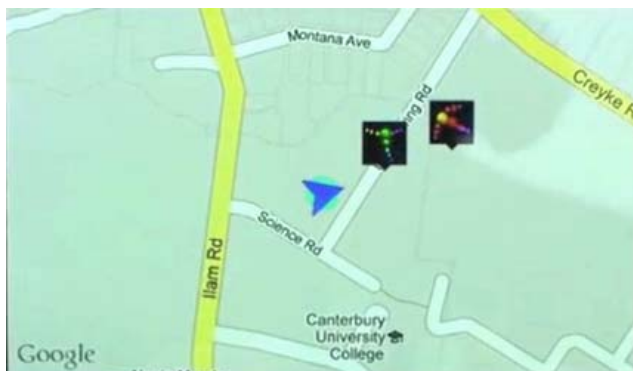


Demonstration: GeoBoids: Mobile AR for Exergaming

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ABSTRACT

We have designed a mobile Augmented Reality (AR) game which incorporates video see-through and spatialized audio AR techniques and encourages player movement in the real world. In the game, called GeoBoids, the player is surrounded by flocks of virtual creatures that are visible and hearable through mobile AR application. The goal is for the player to run to the location of a GeoBoid swarm in the real world, capture all the creatures there, then run to the next swarm and repeat, before time runs out, encouraging the player to exercise during game play. The most novel elements of the game are the use of audio input and output for interacting with the creatures. The interface design of the game includes AR visualization, spatialized audio, touch gestures and whistle interaction.

Categories and Subject Descriptors

H.5.1 [Multimedia Information Systems]: Artificial, augmented, and virtual realities;

General Terms

Human Factors, Gaming

Keywords

Augmented Reality, Mobile Gaming

THE DEMONSTRATION

GeoBoids is a mobile Augmented Reality (AR) game designed to combine fast-paced, arcade-style action with large-scale physical user movement for exergaming. The concept is that geometric creatures from the eighth dimension are visible in our dimension using a specially equipped device (the player's smartphone). They congregate in flocks in certain areas of our world. The player's goal is to travel to those places identified on a map, and collect GeoBoids, in order to help them return to their own dimension. Each species of GeoBoid has its own properties, including color, shape, flying pattern, active time of day/night, and affinities. Two main game-play modes have been implemented: Field Mode and Arcade Mode.

Field Mode play assumes the player is standing in a large open space, about the size of a football field. In this mode, the player sees a digital map of the local area, with locations of GeoBoid flocks displayed as overlays. These locations are randomly generated each time the player plays a level in Field Mode. The player position is denoted by an oriented arrow, which is updated dynamically as the player moves around the physical world. An audible sonar "ping" is played using spatialized audio according to the distance and direction toward a GeoBoid flock, helping the player to find the nearest GeoBoid. Once the player is within range of a flock, play switches to Arcade Mode.

In Arcade Mode, the player is faced with waves of GeoBoids with varying attributes, and must capture all GeoBoids in the level within a set amount of time to move on to the next level. Capturing a GeoBoid results in points and added time for the player, and different GeoBoids have different point and time values, depending on the difficulty of capture.

The game uses video see-through AR using tracking information from motion and location sensors. As a result, the GeoBoids appear visually and aurally as if they are situated in the real world.

The motion sensors are used to allow "point-and-shoot" interaction, with a swipe gesture used to capture the GeoBoid within the on-screen reticle. For the GeoBoid in the reticle, a health meter is displayed on the left side of the reticle, allowing the player to maintain focus, while still receiving game status. A continuously updating radar shows the location of GeoBoids around the player, and an on-screen countdown timer is used to provide motivation for the player to capture all the GeoBoids as quickly as possible. We have implemented several game levels with increasing difficulty as the player progresses.

One of the unique game mechanics is the use of whistle as an input option. Within the AR view, if the player whistles into the phone at the correct pitch and for the correct duration, the GeoBoids get scared. As a result, they flock more tightly, thereby making them easier to capture. Interactive feedback using an on-screen audio level is given to the player to let them know if they are whistling correctly.