May 2008 Paper

Introduction

The Augmented Reality and Interactive Storytelling (ARIS) project is the continuation of proof of concept research into delivering a web based, portable platform for distributed authorship of an augmented reality virtual world.

In the original concept, an XML editor and flash player were employed to deliver an educational art history curriculum that explored how interactive storytelling used in physical context of a curated space may aid in the immersion and engagement of students. The interaction progressed as students made choices in virtual conversations with historical artists and moved around within a museum that contained works from those artists with corresponding location codes. Though the project was completed in only a rudimentary form, the team believed that the use of mobile, internet connected devices to scaffold the discovery of knowledge within a physical space was a promising endeavor. Our effort was to continue this work and address some of the concerns raised in the first exploration.

We began by designing a team that consisted of three members with diverse expertise, but a similar view of the science of teaching and learning. Chris Blakesley has a background in film, storytelling and instructional design, Seann Dikkers has taught and worked as a grade school principal and David Gagnon comes from a programming, instructional design and project management background.

Three goals emerged to guide the next phase of exploration and design:

1. Develop a rich, interactive narrative and player identity to structure and complement the learning treatment.
2. Employ multiple mechanics to identify the student location within the space in addition to GPS.
3. Develop new ways to encourage playful, critical interaction with a specific environment.

During the first iteration of design, a new curriculum was designed to teach middle-school aged students about the history and symbols of the state of Wisconsin through physically exploring the capitol building and adopting the identity of a historical researcher from the future who aims to solve a mystery. During the process of this design, the team feels it has met the stated goals and generated many future research opportunities for ARIS.

Theoretical Preface

- Setting, Roles and Goals can increase engagement and investment. (Jenkins - First Person)
- A narrative can facilitate the formation of expectations, activates prior knowledge through exposure to familiar patterns (such as genre, character types), contribute to a sense of confidence, and help form expectations (Bruner).
- Meaning is made through exploration of interests and interaction with others (Vygotsky)
- Place Based Learning theory states that when learning in community places (other than the school), people make meaning that contributes to civil action, community responsibility, and ecology awareness (Gruenwald, Orr).
- With the opportunity to exercise agency, learners become active producers of knowledge rather than (solely) passive consumers.
- Designed experiences have the capacity to situate and embody learning objectives
- Flow: Mihály Csikszentmihályi presents the idea of flow which was part of our design considerations. Based on his ideas, we argue that in gaming settings the game designer must consider that a game should be both challenging and interesting at the same time. This contrast is that a game can become too boring (uninteresting) if the brain discovers the patterns (Koster) and tires of the experience of the game because nothing new or challenging arises during the gameplay. Otherwise the game can err on the side of being too difficult also, a game that presents challenges without proper scaling and training embedded in the game in the early stages, will turn off the player because the challenges seem unreasonable to them. For the ARIS project this meant that for the game to be done well in such a new format, that game testing is essential. We still need to game test the initial prototype with playeres that can express their experience with the game.

Project Narrative

Hyper-personal computing, virtual/physical mapping and distributed authorship

We began with the goal of building a platform that would foster a new approach to location based learning using internet connected portable devices. This goal, in part, was motivated by the recent emergence of a new genre of hyper-personal computing devices that are identified by:

- Pocket-sized, soon-to-be popular culture device
- Wireless TCP/IP internet connection in addition to SMS messaging and telephone
- Ability to run 3rd party programs
- Audio and Video playback capacity

With the addition of a mechanism to determine the physical location of such a device, the possibility of creating virtual worlds with a one-to-one or many-to-one relationship to the physical world exists. At any physical location, a person with the appropriate device could determine if a virtual world had been created for their current location. If so, the device would act as a gateway to the virtual world, using the designed as content to augment the inhabited physical space and giving the location additional meaning.

