

Augmented games can increase the diversity of sports

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Augmented climbing wall increases social interaction, helps to attract wider target audiences and empowers users to become content creators.

Augmented climbing wall operates as a huge touch screen. It combines body tracking with custom computer vision software, depth camera, and projected graphics. A conference paper about the system received a best paper honorary mention in the ACM CHI 2016, the leading conference on Human-Computer Interaction.

"The goal of the augmented climbing wall is to increase the diversity of movement and add new challenges to the sport," states Perttu Hämäläinen, professor of computer games at Aalto University, Finland.

The study highlights three opportunities in digital augmentation of a sport. First, interactive augmented visuals can increase the diversity of movements and challenges. Secondly, users can easily become [content creators](#) with a low risk. And thirdly, digital content can be procedurally generated for endless gaming experience.

"Climbing as such, is mostly climbing upwards with your own pace. Augmented climbing makes it different, as you can add new challenges, such as timing of moves, evading moving obstacles, and climbing in all directions. . The system also makes possible to have hundreds of climbing routes on a relatively small wall," says Postdoctoral researcher Raine Kajastila.

Digital augmented content allows anyone to create new games and challenges. It even enables a social community of players giving advice to each other. It is possible to create one's own climbing route, which can be rated and commented by others. The researchers believe such a safe-to-edit digital content layer could be extended to other sports as well.

"What was surprising that 3 out of 50 respondents mentioned the augmented climbing game making them to forget their fear of heights. And climbing downwards, often regarded as boring, was considered meaningful and fun," adds Hämäläinen.

Other responses of the climbers included, among others:

- Fun endurance practice that does not feel like practice. Makes one sweat, panic and laugh.
- Spending a longer time on the wall.
- Really great grip practice! I forgot to fear heights and falling.
- More exciting, one could participate as a spectator by giving instructions related to the moving lines.

There are also challenges that can provide pointers for future work. Climbing close to such a large display causes challenges for perception and interaction, as the climber cannot always perceive what happens for instance below his or her feet. Furthermore, extrinsic motivation such as leaderboards may induce cheating. The most common cheating method was to use two simultaneous players in order to score as high as possible. In addition, the magnesium carbonate dust in the climbing gym caused challenges for the hardware. The projector and computer need to be well protected from the magnesium dust, otherwise they will break fast.

"However, the Augmented climbing wall is versatile and compact. In addition to the use in climbing gyms, it seems a good fit for indoor sports facilities for children, fitness centers and events. The users highly recommended that the games are suitable for all from kids to advanced climbers. Dozens of climbing centers all around the world have already contacted us and would love to have one," concludes Kajastila.

The Augmented climbing wall has been in continuous daily use for months in two locations Boulderkeskus bouldering gym in Helsinki and Irtimaasta family climbing center in Tampere.

A patent is pending for the Augmented climbing wall technology and the [climbing](#) wall project is currently in a commercialization phase, soon available globally.

More information: A conference paper about the system received a best paper honorary mention in the ACM CHI 2016, the leading conference on Human-Computer Interaction.

[mediatech.aalto.fi/~rakajast/P ... 2016_cameraready.pdf](https://mediatech.aalto.fi/~rakajast/P..._2016_cameraready.pdf)

Provided by Aalto University

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