg and Galyean [Blu97]:

- *environmental methods*: introducing new characters and objects into the story world
- *motivational methods*: giving a character a goal to pursue
- *proscriptive methods*: disallowing a character’s intended action

Every time an actor wants to perform a certain action, it needs to ask permission of the director, using proscriptive methods. The director then gives permission or not, based on the following:

- *the episodic constraints*: the princess is not allowed to kill the villain (for example because the villain is still needed further in the storyline)
- *knowledge about the world*: the princess is never strong enough to lift up the villain
- *knowledge about stories*: attacking three times in a row creates a boring story

At the beginning of each episode the characters are given a goal for that episode, which is currently the only moment when motivational methods are used.

Environmental methods are currently only used at the beginning of an episode to create the setting and characters [Ren04].

5. DIRECTING THE STORY

The currently used director already concerns itself about the basics: creating a consistent story, which follows the episodic constraints.

What other means can a director use to guide the actors in such a way that more interesting stories are created? And then, what choice would probably create a more interesting story? So the task for the director first lies with making a list of possible actions for this situation, and then to make a decision.

5.1 Possible Director Actions

The actor decides it wants to do something, and asks the director for permission. At this point, the director can decide on multiple different things to do. The director might also decide to guide certain actors or change something in the story world, not as a reaction to an action an actor wants to take, but to avoid or create certain possibilities in advance.

5.1.1 “Do the Right Thing... Oh, Not That...”

Blumberg and Galyean [Blu97] introduce four means of influencing the actor, of which three have already been mentioned in the previous section. The current Virtual Storyteller system already uses some of these means of control, as mentioned in the previous section.

Prescriptive and Proscriptive Control

At the lowest level of control, the director can tell the actor to engage in a specific action, or to specifically not engage in a certain action. The first is prescriptive, the second is proscriptive control. These means of control can be applied on motor skill level ('go forward') and on behavioral level ('find the sword').

Another way to use proscriptive control is by changing the world in such a way that the action can no longer be executed by the actor. For example, if an actor wants to cross a bridge, the bridge suddenly collapses by a dog walking over it³.

Motivational Change

Another option is for the director to change the goal the actor pursues or the actor's feelings. If the two main protagonists have goals that are not in conflict, or do not bring the two together at any point, then there is no tension.

Environmental Change

The story world can be changed by introducing new characters and objects, creating other possible goals, feelings and (re)actions for the actors to choose from. It is also possible to give the actor imaginary sensory input, so the actor imagines a certain object or person to be there.

Suggestions

Blumberg and Galyean mention that some of these control methods should be more considered as suggestions: it increases the chance an actor will do something, but it is not an order. Swartjes takes it a little further in seeing suggestions as a separate way to influence actors³. The director asks the actor to do something, or go somewhere specific, if it becomes possible. In other words: an actor can create a lot of plans to attain his goal, but plans that follow the suggestion get priority over the plans that don't.

5.1.2 "Managing Interaction"

In the Mimesis system [You03], the director tries to stay ahead of the user by making a plan of what would be nice to happen. In this system, there is one autonomous actor: the user. When this actor does not follow the plan as it was created by the director, the director can choose one of the following solutions.

Intervention

First of all, the director can let the actor take the action, but change the outcome. Riedl, Saretto and Young [Rie03] mention an example of Sam, played by the user, who tries to shoot a bank owner. The normal outcome would be that the bank owner is shot, but in case of intervention, Sam misses his target.

Accommodation

The alternative is to change the plan as it was set up by the director, to accommodate the action, resulting in a new narrative structure where the action does happen.

5.1.3 "Guiding Interactive Drama"

[Rie03] also describes the architecture as defined by Weyhrauch in "Guiding Interactive Drama"⁴.

