Treating phobias with computer games using consumer level hardware and software components

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Abstract

Phobias are a relatively prevalent form of anxiety disorder [1]. Treatment for phobias, which can be debilitating, can be rather costly and difficult. We present a system designed to overcome the challenges of traditional treatment and the demands of current computer-based exposure therapy systems. Our system consists of affordable consumer level hardware and software components. Our system also leverages networking technology to enable the patient to engage in therapy in the comfort of their own home. These advantages have implications for the treatment of various types of phobia.

Challenges in Phobia Treatment

- Typically consists of exposure, which can be difficult to administer
- Involves a series of costs and outside challenges:
  - animal care, for animal-related phobias
  - travel to treatment facilities
  - entail use of public spaces
  - and potentially many more unforeseen costs and challenges...
- Computer-based exposure therapy typically requires:
  - specialized equipment
  - expert setup and configuration
  - a permanent or semi-permanent housing facility

Goals

- Immense the user in a virtual, controlled and safe environment where they can face their fears
- Use COTS components so the system can be used in the average computer user’s home
- Connect the clinician to the patient remotely (patient experiences treatment, potentially from home)

Our System

Our system PhoVR incorporates the following in order to overcome these challenges and provide an immersive experience for the user:

- The Kinect is a COTS product that allows the user to interact with the system using Natural Interaction
- Unity3D [2] provides visually pleasing rendering, a backbone for networking & security, and a rapid development environment for creating new treatment scenarios
- Drivers and middleware [3][4][5] provide access to the Kinect and its body tracking data

Clinician’s UI

The clinician is presented a UI with multiple controls for:

- Creating virtual entities, such as spiders, as needed for specific types of phobias
- Sending/Receiving and saving treatment questionnaires
- Managing clinical sessions using available database systems (such as MySQL, PostgreSQL, and Access)

Remote patient monitoring is realized through first person game controls (keyboard walk, mouse look). The clinician is able to walk about the scene and view the patient as an in-game avatar. This avatar, a 3D simplified human model, reflects the skeletal data from the patient’s Kinect.

Patient’s UI

Tracking the motion of the user using the Kinect allows the system to actively position the in-game camera in response to the user’s motions, creating an immersive experience. The Kinect also enables Natural Interaction with entities in the scene in a “reach-in” manner. This allows for the scoring of intimate interaction, for example “touching”, or reaching, for spiders.

References