With the possibility of creating virtual worlds mapped to physical realities it becomes apparent that crowd-sourcing may prove an effective method of populating the virtual spaces with educational material. The vision would follow that many content experts could author material for their particular expertise and a single user could navigate between them in a unified fashion. Following, players themselves could author content. This requires that the tool to create such a world is designed to be user friendly as well as affording logical interconnections between different authors’ worlds. The team needed to design the equivalent of a wiki for augmented reality. ARIS is thereby focused on creating a tool to create and play AR games, not a single game itself.

Much needs to be done on the idea of distributed authorship for such augmented reality projects. We believe that opening a usable engine will bring forth a wide variety of ways to account for space in these gaming environments.
Narrative Study

Does an emphasis on narrative, player identity (roles), goals, and player agency in instructional treatment design positively influence the process of learning? What attributes of stories and parables are the most effective in contextualizing systemic knowledge? In addition to exploring the design of augmented reality, one of our semester goals was to survey the research surrounding educational storytelling and interactive fiction.

Story

A sequence of events usually involving characters, settings and objects, and a theme.

Narrative

The *telling* of a story. Stories are shaped and repurposed to suit particular audiences in various methods, including oration, radio, television, literature, film, and games. As this process happens, a narrative forms.

Unlocking schema

Physical presence in a place combined with narrative interaction creates instant schema. In other words, location-based learning in a narrative context is a catalyst to the formation of experience and memories. Information related to that environment now has context.

Hermeneutics

The study of interpretation. Narratives are created differently in people's minds as they experience a text. For instance, people's past experience with stories means that they will approach a new story with expectations. An effective storyteller will account for this, and could violate some traditional norms in order to create gaps in the audience's interpretive trajectory. This heightens anticipation and engagement as a resolution is sought.

MacGuffin

Although we focused most of our narrative research on interactive storytelling type sources, we also found a film storytelling technique that helped our thinking: the MacGuffin. Alfred Hitchcock popularized the "MacGuffin," which he defines as an object which facilitates plot movement - although the purpose of the object doesn't really matter. For example, in the film North by Northwest, the MacGuffin is the mysterious microfilm Cary Grant's character is suspected of possessing, and is chased down for. The audience never discovers the specific contents of the microfilm. For our game, interacting with objects was a key game mechanic, so the idea of giving them a MacGuffin-like relevance to the story's plot-line seemed appropriate.

However, the aim of the first ARIS game was to teach as much as possible about objects at the Wisconsin capital, and their relationship to national and state symbiology, patriotism, etc. In researching the uses of the MacGuffin idea, we found that George Lucas was heavily influenced by the idea. Where Hitchcock believed a MacGuffin doesn't need to hold significance for any reason besides advancing the plot, Lucas argues that a MacGuffin works when it holds supreme significance, and is sought after by many characters in the story. For instance, the MacGuffin in Raiders of the Lost Ark, the Ark of the Covenant not only propels the plot, but is researched, debated, and explained throughout the story.

Consequently, we combined the approaches of Hitchcock and Lucas with our MacGuffins. Drawing upon these influences, we agreed upon a basic story premise that we felt complimented the learning standards and state capital location. The players will need to capture several objects at the capital as well as search for a lost agent as the primary goal. The reasons for doing this will be slowly - or perhaps never - revealed.

Immersion and Engagement

Immersion may be complemented by engagement by giving players agency within the system to affect the narrative (Douglas & Haradon, 2000).

Classic Narrative Formats

Aristotle's dramatic structure (three acts), Freytag's Pyramid, and The Hero's Journey (Joseph Campell)

Topic Selection

Our first approach was to utilize our relationships at the UW to find a faculty subject matter expert that would collaborate and utilize our project in their course. Some ideas included:

- Michael J. - Modern Art history and Art Criticism
- Betty Hurd - Retail Design and Material Culture

With the addition of Seann Dikkers to our team, we switched our focus to graduation standards for K-12 grades. This switch had some advantages and ramifications:

- Having a SME integrated into the team provides easy communication with the other designers, relieving the stress of charting a new process.
- Aligning our project with the teaching challenges of the K-12 world would serve the needs of many teachers.