System-controlled Characters

There may be a sword in a nearby forest the hero in the story needs to be able to conquer the villain. Unfortunately, if the hero never hears about this sword, his only chance of finding it

is tripping over it. Unless of course the director can send a wise old hermit to tell the hero about this fabled sword. Weyhrauch uses system-controlled characters to guide the human user, as mentioned in the example. In the same way, system-controlled characters could be used to guide the autonomous characters in the story in the Virtual Storyteller.

Altering the state of the story world

Environmental change, as already described in 5.1.1 is also used in Weyhrauch's system.

5.2 Which Action is the Best?

Now the director knows what different actions it can undertake, it has to decide on what action would be the best. While making this decision it is important to maintain actor autonomy where possible, and at the same time to influence the actors in such a way an interesting story will develop.

At this point we need to determine what makes an interesting story. There is still a lot of discussion on this point, but there are a couple of people who have discovered some of the elements.

Mateas describes a theory for interactive drama he calls *dramatic beats*: short story elements that make feelings and maybe even goals shift, the more the better [Mat00]. That this is a useful idea for interactive drama seems logical, but is it just as useful for story generation in a fairytale setting? In general one could say that shifts in the story are interesting, may it be in emotions or in adapting new goals. A story where the actors just keep going in the same direction until somehow the story gets to an end has too little change and will very probably be boring.

What we really need is a way to give the possible actions a score, based on the experience for the user [Rie03⁴]. Szilas [Szi01] proposes eight criteria for evaluating actions in interactive drama; this idea seems also very suitable for storytelling:

- *consistency*: the intended action is evaluated against the values of the character (like 'courage', 'honesty') to answer the following question: is it in character for the actor to perform the action?
- *conflict*: does it makes the character torn between his or her values and reaching his or her goal?
- *surprise*: how surprising is it to carry out this action?
- *expectation*: does the action raise new questions, or does it solve existing intrigues?
- *progression*: how much does the action make the story and intrigue evolve and move on?
- *demonstrativeness*: "how much [does] an action illustrate character features to the user" ?
- *impressiveness*: how spectacular is this action the actor wants to perform?
- *space continuity*: the closer the location the action takes place is to the location of the previous actions, the more continuity

To know what the best action is, the possible future developments of the story created by that action could also be taken into account. For this the director would need some kind of simulation possibility.

6. DESIGN OF THE DIRECTOR

We now know what actions a director can theoretically undertake, and ways the director can decide what action to take,

³ I. Swartjes, personal communication, May 2005.

⁴ P. Weyhrauch. Guiding Interactive Drama. Ph.D. thesis, Tech report CMU-CS-97-109, Carnegie Mellon University, 1997.

but which means are really suitable for a story generation system like this?

First we will take another look at the possible means to guide actors, evaluate them against the needs of the Virtual Storyteller, and choose the ones that are most suitable to actually be implemented. Then we will make a decision about what selection procedure the director should use to select that action that may create one of the more interesting stories.

6.1 The Suitable Action Possibilities

While selecting suitable action possibilities the strongest reasoning came from the notion that we would not want to curb in the autonomy of the emotional agents. This is the core of the current Virtual Storyteller system. Intuitively this approach is very easy to understand, and it keeps it easy for the narrator to explain an actor's actions, since they do not change suddenly for no obvious reason. By adhering to this basic idea, the system can also be used quite easily for interactive storytelling, if we ever would like to take that step.

6.1.1 Prescriptive Control

Using prescriptive control, telling the actor to execute a specific action, is a direct violation of the actor's autonomy, and should therefore be avoided in systems like this.

6.1.2 Proscriptive Control

Proscriptive control, prohibiting the action the actor wanted to take, makes the actor think about other possible actions to attain its goals, which will still be in character. Only when there are no other possible actions the actor can take, the director cannot use this means of control. In all other cases this method can be used without causing any problems.

6.1.3 Eliminating Possibilities

The second means of proscriptive control, by eliminating the possibility for the actor to take that action, is also very suitable, for exactly the same reasons. It also hands the narrator an explicit reason why the actor could not or would not perform that action.

