Mobile Outdoor Game (Situational Visualization)
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Introduction

The growing ubiquity of mobile 3D graphics, GPS positioning, and wireless networking has made new computer applications (and new computer games) possible. We envision a mobile game where players are outfitted with laptops (or handhelds), GPS units, and wireless networking. The game might take the form of an "assassin" game, "capture the flag" game, or "foxes and hounds" game.

Capabilities

Here are capabilities which our software, hardware, and infrastructure can support:

- GPS units can position an individual, but only outdoors and with some inaccuracy, usually about the width of a two-lane road.
- A set of code is available to allow a wireless TCP/IP connection to a differential GPS server. This should increase the accuracy of the GPS position fix.
- The campus WiFi networking provides outdoor coverage around the Campanile and the south side of CRB. Several buildings have indoor coverage.
- An application for automatic campus WiFi login exists. Software should be designed with the knowledge that the network connection will be intermittent.
- We have a location server that allows computers to register IP addresses and latitude and longitude information. This is important since the wireless network uses dynamic IP addresses. Also, this serves as a central repository for accessing position information for all client computers.
- We have VGIS, 3D terrain visualization software, that displays 3D building models, satellite imagery, and 3D elevation data. A high detail model is available for the Georgia Tech campus. This can function as a "collaborative map". For the relatively flat Georgia Tech campus, a 2D map could also work.
- We have a weather server that transmits the position, speed, and direction of weather phenomena.
- An item server can be constructed, based on our server software that allows virtual items to be distributed across the campus.

Suggested Scenarios

"Foxes and Hounds (and Owls)"

One or more individuals are the fox(es). A group of owls are outfitted with GPS and wireless networked laptops. They must observe the fox(es) and vector the hounds to apprehend the fox(es). This is done by sending text messages to the hound or making markings on the collaborative map that the hound can see. The hound has also has a GPS and wireless networked laptop and receives the text messages and the markings. Both the owls and hound may have to duck in and out of buildings to send and receive information (due to wireless coverage).

"Assassin"

A group of individuals are outfitted with GPS and wireless networked laptops (or handhelds). These laptops send position information to the location server. When two individuals are within a certain proximity, they can have a virtual battle. The item server can position health, ammunition, etc. around campus so players can upgrade their capabilities. A variation to extend game play over time would be to allow users to "plant" a seed at any location. Over time, the seed will become some valuable resource. A variety of software functions can be added to help players set up a rendezvous for battle. One example would be to allow a player to mark regions on the software map. When a second player enters this region, the first player would be alerted. This allows players to set up virtual "triplines" across locations that might act as choke points for movement. The weather server could be used to create mobile, virtual "tornado" and "lightning" hazards for players to avoid.

"Capture the Flag"

This game involves two teams. Again, each player has a GPS and wireless network, transmitting their location if there is network coverage. Each team has a captain and a virtual fort. The forts can be located at CRB and the Campanile since there is good outdoor network coverage at these locations. Captains manage defense of their forts and collection of resources around campus. The captains watch the motion of both friendly and enemy forces. The captains send messages to their players. The players may need to go inside a building to receive messages due to network coverage. Players forage for health, ammunition, and weapons around campus. Energy resources can also be foraged to power the home base's defense shield. The "seed" variation on resource creation could also be employed. Captains may ask players to return to defend the home base, forage for resources, or attack the enemy base. The weather server could be used to create mobile, virtual "tornado" and "lightning" hazards for players to avoid. As before, when players are close together, they may engage in a virtual battle. Since team play is involved in this game, players can team up to attack an opponent. One option for defeated players is a return to base to sit in a recharging zone for a period of time before re-entering play.