We made the choice to approach the design so that the product would not only be fun but playable in school settings because it meets the curriculum delivery needs and would be easy for the teacher to employ. This includes assessing student performance with minimal teacher investment. For these goals to be met, the prototype game must:

- Deliver material from the national graduation standards that are implemented in public education
- Choose material that lends itself to a place-based environment

We identified 6 possible standards including symbiology, human-environment interaction, public works, and other ideas. State Symbiology rose to the top of this list by:
Rapidly prototyped game story ideas to gauge which ideas unlocked creative energy in the team
Envisioned the relationship between the possible sites and the topic. Which locations would be interesting?
Inquired into which ideas would require the fewest number of changes to the authoring tool we envisioned
Looked for a narrative structure that would unlock schema, have flow, lure the player with a MacGuffin, and was easily immersive.

Development

Rapid development iteration of ARIS editor and engine

The ARIS team established a value of cutting corners wherever possible to get us 90% of the benefit of an idea as quickly as possible. Though some downsides exist to this strategy, such as low quality graphic design and the generation of throw-away code, overall this bias gives the team the ability to try ideas at low cost and change paths quickly. In the professional world, we call this rapid prototyping and agile programming. Leave the long lists of functional specifications for Microsoft, we have things to try.

In the first iteration of a dialog engine, Adobe flash was used for a player and a single XML file was used to store the nodes of dialog and player choices. Microsoft excel was used to edit the XML file, then it was uploaded to a web server in order to share and test.

For ARIS to move forward, a more robust model was required for data storage. We decided to use the opensource industry standard of using the MySQL database server combined with a modified version of the PHPMyAdmin web based MySQL interface to edit the game data.

Though flash has over a 90% install base on personal computers, on portable devices, flash support is much more limited. Only the PocketPC/Windows Mobile platform has Flash 7 support. For a system like this to be successful, we want to utilize the devices that people already have, or will have in the near future. At this point, that means that we want to stick with standard HTML and JavaScript, which can be generated from a PHP-based system interfacing with the MySQL data.

Once the decision was made to structure the system in PHP/MySQL, it took around 20 to have a working version in place. This work allowed every member of the team to author content simultaneously, requiring only an internet browser for playing or editing.

Forming Team Roles and Structure

For the first round of ARIS work, each member of the team took on a different responsibility:

- Dave was doing development work, technical analysis of platforms and testing GPS and Loki feasibility.
- Chris designed the setting, story and player identity in addition to collecting and distributing research articles on narrative and AR
- Seann went on site to the capitol and started developing puzzles and sequence of events
- 1.5 hour weekly meetings were formed to determine next priorities were used in lieu of gantt charts of the entire semester which would be out of date before they were finished.
- No single member worked in isolation or could claim 100% ownership of any idea.

Creation of a master narrative

A story breakthrough occurred when Chris and Seann met out at the space (Capital) to work on the puzzles and game mechanics. We thought of a MacGuffin: the players would be on a rescue mission to save an agent. This seemingly simple decision was a big deal to us because it gave a broad context or connectedness to our various puzzles and activities. We also sensed that this story would afford new ideas and possibilities.

We created a chart for the whole game/story.

Soon after Seann started working at the capitol and Chris began working on the larger narrative, they combined their work and formed the structure of the game.

We started creating player quests and dialog content.

Interactive content requires hundreds of possibilities for interactions that may take only seconds for a player to complete when using a node-based structure.

Workflow Adjustment

Things slowed down because editor/our process was not optimized (Phase I issue) This led us to a shift in writing technique. One way that we streamlined the writing process was to reenvision what kind of writing literacy was relevant. Later in the paper we flesh this out as Phase I and Phase II authoring styles.

Refinement of the setting, plot and role of the player in the game narrative.