6.1.4 Motivational Change

Whether motivational change limits the actor's autonomy can be answered in two directions. It changes the goal of the actor, but the actor can still do whatever it wants to do. On the other hand, the actor is not acting like it would, because he is virtually brainwashed. This also adds a big challenge for the narrator: how to explain the sudden change of feelings to the audience?

This downside does violate the core idea of the system: letting actors create the story, based on their emotions, characters and goals.

6.1.5 Environmental Change

Changing the story world by adding objects of characters is one of the more suitable means for the director to influence the autonomous actors, since it does not change anything about the actor's feelings, goals or personality.

6.1.6 Suggestions

Suggesting actions to actors sounds like something a real film or theater director would do. It is like politely asking the actor to do something, if it happens to coincide with his personal goal.

If this system would ever want to make the step of letting actors be controlled by humans, moving it towards interactive storytelling, this method cannot be used for the human

participants without giving them the feeling of being influenced in their decision-making process. For the current story generation system, this is not a problem as of yet.

6.1.7 Intervention

One of the more subtle actions the director can take: change the result of the action taken by the actor. Again, this reaction is very suitable because it does not change the actor's feelings etc. in a direct way.

6.1.8 Accommodation

In the current system, the director does not create a future story plan. It only guides the actors through the world, within the episodic constraints. The actors create the story. Since there is no plan, there is no need to adjust it when one of the actors does something 'unexpected'. But could the system possibly be improved by adding such a future story plan?

In 5.2 it was already mentioned that to determine the real value of an action, you should also look at possible future developments. For this a plan of a possible future development of the story would be very handy, but it would have to be calculated for all possible actions, which takes a lot of extra time and creates a whole new issue. Especially when the story world would be expanded with more characters and more actions they can take, this could create future problems.

On the other hand there are already systems that make use of this [You03], so it should be possible. And this 'looking into the future' might be the very key to creating even more interesting stories. We will look into that in the next subsection, which handles the action selection procedure.

Looking at the feature of accommodation itself, it is actually nothing more than the director saying to the actor that he can go ahead with what he wanted to do. This cannot be really considered means of guiding a director since it is actually the absence of guidance.

6.1.9 System-controlled Characters

The notion of system-controlled characters is very interesting, and a very good way to guide autonomous actors when needed.

It creates a contradiction within the Virtual Storyteller: not all actors will be autonomous emotional agents, which is the actual basis of this story generation system. Also it may sometimes be a problem for the narrator to convince the audience of the reason why certain system-controlled characters are acting the way they do. This is why, when using system-controlled characters, we would not want them to keep influencing the story after they have served their use.

It is a fact, that system-controlled characters can be very useful to hand actors specific knowledge or guide them in a specific direction. This is exactly what you would want to use characters introduced by *environmental change* for.

6.1.10 The Chosen Features

One of the most important features of the system is the autonomy of the agents, the actors. Taking this into account, the following action possibilities are the most suitable for the Virtual Storyteller and similar story generation systems: *proscriptive control*, *eliminating possibilities*, *environmental change*, *suggestions* and *intervention*.

Environmental change in this context consists of two possibilities: adding objects to the story world, and adding system-controlled characters to the story world.

6.2 The Action Selection Procedure

How should the system decide what action to execute? A couple of possibilities were already mentioned in section 5.2, but how suitable are they?

To be aware of the full influence of a possible action, the director should also create future story plans. These plans can then be evaluated against the adjusted version of Szilas' method to select the best action to take. This guarantees that the action is not only suitable for that specific moment, but results in a better story overall.

An important side note to this extension however is that it will dramatically increase the time needed to find the best action. For all actions all possible futures can be looked into, and if the stories get more characters and the characters get more possible things to do, this will introduce new issues.

When looking at the possible futures globally two approaches can be taken: to take the action that has (one of) the best story ahead, or to take the action that has overall the best stories as a result. The most logical choice would be the approach that results in the highest chances for the audience to hear a good story, which would mean the second approach would be best.

