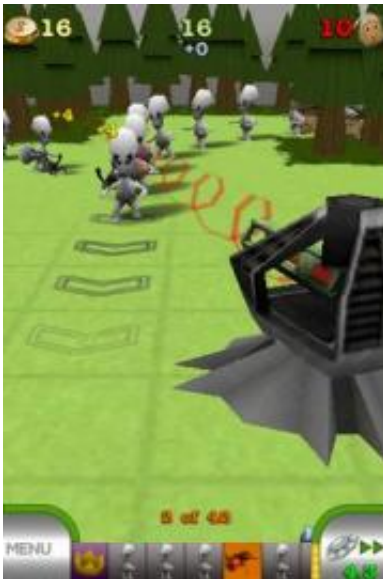


Cheat-Resistant 3D iPhone Game Relies on Score-Checking Replays (w/ Video)

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Screen shot from TowerMadness.

(PhysOrg.com) -- Aliens are stealing your beloved sheep and you've got to stop them. That's the premise for TowerMadness, a new 3D iPhone game that is one of the most cheat-resistant iPhone games available, according to its three developers, all with ties to the University of California, San Diego.

Three current and former UC San Diego [computer science](#) students created TowerMadness, the cheat-resistant 3D game which challenges players to repel alien onslaughts by constructing defensive towers in

strategic locations. A multi-touch interface allows TowerMadness players to zoom in and around the visually-detailed 3D action.

The game's cheat resistance is rooted in a unique online replay feature. In particular, the developers built a proprietary replay verification system that automatically replays high-scoring games and checks that players legitimately scored as many points as their devices are reporting.

"The replays allow us to verify that the games submitted to our servers are genuine, keeping the online global scoring fair and fun for everyone," said Iman Mostafavi, a computer science Ph.D. student at the UC San Diego Jacobs School of Engineering and one of the game's three developers.

Each replay is a tamper-resistant, highly compact recording of a player's actions over the course of a game.

"We've already thwarted several attempts at cheating," said co-developer Volker Schönefeld, a former visiting graduate student to UC San Diego's computer science department who is completing his doctoral degree at RWTH Aachen University, in Aachen Germany.

The replays are significantly smaller than a video of the same length and can be transmitted over the Internet in seconds.

TowerMadness' replay features grew out of the technology Schönefeld pioneered in 2003 for Waaagh!TV, his e-Sports broadcasting company. Waaagh!TV develops software that allows thousands of users to simultaneously watch live online matches of the popular computer game Warcraft III.

In addition to cheat resistance, the replay feature allows TowerMadness

players to show off their strategies and learn new ones by watching completed games. Anyone with a copy of TowerMadness can watch the replays.

The game includes additional online features supported by Google's App Engine cloud computing platform. Players can compete globally for high scores, download free additional game content, and share their games on Twitter and Facebook.

Schönefeld and Mostafavi, along with Arash Keshmirian, a UC San Diego computer science BS/MS alumnus, began developing TowerMadness in their spare time shortly after Schönefeld's first visit to the department in 2008. "With our shared interest in building apps for the platform, combined with many years of experience in developing computer graphics software, I knew we could push the [iPhone's](#) capabilities to a level where only experienced developers could compete. This would be an important differentiator in an already crowded marketplace," said Keshmirian, who is now an entrepreneur and consultant based in Silicon Valley.

On May 15, 2009, after nearly six months of development, TowerMadness scored a preview feature on the holy grail of iPhone gaming Touch Arcade, which fueled widespread anticipation for the release. The game went live on May 23rd, and news and reviews of the game began appearing on numerous blogs, web sites, and media around the world. Several days later, TowerMadness won an award from the prominent mobile gaming web site Pocket Gamer.

Another big visibility boost came when Apple picked TowerMadness for a prized high-profile spot on the iTunes App Store itself—the Featured Apps section.

"In a sea of over 50,000 apps, visibility is paramount. Being put in the

spotlight by Apple early on has been a tremendous boon,” according to the developers. Only a month since its launch, players have submitted well over 150,000 rounds of TowerMadness to the online leaderboards.

Much of the cutting-edge 3D graphics, programming and gaming know-how that is helping to make TowerMadness popular was developed, strengthened or nurtured at UC San Diego. The UCSD Department of Computer Science and Engineering (CSE) and the UC San Diego Division of Calit2 (California Institute of Telecommunications and Information Technology) played particularly important roles.

The trio’s company, Limbic Software, plans to continue releasing downloadable content and updates for TowerMadness. Hoping to bring the excitement of competitive gaming to mobile gamers, the game will soon allow players to compete for real prizes. The team is also working hard towards the release of their upcoming second game.

The TowerMadness web site www.towermadness.com features more information, screenshots, and videos.

Before developing TowerMadness, Iman Mostafavi worked on various visualization projects at Calit2, including some that matured into StarCAVE, a five-sided virtual reality room where scientific models and animations are projected in stereo on 360-degree screens surrounding the viewer, and onto the floor.

Mostafavi also develops algorithms for improving the quality and utility of 3D models that represent biological data gleaned from biological images taken by electron microscopes. Mostafavi performs this work at the National Center for Microscopy and Imaging Research (NCMIR) at UC San Diego, which develops state-of-the-art 3D imaging and analysis technologies to help biomedical researchers understand biological structure and function relationships in cells and tissues.

Mostafavi also collaborated on UC San Diego interactive artwork, shown at SIGGRAPH 2007, that explored new ways of representing nature in the era of metagenomics.

At UC San Diego, Keshmirian developed physically-based simulations of light transport to produce realistic images of various phenomena, such as light passing through plant leaves. Keshmirian's 2008 thesis, with advisor, computer science professor Henrik Wan Jensen, describes a new, and significantly more complete model for the simulation of light within camera lenses. The techniques can be used to artificially produce many of the effects observed when taking photographic pictures in the real world, thereby enhancing simulated images. Keshmirian was also the editor of the photography department at the UCSD Guardian, the university's official student-run newspaper.

“Having the opportunity to take two completely different perspectives on photography: scientific and artistic, was a real boon for both my research and my art,” remarks Keshmirian. Keshmirian's creative eye helped him develop the quirky-cute visual style for TowerMadness.

During his six month stay at the computer science department at UC San Diego, Schönfeld worked on his Master's thesis, the topic of which is the mathematical analysis of physically-based simulation of light as it travels through a virtual scene. Schönfeld performed this research under the supervision of computer science professor Henrik Wann Jensen.

Provided by University of California - San Diego ([news](#) : [web](#))

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