Addressing Scalability Limitations of Mobile Alternate Reality Games through End-User Content Authoring

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Abstract
Alternate Reality Games (ARGs) provide the player with a real world, interactive narrative experience. Mobile ARGs, which utilize geo-location aware devices, are limited by geo-specificity – they require players to visit real world locations. We argue that end-user authoring, coupled with artificial intelligence, can increase the availability of geo-specific content. WEQUEST is an authoring tool and game engine that supports allows end-users to create, share, and play mobile ARGs.

Keywords
Alternate Reality Games, End-User Content Generation.

ACM Classification Keywords
[Information Interfaces and Presentation]: Multimedia Information Systems – Artificial, augmented, and virtual realities

General Terms
Design, Human Factors

Introduction
Alternate Reality Games (ARGs) layer a fictional world over the real world, engaging the player in an
interactive story that plays out in the real world. With geo-location aware devices such as smart-phones, mobile alternate reality games can make use of real world physical spaces as environments in which the story plays out. By bringing play out into the real world, the player can benefit from rich social and physical experiences not possible with console gaming [3].

Although ARGs are growing in popularity, there are two significant problems that must be overcome in order to reach a wider audience. First, ARGs often require a large amount of human effort in order to run successfully. A game master is required to author the story instance and often monitor its state in order to make adjustments to the narrative arc or trigger branching points as necessary. Many ARGs additionally utilize confederate actors to play non-player character (NPC) roles. In mobile ARGs, confederate actors must be planted throughout the physical world to interact with players in real time. Secondly, mobile ARGs are by nature location specific, often the player is required to visit a certain location or landmark in order to progress the story.

Taken together, these two problems limit the ability of ARGs to reach the mainstream. Due to human effort of game masters and confederate actors, games are necessarily played infrequently and with small- to medium-sized numbers of participants per game. The geo-specificity of games means those games that are played are only accessible to those who live in the area in which the game is set.

We argue that the keys to scaling mobile ARGs are two-fold. First, we must automate the role of the game master and non-player characters, thereby pushing the game and story logic to geo-location aware mobile devices such as smart phones. Second, greater amounts of content – games/stories – need to be made available. A large library of games increases the likelihood that there will be stories of interest to different users and that some of those stories are geo-specific to different users. End-user content authoring is a practical solution to this: it provides players’ the opportunity to create games that play out in their own areas and fostering a community of sharing.

**End-User Authoring with WEQUEST**

End-user content generation is an increasingly common means of increasing the amount of game content available to players. It has been a prominent way of expanding content of desktop computer games, and has the potential to increase the number of games and the diversity of places that ARGs can be played.

Authoring tools can be devised to allow motivated
players to create new games for the places that they live and to share those games with others living in the same area. Authoring tools have been developed for audio tour guides [5], but stories are more complex than tours. The SpyFeet mobile ARG [4] allows users to program stories, which limits non-programmers.

To encourage end-user authoring, we developed an ARG authoring tool called WeQuest. In WeQuest, ARG stories are created by building a dependency graph, a directed, acyclic graph (DAG) where nodes correspond to story events in physical space and arcs impose constraints on visitation order. Story events, which require the player to be within a certain radius of specified GPS coordinates, involve engaging in dialogue with NPCs and using or acquiring virtual inventory items. Arcs between nodes represent dependencies that must be fulfilled for a particular event to fire. A dependency graph is thus a technique for managing lock-and-key style game play; for an event to occur, it must be “unlocked” by completing all other events it depends upon. Dependency graphs support linear stories, parallel multiplayer events, and branching.

Figure 1 shows the WeQuest authoring environment. In a modular fashion, locations to be used within the game (big boxes) are populated with story events (small boxes), which are linked together to create the lock-and-key story flow. An evaluation suggests people find authoring stories enjoyable and that the tool supports a wide range of authoring styles [2].

**Automating Game Play**

Once games have been authored, they can be published to the game server where they can be played and shared amongst users. The WeQuest game engine runs on an iPhone (Figure 2), but could easily be ported to any platform. Because the logic of story progression is encoded into the dependency graph structure, the Game Engine execution loop is simple: once a story (dependency graph) has been downloaded, the Game Engine periodically searches through the list of nodes to see if the player is within a certain radius of the node and all the node’s dependencies are unlocked. If so, the Game Engine follows the instructions authored into the node: show a picture of an NPC, show a movie, play an audio file, display a line of dialogue from an NPC, provide a set of dialogue options for the player, or present a virtual inventory item.

**Location Translation**

While end-user authoring has the potential to increase the amount of content available for players, stories will exist that some people cannot play because the stories are not set in locations easily assessable to all. An intelligent process, location translation, seeks to make all content accessible to all players regardless of geographical constraints. Location translation maps locations in a game story to analogous locations in a...
Conclusions

ARGs, while growing in popularity, must overcome significant scalability issues in order to reach the mainstream of gaming. In this paper, we argue that end-user content authoring is one potential solution to help overcome these issues. We present WEQUEST, a suite of tools which supports end-user content generation of ARG stories which can then be played, shared and translated.

References