Creating order in non-linear storytellling through the use of quests.

Quests, in the context of ARIS authoring, are really nothing more than starting points in conversation with a virtual character that are unlocked by a particular event, and completed with another event. As soon as we began writing dialog and stories, the number of nodes exploded. By splitting the parts of the game into quests, we were able to reign in the complexity and abstract whole trees structures of nodes as independent quests.

Consistency check and Completing the Game

Filling in all the missing pieces of the huge structure we designed became overwhelming. While the larger narrative created a structure that gave meaning to the individual quests, we became anxious to see real students playing the puzzles that were already designed.
We visited the Capitol together for the first time as a complete team and walked through 4 of the quests and brainstormed design strategies for a 5th. Seeing the content in context of the space encouraged our team to continue building the remaining pieces, but as started in the following section, we formed some ideas on how development and design should continue.

Lessons Learned

Team dynamics

1. Meetings
   a. Weekly meetings work well to foster quick decision making and big-picture sharing
   b. Informal meetings, using the wiki and email communication (over 200 emails in 14 weeks) also facilitated for team communication
2. Team expertise must account for essential needs
   a. An integrated subject matter expert
   b. Programming responding to development
   c. Story Design
   d. Project Management

Tech Lessons

- Need Cell-Based Wi-Fi Connection. WiFi connections to the internet have very limited ranges and unreliable signals in Madison despite for the city wide wireless internet service. The UW Campus also provides wireless access for students, but it requires a web-based login. There is no systematic workaround for the captivator technology, though a non-scalable solution has been identified.
- Three core mobile environments exist, each with their own disadvantages and affordances
- Used opensource standards, decided to keep project opensource
  - Web Based Editor and Game using PHP/MySQL
  - Multimedia using Flash and MPEG4
- We built a structure in which you can fit lots of activity types
  - Nodes
  - Quests
  - NPCs
  - Locations
  - Items
  - Events
  - Other media types can be inserted into any other data type

<table>
<thead>
<tr>
<th>Windows Mobile</th>
<th>IPhone</th>
<th>iPod Touch</th>
<th>Android</th>
<th>Laptop/Tablet PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTML/CSS Support</td>
<td>Pocket IE and Opera</td>
<td>Safari</td>
<td>Safari</td>
<td>Android doesn't even really exist.</td>
</tr>
<tr>
<td>Basic Javascript</td>
<td>Opera</td>
<td>Safari</td>
<td>Safari</td>
<td>IE, Firefox and Safari</td>
</tr>
<tr>
<td>Full AJAX support</td>
<td>Possibly in PIE on WMI, we haven't tested yet</td>
<td>Safari</td>
<td>Safari</td>
<td>IE, Firefox and Safari</td>
</tr>
<tr>
<td>Hardware GPS</td>
<td>Using GPSGate and Opera or Local SDK</td>
<td>Local SDK Only</td>
<td>Local SDK Only</td>
<td>Using GPSGate, Local SDK</td>
</tr>
<tr>
<td>Pseudo-GPS</td>
<td>Local SDK exists for Loki</td>
<td>Local SDK Only</td>
<td>Local SDK Only</td>
<td>Using Loki in Firefox</td>
</tr>
<tr>
<td>Keyboard</td>
<td>Many choices</td>
<td>Touchscreen keyboard is limited, hardware keyboard is Currently Not-Supported</td>
<td>Touchscreen keyboard is limited, hardware keyboard is Currently Not-Supported</td>
<td>Full, Standard Keyboard</td>
</tr>
<tr>
<td>Camera Support</td>
<td>Camera support may be found through Flash on patioular models (awaiting confirmation), Local SDK</td>
<td>Local SDK Only</td>
<td>NA</td>
<td>Flash Support, Local SDK</td>
</tr>
<tr>
<td>Audio/Video</td>
<td>Done through Flash or Windows Media files and MP3</td>
<td>MPEG4/H.264 and MP3 only</td>
<td>MPEG4/H.264 and MP3 only</td>
<td>All formats supported</td>
</tr>
<tr>
<td>Flash Support</td>
<td>Flash 7 and Flash Lite 2</td>
<td>None</td>
<td>None</td>
<td>Flash 9</td>
</tr>
<tr>
<td>Touchscreen</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Accelerometer</td>
<td>No</td>
<td>Yes, though local SDK</td>
<td>Yes, through local SDK</td>
<td>Yes, through local SDK</td>
</tr>
<tr>
<td>Development environment(s)</td>
<td>Many languages for dynamic HTML/CSS/JavaScript C# for native applications Flash 7</td>
<td>Many languages for dynamic HTML/CSS Javascript Objectives C for native applications</td>
<td>Many languages for dynamic HTML/CSS Javascript Java-like language for native applications</td>
<td>Many languages for dynamic HTML/CSS Javascript Many options for native application</td>
</tr>
</tbody>
</table>

