Interactive bouldering wall using motion detection and projected images

The aim of this project was to create a platform that would enable making cheap and simple to set up interactive climbing walls.* This piece of software detects and tracks motion and is then able to project contextual information on the artificial climbing wall for the climber to see. This projection can for example be used to point out certain places on the wall that the climber must reach and touch, after which a trigger is activated and the target is moved to a different area of the wall.

This setup can quicly and cheaply be implemented on existing climbing walls, as it only requires the addition of a webcamera, video projector and a low-power computer to run the software. The camera, along with the projector is placed a few meters from the wall, so that the climber can see the images projected on the wall.

The motion tracking of the climber is accomplished by background subtraction using Python and the OpenCV library.

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Public repository:
bitbucket.org/lauri_miller/

First the backround image is captured, after which the motion tracking starts.

The image is first desaturated, then blurred to reduce noise from the camera.

Then the backround is subtracted from the current frame.

The image is diluted and a certain threshold is selected to seperate change from the base frame.

The contours of the changed area are applied to the captured frame.

**A note on climbing walls: artificial walls and gyms are used as a training tool by rock climbers or climbed as a form of recreational activity.*

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