Szilas' approach [Szi01] is not designed for a story generation system with autonomous agents, but for interactive drama where a lot of control is given to the narrator. This makes some of his criteria useless for our system, and there are probably also criteria not mentioned that would be useful for the Virtual Storyteller. It would be very interesting to look into ways to adapt this approach for story generation systems like this one.

Mateas' beats [Mat00] are the next best thing we have come across so far: to choose the action that makes feelings, and maybe goals, shift as much as possible. In 5.2 it is already discussed why this method may also be suitable for story generation systems.

It may be almost impossible for the director to predict these shifts for the evaluation of the generated possible story futures, but it may be possible to capture the essence of Mateas' dramatic beats that can be evaluated against actions as opposed to feelings.

For the procedure that we would like to use we would need to adapt Szilas' approach, and try to find a definition of dramatic beats as to fit it within Szilas' method as well. Unfortunately this will be a whole new research to carry out. We would also like to incorporate the feature of the director to look at the possible future developments of the story to select the action that will have the best overall effect, and not just the best effect at that very moment.

One important thing to keep in mind with action selection is to keep a certain amount of randomness. The system should still be able to generate a large number of different stories, so it should not only tell the most interesting one within the given plot.

6.3 Fundamental Changes

To support these new features, some fundamental changes to the system will have to be made.

Proscriptive control is already available, so fortunately this feature will pose no problems.

For the director to be able to eliminate possibilities, it will first need to know how certain specific possibilities can be eliminated. For this, a library will be needed containing situations and ways to change them into a different situation where certain actions are not possible anymore. This could for

example be done in the same way Minstrel uses as mentioned in 2.1.1: using old situations and changes to apply to the current situation at hand.

To introduce new objects in the story world, these objects will have to be defined within the story ontology in advance. Introducing a PC in a fairy-tale world would create rather strange stories.

If the director chooses new characters to the stories, these will have to have been defined in advance as well. If these characters would also have been autonomous, they may not fulfill their specific function at that moment, which is why it was decided to let them be directly controlled by the system, in this case: by the director. This means that the interactions that these characters could be used for will also have to be defined within the story.

To support suggestions the director will need some knowledge about what events would make the story evolve, like letting the hero and the villain meet.

Currently an action has one result. For the director to be able to use intervention, apart from the default result, other possible outcomes will need to be specified. The actors will always count on the default outcome in their plans to reach their goals.

7. EVALUATION

This research resulted in some design ideas, not in a complete implementation that can easily be tested next to the previous version of the Virtual Storyteller. Still we would like to point out what the new director could be able to improve on the stories generated so far [Ren04].

The following stories have been generated by the latest version of the Virtual Storyteller. To keep focus on the actual events these stories have been slightly rephrased. The generated language is not important at this point, since that is not a responsibility of the director; the events are.

7.1 Story 1

Once upon a time there was a princess, called Amalia. She was in the small forest. There was also a villain named Brutus, who lived in the eastern desert. And there are two swords: one in the mountains, and one in the large forest.

Amalia walks to the western desert. Brutus happens to walk to the western desert as well. Amalia sees Brutus and becomes afraid. She flees into the small forest, but Brutus follows her.

Amalia becomes afraid because she sees Brutus again. She hits Brutus. He lifts her up.

Amalia screams. Brutus is hopeful because he has Amalia in his claws. He walks to the eastern desert taking her with him.

Amalia keeps screaming while Brutus enters the castle. Amalia still screams when Brutus takes her hostage. And people spoke for years after about this sad event.

With proscriptive control, the director could have forbidden Amalia to scream for a third time, so she will have to choose another action, if possible. Seeing an actor react exactly the same for three times in a row, does not make the story progress.

By eliminating possibilities the director could have kept Brutus at bay. For example when Brutus wants to follow Amalia into the small forest, maybe he gets lost and ends up somewhere

else. This would give Amalia at least a little time to try to find help, like a sword.