AR Lessons

Interaction with space

The space in which a game is played is much more than a set of GPS coordinates, it is an infinite resolution world waiting to interact with the player. Our team is exploring thee specific avenues of interacting with the space in which the games are designed. When a learner is physically positioned within an environment which contains information, specific schema are formed instantly by the experience (the combination of a place’s ambiance, story immersion, and game engagement will enhance learning potential)
1. Many spaces contain characters that can become part of the learning environment without knowing
   a. We gave the information booth workers a pivotal role in the capitol game because they know and will volunteer particular information
      more effectively than any other source such as google searchers or guide books.
   b. It is easy to envision borrowing common-knowledge information about a public character to inform player decisions. For example, the
      State St. character "Peace Richard" always chants through the names of the world's nations in alphabetical order on Library mall. If the
      player was present at the right time, this would be easily observed.
2. Items of permanence
   a. Any item which is reliably placed may be used as an element of the ARIS setting. For example, we used the position of statues in the
      Capitol as hints in the game.
   b. The original purpose and content of an item may be manipulated to support the designed experience. For example, with a numeric key,
      a plaque can be transformed into a secret message.

Locating the Player

A number of methods may be used to locate the player or ensure that they are at a particular location within the ARIS system

1. GPS works well for highly accurate location sensitive activities that are outside with a clear view of the sky and away from any interference to
   either trigger events or verify a target position.
2. Loki, an SDK for Skyhook wireless' WiFi triangulation technology, is used like GPS where accuracy can be reduced and indoor positioning is
   necessary.
3. Short answer, matching and sequencing questions can be used to conclude an activity which is location dependent.
4. Location sensitive, flash-based puzzles can be custom-constructed to ensure that a player is in the correct place. For example, we have created a
   2nd floor rotunda activity that not only requires the player to arrange the position of specific landmarks on screen to match the environment, but
   also match each on to their purpose in order to continue.
5. Multiple choice networks in dialog can use a series of questions to determine whether or not the player is in the correct location in a
   conversational format. This has been the most challenging and unnatural to implement.

Types of activities

1. Environmentally situated Puzzle (Gemini Poem)
2. Non-Environmental Puzzle
3. Research and Find (example: Find the genius)
4. Decrypt item of permanence with augmented key (example: cypher to pick letters on a plaque)
5. Fetch (example: Need 3 sister dopples for cryptic numbers)
6. Explore and Summarize (example: go look at the four items and summarize their meaning
7. Find a place/item in a photo (starfish)
8. Giving directions (as in "go the direction that item is pointing")
9. Camera overlay to indicate location
10. Find this sound

