SA/MA “Remote AR exploration using Micro Quadrotors”

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Introduction
Head mounted displays (HMDs), through which one can simulate immersive remote inspections of interesting sites, are becoming accessible and easy to interface. At the same time, Micro Aerial Vehicles (MAVs) represent a unique opportunity to establish video-links between remote sites, and to film such locations from viewpoints that would otherwise be impossible to reach. In this project, we want to build an immersive AR system that allows user to inspect remote sites while sitting at their desk. Rather than offering a simple video-link between the two sites, we are interested in presenting to the user video streams of the place augmented with graphics and other information. In addition, we want to give to the user full control over the MAV, and thus we are interested in enabling piloting of the robot through head and body movement, as well as hand gestures. To complete the immersive system, we plan to use HMDs for immersive rendering.

Thesis Description
In order to enable remote exploration of remote sites, we plan to use HMDs, full-body/head/hand tracking and AR techniques to create a seamless, immersive experience. The student is expected to design, implement and evaluate the proposed system developing: a) immersive AR rendering from aerial views of a remote site; b) video streaming and augmentation; c) MAV flight control through head/body/hand movements (with the possibility to use existing group’s resources). The goal is to develop a fully working system that will allow a seamless remote exploration, and to demonstrate its usability in a real-world scenario.

Requirements
The ideal candidate will have a background in Computer Vision and Software Engineering. Solid programming skills, especially on vision and AR related topics, and an interest in hands-on development and experimentation is also a requirement.
Programming languages: C/C++ - (Optional) Additional development tool: Unity