The director could also have introduced a prince on his noble steed in the final scene, to demand a duel with Brutus, evolving the intrigue, making the story end a little less obvious. If the story still has a bad ending, at least it was exciting for a moment, when both sides had even chances.

7.2 Story 2

Once upon a time there was a princess, called Amalia. She was in the small forest. There was also a villain named Brutus, who lived in the eastern desert. And there are two swords: one in the mountains, and one in the large forest.

Amalia walks to the western desert. Brutus happens to walk to the western desert as well. Amalia sees Brutus and becomes afraid. She flees into the castle, but Brutus follows her.

Amalia becomes afraid because she sees Brutus again. She hits Brutus. He kicks back. Amalia starts screaming, and Brutus hits her. While Amalia is still screaming, Brutus lifts her up.

With a screaming Amalia in his hands, Brutus is hopeful his plan will succeed and he does, because he takes her hostage in his castle. And people spoke for years after about this sad event.

Again, Amalia is pretty hopeless in the end. After a couple of screams the audience already thinks: she is not going to make it, and they're right. Three screams while getting kicked, hit and lifted up in the air is also very poor acting: a bit more versatility to engage the audience would have been nice. The director should have forbidden her to result to the same action three times in a row, to avoid this boring repetition.

In this story Amalia starts the fight by hitting Brutus, when that was her only chance to run away. She knows she is weaker than the villain, so this is a rather poor choice of action, but maybe it was decided in the heat of the moment.

Apparently Amalia does not know Brutus is in control of the castle. It does bring the story to a quick end when she flees into the very building Brutus wants to hold her hostage in. The director could suggest to Amalia she might prefer to walk to the mountains or the large forest, or a character could be introduced to warn her of the true nature of the castle. This should avoid her fleeing into the castle, and raises her chances for finding a sword.

7.3 Story 3

Once upon a time there was a princess, called Amalia. She was in the small forest. There was also a villain named Brutus, who lived in the eastern desert. And there are two swords: one in the mountains, and one in the large forest

Amalia walks to the western desert. Brutus happens to walk to the western desert as well. Amalia sees Brutus and becomes afraid. She flees into the small forest, but Brutus follows her.

Amalia starts screaming for help and Brutus hits her. Amalia becomes afraid and hits him back. Brutus however lifts her up. Amalia screams while a hopeful Brutus kicks her. Amalia is still screaming when Brutus kicks her again. Brutus takes the screaming Amalia with him to the eastern desert.

When Amalia starts singing Brutus hits her to shut her up. Amalia starts screaming and Brutus hits her again. It doesn't help: Amalia keeps screaming.

Brutus takes her hostage in the castle. And people spoke for years after about this sad event.

The whole screaming, singing, hitting scenes are kind of boring, since nothing really happens except for Brutus showing he really is a brute. Something as demonstrative as that might be interesting for the beginning of the story, but not at the end. The newly designed director could have used his proscriptive powers to avoid this and let the actors do something not as demonstrative, but more progressive, to put it in Szilas' terms [Szi01].

The director could also have intervened by letting Amalia break free and flee. There is currently a rule that heroes can never run from villains if they are weaker, but in this case, the story has just started and ends before any intrigue could have developed.

7.4 Story 4

Once upon a time there was a princess, called Amalia. She was in the small forest. There was also a villain named Brutus, who lived in the eastern desert. And there are two swords: one in the mountains, and one in the large forest.

Amalia walks to the western desert. Brutus happens to walk to the western desert as well. Amalia sees Brutus and becomes afraid. She flees onto the bare plains, but Brutus follows her.

Amalia becomes afraid because she sees Brutus again. She runs off to the mountains. Unfortunately Brutus stays on her tail.

Amalia takes the sword she finds in the mountains. Brutus becomes afraid and kicks her. Amalia stabs the villain. And she lived long and happily ever after!

The sword is a key element in the story, since it gives Amalia equal chances in fighting Brutus. Of course there is only a small chance Amalia accidentally finds the sword that gives her the ability to actually conquer the villain.