Some example activities from the capital game

<table>
<thead>
<tr>
<th>Name</th>
<th>Start</th>
<th>End</th>
<th>Player Debrief and/or concluding action</th>
<th>Method for Solving</th>
<th>Success Detection</th>
<th>Activity Type</th>
<th>Required Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freedom</td>
<td>In the north meeting room. Upon looking at painting of 3 sisters, the player is told to find the third.</td>
<td>Outside on the state st. corner of the capitol is a statue of the &quot;third sister&quot;</td>
<td>Factoid: Wisconsin valued the contributions of women in the state's history enough in 1893 to commission 3 statues to be built. The guidebook, the internet, talking to a guide, others?</td>
<td>Hardware GPS Research Find Information Gathering Critical Thinking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Find Genius</td>
<td>First quest of the Game, right after briefing. Player is told to find the genius. On the second floor, looking at statue.</td>
<td>Touch device to statue to do a &quot;molecular scan&quot; at which time the device plays a flash movie of a photo of the statue being scanned. Talking to a guide. Not easily found through internet research or guidebook</td>
<td>Series of multiple choice questions Research and Find Information Gathering, Communicating, Direction Following</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cryptic Poem 1</td>
<td>On second floor, looking at genius statue. A poem is given.</td>
<td>Still in room, looking &quot;through&quot; statue at the right angle to discover answer written on the ceiling.</td>
<td>Move directly into Twin guest Talking with partners about meaning of puzzle then carefully exploring the space Short Answer Environmentally situated Riddle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twin</td>
<td>Solved Cryptic Poem 1 and found the word &quot;genius&quot;. Genius means twin, we must be looking for a twin. Find a twin to the genius.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collecting Artifacts</td>
<td>A puzzle came in. Can you solve it? Match the object and the purpose of the object to its location on a map. Once a pair is properly placed, that location is solved. When all four are solved, puzzle is complete.</td>
<td>Puzzle &quot;unlocks&quot; showing the next location to go. Do we need to debrief the artifacts? Using on-screen map to find 4 artifacts, observing them, then interacting with a drag and drop puzzle.</td>
<td>Custom on-screen interaction Explore and Summarize</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Authoring process
Using the ARIS engine involved writing nodes, events, items, locations, and quests that all had to seamlessly flow for the player. From the perspective of writing, we found it to be nearly impossible to write large amounts of story without quickly falling into a very linear, 'which-way-book' kind of environment for the player. Upon game testing, segments that were written such actually became inconsistent, confusing, and distracting and needed repeated refinement. This brought out a need, from the development end, to rethink and reform how writing gets done in this setting. In fact, it wasn't really writing in a traditional sense. It was what we now call 'authoring'. One way to frame and title this shift for us was how the first half of the game was entered into the ARIS engine and how we entered the second half of the game. Phase I and Phase II.

In Phase one, the story was entered into ARIS chronologically from the beginning of the story forward. Each element was produced as the player would experience it. So, the nodes would be written and when they required an event, that would be written. At the point in the game where a player received an item, the writer would need to stop writing nodes and shift to writing a quest unit, then return to the nodes, making sure all the linking cell numbers worked smoothly. We found that this produced a game that generally worked, but, as pointed out, wasn't fun or engaging.

Writers changed the system by which the second two thirds of the game were put together. Productivity shot up in this phase, though we can't fully claim it was due to our shift in writing techniques. There is some possibility that we sped up simply as we became familiar with the engine use, however, we'd suggest that it was our familiarity that actually contributed to the development to a new format for authoring.

Phase II methods for authoring looked at the story more like a movie production than a novel. Instead of telling the story chronologically, we started to tell the story by entry type. This needs some elaboration. First we entered all remaining quests and assigned them numbers, then all remaining items, then events, and finally did the writing for the nodes. Knowing the numbers for quests, events, and items, allowed us to link as we wrote the primary story delivery going on in the nodes. It also enabled us to see what portions of the story could be told in non-traditional ways. Because the quests were written, we save redundancies and could reduce unnecessary and often 'clunky' writing in the nodes. Items carried narrative value as we could add images and text to amplify the players interaction with them. The nodes could then be streamlined, written all in line (not stopping to add a quest), and carried more of a sense of flow to the gaming experience. Phase II required pre-writing through the conclusion of the game, so that each category could be finished in it's entirety before moving on. We found creativity less limiting when we forced the engine to do what worked for the story versus creating a story based on what affordance the engine gave. This method also, and as an added caveat, sped the process up amazingly -- having pre-numbered all types of input. This was a far more constructed production process than a linear writing engagement.

