ANGELINA - Coevolution in Automated Game Design

Michael Cook and Simon Colton
Computational Creativity Group, Imperial College, London (ccg.doc.ic.ac.uk)

Figure 1: Screenshot from a game about a murdered aid worker from Scotland. The background image is of the Scottish landscape, and a red ribbon image has been selected to represent the aid charity.

ANGELINA

ANGELINA is a co-operative co-evolutionary system for automatically creating simple videogames. It has previously been used to design both simple arcade-style games and two-dimensional platformers. In the past, ANGELINA's efforts have been focused on mechanical aspects of design, such as level creation, rule selection and enemy design. We are now in the process of expanding ANGELINA's remit to cover other aspects of videogame design, including aesthetic problems such as art direction and the selection and use of external media to evoke emotion or communicate meaning.

ANGELINA has produced several new games for this demonstration, exemplifying the new abilities the system now has. Its co-operative co-evolutionary system for platform games is composed of four modules: (i) a level designer that places solid blocks and locked doors to shape the progress of the player (ii) a layout designer that places and designs the enemies the player faces, as well as the start and end of the level (iii) a powerup designer that defines what bonus items the player can acquire during gameplay and (iv) a creative direction module that arranges a set of media resources in the level for the player to discover during gameplay. This latter module is the newest addition to the system, and takes advantage of many new capabilities built into ANGELINA for retrieving content from the web dynamically for use in themed videogames.

Design Task

Inspired by the collage-creation problem described in (Cook and Colton 2011) ANGELINA obtains current affairs articles by accessing the website of the British newspaper The Guardian. It selects a news story, and attempts to design a short platform game whose theme is inspired by the news article selected. Currently, this allows ANGELINA to demonstrate simple abilities such as the appropriate selection of media from a wide variety of sources, and arrangement in a potentially nonlinear level space.

Figure 2: Media retrieved for a game inspired by an inquiry into a newspaper. Left: an image retrieved using the phrase 'newspapers and magazines'. On the right is Rebekah Brooks, one of the journalists in the investigation.

ANGELINA uses online knowledge sources such as Wikipedia to extract additional information about data retrieved from the news articles - it can, for instance, identify when a country is the subject of a news article, allowing the system to search photography websites such as Flickr for photographs of that country to use as a backdrop to the game. Keyword-based searches can also be augmented with emotional keywords to alter the results they return, based on techniques described in (Cook and Colton 2011). By reading live Twitter search results about a named person in the news article, ANGELINA can use search augmentation appropriate to the opinions it finds to retrieve media that reflect perceived public opinion of a particular topic. Although a simple technique, it is a first step towards the system dealing with opinion and bias through the work it produces.

Games

The games produced are simple platform games, loosely following the design tenets of the *Metroidvania* subgenre. The player must navigate the level space to reach the exit, but in order to gain access to later level sections, it is necessary to seek out and obtain items that add to the player's capabilities (for example: unlocking doors or changing the player's jumping abilities). As the player explores further they will encounter enemies, as well as images and sound content that is appropriate to the game's theme.

ANGELINA is implemented in Java, but the games the system produces are Flash-based. When ANGELINA has evolved a game design, it modifies an existing ActionScript game template to include the generated design content, as well as incorporating the media downloaded and selected from the internet. All of the games available in the demonstration, as well as others developed by the system, are available on the project website: www.gamesbyangelina.org

References

Cook, M., and Colton, S. 2011. Automated collage generation - with more intent. In *Proceedings of the Second International Conference on Computational Creativity*.