It would be interesting if the director could introduce a hermit who tells Amalia about the sword, giving her a more fair chance. The director could also suggest to the princess to run to the large forest instead of running into the castle. Or the director could use intervention: the princess wants to run to the desert, but gets lost and finds herself in a large forest.

This is the one story where there is no real struggle between Amalia and Brutus, while now there is an even chance for them to win. The director could have used intervention by letting Amalia stab air the first time, after all, she is probably not a professional sword fighter. Hitting on the first strike is quite an impressive event, but killing him on a second strike is still an impressive action for a young princess, and it does add some suspense.

7.5 Possible Improved Story

We have looked at how the new director could improve the stories generated by the Virtual Storyteller so far, but to give a good example of the influence of this new director, here is a story the new system could theoretically generate. The adjustments are based on the possible improvements mentioned for the generated stories in the previous sections.

Once upon a time there was a princess, called Amalia. She was in the small forest. There was also a villain named Brutus, who lived in the eastern desert. And there are two swords: one in the mountains, and one in the large forest

Amalia walks to the western desert. Brutus happens to walk to the western desert as well. Amalia sees Brutus and becomes afraid. She flees into the small forest, but Brutus follows her.

Amalia becomes afraid because she sees Brutus again. She hits Brutus. He lifts her up.

Amalia screams. Brutus is hopeful because he has Amalia in his grip. He walks to the eastern desert taking her with him.

But there comes a knight on his noble steed to help the princess whose screams he heard. He demands a duel with Brutus for the princess.

Brutus accepts, but when he discovers the knight is stronger, he flees in to the castle.

The princess thanks the knight and continues to explore the world. When the knight leaves Brutus continues to follow Amalia for he still wishes to capture her.

On the bare plains Amalia meets an old hermit who tells her about a sword in the mountains which could help her if Brutus would bother her again. Meanwhile Brutus followed Amalia to the bare plains.

Amalia goes to the mountains to search for the sword and finds it. When Brutus arrives in the mountains he becomes afraid, because Amalia now has a sword.

Amalia tries to stab Brutus but she misses. Brutus hits her, but when Amalia aims for Brutus the second time she hits him straight in the heart.

And she lived long and happily ever after.

8. CONCLUSIONS

By introducing five simple means for the director to influence the actors the generated stories can already be greatly improved. The obvious improvements are adding some suspense because the main characters can get even chances to win, and removing some of those repeating actions.

To see whether the director can also improve the generated story on other fields, the stories will first need to get more complicated. There is currently little room in this little storyline to add real conflict or impressiveness to the story.

The evaluation also shows the importance of the way a story is told. Even if the plot would be perfect, it cannot engage the audience if it is told in this very direct way. Improving the way the plot is presented will be very important to take the generated stories to the next level.

9. DISCUSSION & FUTURE WORK

It is most difficult to define what makes a story 'interesting'. Szilas approach [Szi01] is a good start, but it needs adaptation to the story generation environment.

The found director features are all based on work and ideas of others. There may be more possibilities that just have not been discovered yet.

The evaluation is very theoretical. To see the actual results, the director would first need to be designed in more detail and

preferably be implemented. Only then a real evaluation can be conducted.

With the implementation of this design, it is important to keep some randomness in the action selection. Means of control are good, but we do want to be able to generate a variety of stories.

Since all the actors are autonomous emotional agents, the step towards interactive storytelling should not be such a big step to make. It would be interesting to look into what would need to be adjusted to actually make this step. Interactivity can make the experience a lot more interesting to the user, but it also adds a whole new challenge on how to make the story interesting from a first person point of view.

Another way to spice up the stories is to add more interaction possibilities between the actors, so they can collaborate and deceive each other, to reach their goals.

Also, the way the events are structured in a narrative is still very simple. With the use of more knowledge about narrative, the way the plot is presented to the user can be improved a lot, which also adds engagement for the audience.

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