Adaptive Game World Interactions

MSc project proposal – 2011

This MSc project will investigate the automatic adaptation of the interactions available in game worlds, to better fit individual players.

The project combines two of our group's active research interests. One of them is game adaptivity, specifically the generation of game world content customized to fit the players experience, skills, preferences or style. For example, the generation of more complex building interiors for a player perceived as bored, in a serious game for firefighters. The other investigates semantic game worlds: virtual worlds where all entities are able to assume behaviors like in the real world, thus offering increased interaction possibilities. As an example, imagine a GTA IV-like city where the player can sit in any chair, use any vending machine or pick up any object and use it.

The goal of this project is to create an approach where the interactions that a semantic game world offers are made dependent of the player behavior, i.e. adjustable, at run-time, to better fit the player. As simple examples, imagine that the amount of damage a weapon (picked up by the player) can cause is dependent on the player shooting skill, or that the waiting period / speed of an elevator is adjusted according to the player's pacing style. All of these, and more, will then be supported by an automatic mechanism that matches player observation and requirements with the game world interactions' parameters.

Project description

This project will tackle several challenges, related to different existing fields, e.g. player modelling, semantic modelling, procedural content generation, game design. New techniques will be devised to combine them, with the aim of specifying how game interactions can automatically become aware of and responsive to the player. Eventually, this will allow the design of richer game worlds, where adaptive interactions are offered to players. Some of the main milestones and contributions in this project will be:

- A technique for representing the dependencies between gameplay meta-information and game world interactions;
- A design tool which allows game designers to specify such dependencies;
- A run-time engine for adjusting game world interactions, given an input set of measured player data;
- The integration of a simple player modelling technique, to steer such an engine.
- A case study which demonstrates the approach (probably a game or, at least, a game section).

The technique, design tool and engine will profit from our current in-house libraries and methods emerged from the research explained above. These include a semantic model and a semantic library that empower game entities with information about their attributes, relationships, services, etc. Also, we already developed a scheme for specifying the association between gameplay information and game objects (including player data dependencies). These methods are currently already being used in layout solving, consistency maintenance, (non-adaptive) runtime game interactions, declarative modeling and generation of adaptive game worlds.

The outcome of this project will combine with our own methods for generating adaptive game worlds, thus making a valuable contribution to incentivize the development of adaptive games. Recent conferences (such as FDG 2011) and games (such as Left 4 Dead 2 or The Elder Scrolls V: Skyrim) have shown the emerging interest given to run-time player customization. Adaptive game world interactions is a novel approach in this field, where game worlds are not only made more interactive, but essentially more rich in responding to the individuality of players, increasing therefore their engagement.

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Figs: a more slow-thinking Batman might actually need a simpler code lock to hack into. (Batman Arkham Asylum)