

GALA 2007 submission document

Title: CADIA BML Realizer
Track: Student
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URL: <http://cadia.ru.is/projects/bmlr/>

Movie file submitted: CADIA_BMLR_LQ.avi
We also uploaded a higher quality version in case an exception could be made to the restrictions. We were completely unable to compress the video to acceptable levels due to size/resolution restrictions. A **MUCH** higher quality version (67 MB) was uploaded with the name CADIA_BMLR_HQ.wmv and can also be found here in case of size limits:
http://www.steik.org/dump/CADIA_BMLR_HQ.wmv

Reference teacher: **affiliation:** Hannes Vilhjalmsson, Assistant Professor, Reykjavik University
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Process of development: CADIA BML Realizer was created as a final B.Sc. project in cooperation with the Center for Analysis and Design of Intelligent Agents at Reykjavik University. It was developed from January 2008 to May 2008.

Resources used:

1. Panda3D, 3D game engine
<http://www.panda3d.org>
2. Python, scripting language
<http://www.python.org>
3. Blender, modeling software
<http://www.blender.org>
4. Microsoft Visual C++

Resources required: CADIA BML Realizer was developed on an Intel Core2 Duo 3 GHz PC with 4GB ram and a GeForce 8800 GTS graphics card, under Windows XP. It was tested on a variety of other computers, including up to 5 year old laptops and worked admirably.

CADIA BML Realizer

1. The application and context of the work

BML Realizer is an open source animation toolkit for visualizing virtual humans in rich 3D environments. As an input to the animation engine we use Behavior Markup Language (BML), a new standard language for describing the coordination of body movement in animated characters. This standard is developed by a group of research labs across the world, including [CADIA](#) and [University of Southern California's Information Science Institute](#) (USC/ISI). BML Realizer uses ISI's [SmartBody](#) as the core of the toolkit, but with necessary modifications to make it completely independent, open and very easy to use. Specifically, we adopted a new rendering engine, called [Panda3D](#), and redesigned SmartBody's communication layer to make it usable in a simple single-application environment.

2. Novelty

The purpose of CADIA BML Realizer is mainly to widen the acceptance and recognition of BML (Behavior Markup Language). BML had been specified but few implementations existed, and at the time SmartBody was closed source. We wanted to create a toolkit that would allow anyone to visualize BML in action to both aid the development, without requiring special expensive hardware or costly software. Our project is not a research project but a toolkit and as such we do not claim that our work is state of the art.

3. The architecture

We do not attempt to create an AI, but provide the tools for others to do so. To do so BML is used, but BML is not our creation and several papers have been written on the subject, as such we think it is best to provide references to those papers instead. [1] [2]

4. Performance

The performance is very good, especially if the user has a dual core machine, which allows the Panda3D engine and SmartBody to run on separate cores. User responses (experienced people that have used/created BML) have been very positive.

The cons of the system are that it does not scale very well given the basic usage scenarios. To run complex AI in multiple characters we would likely need to move beyond a single computer and into distributed computing. SmartBody however is designed with that in mind, and so is CADIA BML Realizer, but some slight modifications would need to be done.

The pros are that it is very easy to use and has a great interface for developers. Creating scenes with characters is done in the same manner as any other scene is created and all development fits into the normal Panda3D workflow. It is also open source and free, allowing others to use our work or continue development. In fact, Northwestern University has already started to further development of CADIA BML Realizer.

References

SmartBody's official website:

<http://www.smartbody-anim.org/>

1. **Kopp, Stefan, et al.** *Towards a Common Framework for Multimodal Generation: The Behavior Markup Language*. Marina del Rey, CA, USA : Proceedings of Intelligent Virtual Agents, 2006.
2. **Vilhjalmsson, Hannes, et al.** *The Behavior Markup Language: Recent Developments and Challenges*. Paris, France : Proceedings of Intelligent Virtual Agents, 2007.