StoryFactory – A Tool for Scripting Machinimas in Unreal Engine 2 and UDK

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Abstract. As part of our broader initiative on promoting the education in the field of computer science and ICT at high schools and universities, we have created the StoryFactory tool, which enables students to script short movies in a 3D virtual world. In an engaging way, StoryFactory introduces challenges posed by scripting 3D virtual characters and screenwriting. The tool is supposed to be used in ICT and/or media education classes. Here, we present the tool along with first results from its evaluations.

1 Introduction

With rapid advancements in computer science and ICT, the task of teaching these subjects at high schools becomes increasingly challenging. Today's children grow in stimulating ICT-rich environments, surrounded by computers, cameras, social networks and so on, all of which did not exist a couple of years ago.

Because our department runs a summer school for high school ICT teachers annually, we have the opportunity to learn how teachers cope with this rapidly changing ICT world. Our experience is that while above-average teachers do their best to familiarize themselves with innovations, they can hardly become experts on everything: their knowledge is often fragmented. Students' knowledge of ICT is also fragmented (and, in addition, often superficial), but due to ubiquity of modern technologies, the students often understand some aspects of the ICT world better than the teachers. In general, this undermines students' confidence in teachers' ability to teach them something valuable, which is particularly troublesome concerning talented students, who may become frustrated and lost for further ICT and media studies.

Our working hypothesis is that to overcome this problem, it may help to teach students only some engaging ICT topics in detail (after covering compulsory basics). This would lessen the requirements on teachers' knowledge. In our opinion, virtual reality, virtual characters, films, and virtual storytelling are examples of such engaging topics. Still, teachers need some support.

As a part of a larger project, called Robotomie (www.robotomie.cz), we have developed a freely available tool called StoryFactory (www.storyfactory.cz). This tool—we believe—can attract attention of technology-interested high school students yet be simple enough to be easily usable by high school teachers. In a nutshell, StoryFactory enables users to develop silent machinimas in a large virtual town with modern architecture, employing several teenage characters and a creature (Fig. 1). The characters are equipped with animations for the real world interaction, including

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dating. The graphical content has intentionally strong social aspect that is meaningful to teenagers. This, we believe, can further increase the students' interest.

The educational objective is to familiarize students with basics of 3D animations, virtual characters, screenwriting, and film editing. The teaching methodology is as follows: StoryFactory should be used as a supplement after an expository lecture on these topics. The goal of the student is to produce a short (up to five minutes) silent machinima employing two or three main characters. The machinima should feature a simple narrative arc. Then, the machinima is to be exported to a movie clip and either dubbed or subtitled.

In fact, several tools for producing machinimas already exist (see, e.g., [4]). However, they are often not tailored for our target audience (this requires, for instance, very simple user interface) and/or for usage in computer labs at high schools (i.e., simple installation, executable on outdated hardware etc.).

Short stories can be also developed in Storytelling ALICE, which can be used, in addition to teaching basics of 3D animation and screenwriting, to teach basics of programming [3]. However, while ALICE's target audience is middle school students and the graphics is tailored to that audience, we target high school students. Even though the procedural model underlying StoryFactory may be considered to be a subset of ALICE's procedural model, the surface representation in StoryFactory—dating teenagers—makes our tool more suitable for our target audience. In other words, we claim that the content is very important (see also, e.g., [1] concerning this point).

Fig. 1. The content of StoryFactory in Unreal Engine 2

2 Technical Details

StoryFactory runs on a freely available version of Unreal Engine 2 (UE2) [2]. This engine is 7 years old, making it more likely that the applications will run on usually slightly outdated school hardware (we also have an Unreal Engine 3 (UDK) version). The virtual city is about 500 x 500 m large. Five virtual characters are equipped with about 50–200 motion captured animations each and their surface textures may be alternated (e.g., color of their t-shirts, etc.). We developed most of this content ourselves.

The user controls the movement and animations of characters using a bird's-eye view map of the city and timelines (Fig. 2). The user can also use two cameras.

