**Bachelorproject "AR Demo with Google Cardboard based on javascript"**

**Student:** Lukas Riesen riesen.lukas@students.unibe.ch

**Advisors:** Siavash Bigdeli, Matthias Zwicker

**Goal:** Develop an augmented reality demo using Google Cardboard based on javascript code and existing libraries. Augmented reality includes using input devices (camera, hand tracker) to track real objects, modify/"filter" real images, render and manipulate virtual objects over the real background, enhance scene (textures, videos), or 3d reconstruction.

Example demos could be

- Rendering a virtual object into the videostream captured by the device camera. Virtual object is anchored at a fix location in the real world.
- Add user interaction. Let the user move the virtual object. For example using a hand tracking device, https://www.leapmotion.com/ (not sure this has a javascript SDK)
- AR game, like a virtual chessboard, or balancing a virtual object on a real one.

**Steps:**

1) Set up and test a rendering library on top of WebGL
   - Either three.js, or develop your own (port jrtr from the computer graphics course, for example)

Milestone: Test with a small demo app, like a 3D viewer, or simple game

2) Set up and test an AR library
   - awe.js https://github.com/buildar/awe.js/

Milestone: Test with a small demo app, for example basic tracking of a planar target

3) Make a Google Cardboard AR demo using 1) and 2)
   - https://www.google.com/get/cardboard/
   - ideas for demos see above

**Minimum requirement to complete thesis:**
AR tracking demo, where a virtual objects is rendered onto a real background image captured by the device camera, and shown on the Google cardboard screen

**Extended features, if it goes well:**

- Hand tracking, gesture recognition
- User interaction with virtual objects (move them around based on gestures)
- Develop a simple game (virtual chessboard)
- Share virtual data between multiple users (multiple users see same virtual objects, maybe can even manipulate/move them using hand gestures)

**Background material**

- Material on web about Three.js, Awe.js
- Demos and blog posts, for example http://www.sitepoint.com/augmented-reality-in-the-browser-with-awe-js/