Phase II then could also be called 'authoring'. It was born out of experience with the engine, design reflection, and a desire to get a working game finished. The method could have significance as it resembles the storyboard to filming process in the film industry, pre-writing for large text process, and the script to play endeavor in the theater arts. Out of necessity for performance, speed, and excellence then, we largely returned to the skills we learned (or should have) from our tenth grade English teacher that forced us to pre-write even if s/he did it outside of the context of necessity and efficiency. Formal structures of story 'props' may add a new twist in how we teach writing skills.

So this lesson beings to ask some larger questions. Should story writers learn how to write in more than just a chronological fashion? Writing vs. Authoring? Is there some constructive benefit to categorical thinking and building of plots? Does game design lead into different sorts of authoring processes? What affordance the engine gave. This method also, and as an added caveat, sped the process up amazingly -- having pre-numbered all types of input. This was a far more constructed production process than a linear writing engagement.

Next Steps in ARIS development

As of May, 2008 a successful proof of concept activity and technology has been established which indicates that much more can be done with the ARIS work if given more time. These are the categories we wish to explore next:

Technology

- Design a game level data structure to allow for multiple games to be developed simultaneously.
- Introduce additional variables which determine player state. Currently, ARIS supports the persistent existence or non-existence of player events and items which influence the available quest list and available options with NPCs. The status of each of these variables could then influence the choices available from a node as well as the behavior of a node. This intelligent node a behavior will drastically reduce the number of nodes required to create engaging and logical interactions. Possible extra-node variables include money, reputation, charisma, perception, etc.
- Develop a more robust method of skinning the nodes. We are currently working on an instant messaging theme and a video conferencing theme.
- Develop a graphical editor
- Create small, native servers for iPhone and Windows Mobile to allow access to GPS and Loki positioning from javascript without building a completely native client.
- Allow players to create and manipulate content in the virtual world.
- Allow players to interact with each other to exchange items and chat.
- Add asynchronous events using AJAX to support things such as an incoming text message without the player requesting new information.
- Scripting NPCs to move and change.
- Additional Feature Requests are found here

Process

- In an effort to most efficiently explore the possibilities of ARIS and inform the ongoing development process in a near real-time fashion, designers will prototype and playtest individual quests on a weekly schedule.
- Each activity will demonstrate the combination of one method for solving, success detection or activity type to demonstrate specific ARIS techniques in a unit-testable fashion.
- Create activities for the currently existing technology which has not been utilized:
  - NPCs
  - Money
  - Maps
- Design Individual studies utilizing specific combinations of the activities created above
  - How can player emotions be generated?
  - What is the effect on rich vs. nonexistent narrative?
  - How important is the player understanding of their role in successfully solving puzzles?
ARIS Techniques

Space Utilization

• Coached characters. For example, a bartender could be coached to be on the lookout for payers and responded in scripted ways.
• More?

Location Detection

• Arrange a series of images to match the environment (build a map)
• Pick a spot on a map
• Matching a player-taken photograph with a correct image using computer vision
• Visiting the correct website sets an event for the player
• SMS the correct number (with the correct message) sets an event for the player

Activities

• "Look through" camera with overlay to discover hidden information
• Find an item or place in an on-screen photo or map
• Obtain virtual copies of items.

Post Production

• Sound: Create and record music, sound effects, narration, and dialogue.
• FX - Transitions, animations, coloration.
• Video
• Polish - Maintain the highest fidelity possible for fast transfer rate.