

# Monkey Bridge: Animated Agents in Augmented Reality Games

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## Abstract

*Lifelike animated characters have received significant attention in recent years. Augmented Reality (AR) as a new media demands broader acceptance, which can be achieved by widening its application base to include entertainment and education. In this demo we show how animated agents make autonomous decisions based on their observation of an AR environment in which they are embedded. A multiplayer game illustrates these concepts, where users place real and virtual objects onto a physical surface, thus influencing the behavior of the characters.*

**Keywords:** AR, autonomous animated agents, multiplayer game

## 1. Motivation

Augmented Reality has stepped out beyond the usual scope of applications like maintenance, military training and production, and has been extended to entertainment, which will greatly contribute to a wider acceptance of this relatively novel research field. Animated agents or animated characters, in general, have only recently appeared in AR environments. By observing changes in both the physical and virtual environment, agents are capable of making autonomous decisions, enabling novel behavioral patterns and uncovering fascinating and hitherto unresearched challenges.

## 2. Description of the demo

A “monkey bridge” is a fragile wooden construction over a river in South-East Asia. People frequently risk their lives as they try to keep their balance crossing to the other side. In our demo two players dynamically build a monkey bridge for their monster-like characters using virtual and physical pieces of landing stage, which vary in shape. The goal is to reach a dedicated target in the middle of a virtual ocean. The characters autonomously choose: the path they walk on (see Figure 1); decide how to get from one platform to the other, e.g. climb or jump when there is a slight difference in height between platform edges; automatically choose the straightest path from several available tiles; and fall into the water if there is no suitable piece of landing stage to walk on. The game includes many spectacular virtual and physical visual elements such as animated 3D ocean waves, a flock of

virtual seagull birds, a real, illuminated smoking volcano and lighthouse with rotating lights. Sound effects enhance the playful nature of the game.

The game is built on the Studierstube collaborative AR platform [1] and the AR Puppet character animation tool for AR agents [2]. In the portable version of the demo each user requires a laptop equipped with a camera for tracking ARToolkit markers, which are used to position the ocean (e.g. the playing surface) in the physical world and the pieces of landing stage.



**Figure 1. The player agents autonomously plan their path and behavior (walk, jump, climb etc.) on the tiles**

## 3. Acknowledgement

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