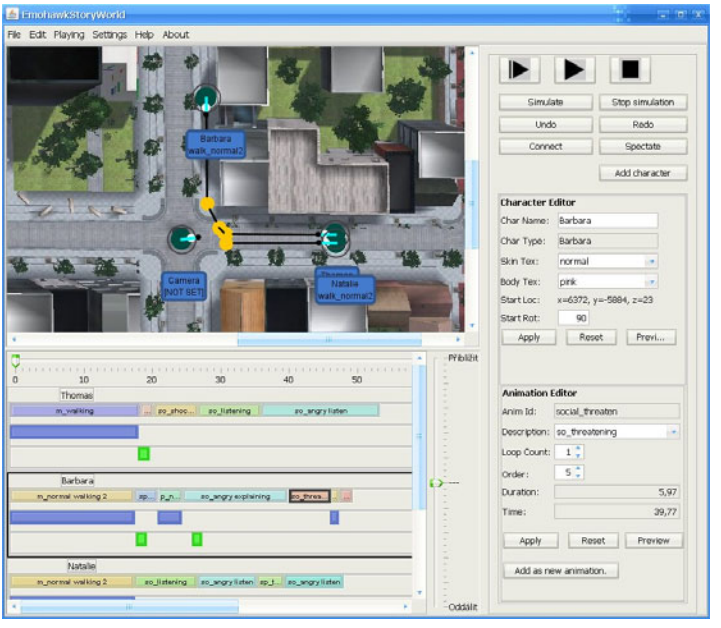

Fig. 2. The StoryFactory's graphical editor. Notice the bird's-eye view of the city in the upper left corner and the animation timeline for each character and camera below.

3 Evaluation

We have already made four small scale evaluations. First, we have informally evaluated graphical content with high school students during several lectures we had at high schools about 3D virtual characters during 2010. Results suggested that the graphical content was largely accepted by this usually very critical audience. Second, we conducted a more formal evaluation with high school teachers as part of our summer school in August 2010 (29 teachers participated). The results suggest that a) the background knowledge of Czech ICT teachers of 3D graphics and animations is minimal, but b) can be substantially improved in one 90 minutes long lecture and one 90 minutes long practical seminar with StoryFactory, and c) the acceptance of StoryFactory is positive (in several evaluative questions, the majority of teachers chose one of the two most positive scores on 5-point Likert scale). The third evaluation was conducted in November 2011 with high schools students (2 ICT classes, 24 participants altogether). The results indicate that a) the students are able to use StoryFactory effectively after a 90 minutes long tutorial, b) the acceptance of the tool by the target audience is positive, including the graphical content (one of the two most positive scores on 5-point Likert scale were chosen by the majority of students). Finally, in spring 2011, we ran a StoryFactory competition for small teams of high school students and teachers. The goal was to create the best short movie (up to three minutes) using StoryFactory running on Unreal Engine 2. The competition itself was successful with 20 short movies received (16 of them submitted for the competition). The feedback from both students and teachers was positive in general. Notable

comments are that a) even UE2 does not run smoothly on some school/home computers, yet some students would prefer to work with the UDK version, which is even more hardware demanding, b) students complained that they are missing some animations, but missed animations were surprisingly few. We are currently scheduling a new round of the competition for autumn 2011.

4 Conclusion

We have presented StoryFactory, a tool in which students develop short movies in a 3D virtual world using virtual characters. The main audience of StoryFactory is high school students and the tool is supposed to support teaching basics of 3D animations, virtual characters, screenwriting, and film editing. On a more general level, the objective is to help teachers to elaborate on these topics in detail using the tool, possibly attracting students to further ICT/new media studies. In this regard, we do not claim that StoryFactory is a silver bullet: students should be involved in other engaging and meaningful ICT-based activities beyond developing machinimas.

Our tool differs from similar tools in that its content and the usage methodology are explicitly tailored to the high school audience. To our knowledge, a tool for that audience was lacking. The tool, including the graphical content, was positively accepted by both students and teachers, as demonstrated by our evaluations.

StoryFactory was also used in spring 2011 in a new media class for undergraduates, who developed machinimas similarly to high school students.

The tool is freely available in Czech language at www.storyfactory.cz, where the students' movies submitted for the spring competition are available too. The English version is available upon request.

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