

## Thesis Project – M.Sc. / Civ.Ing. Level

**Title: Video analysis in sports using a depth camera on an aerial drone system**

The majority of kinematic analyses in sports and health today are performed indoors in specific laboratory settings due to the vast amount of required equipment and the need of a controlled environment for accurate data. However, many sports and activities cannot be performed in such settings due to the confinements given by the room and used tools. Instead, we explore the use of depth cameras on aerial drones that autonomously fly and follow the subject person in the actual environment where the activity takes place. This allows us to closely follow athletes in their natural settings, such as cross-country skiers on an outdoor ski track or canoeists on water.

We have access to the latest depth cameras from Intel; the Intel RealSense cameras and an aerial drone. 3D pose extraction from depth cameras and video cameras exists and can be used, but needs to be adapted to a drone and the given application.

In this thesis project, the student will work on designing, implementing and testing software for video analysis using 3D pose estimation tools. We will combine the video analysis with motion and force sensors for further data collection. The task is to investigate what functionalities are required by the athletes (and their coaches) and how we can build such video and sensor analysis tools. The work will be carried out in close collaboration with researchers at KTH.

The project can fit in several degree areas, such as computer science, computer engineering, IT, embedded systems, machine learning, electrical engineering, medical engineering, sports technology, or similar.

This thesis work will be based at KTH Flemingsberg in the division of Health Informatics. This activity can be offered as either a master and/or 'civilingenjör' thesis project. We can accommodate up to two students. The starting date is flexible.

### **Application information**

If you are interested in this project, please contact the supervisor by e-mail at: [martin.jacobsson@sth.kth.se](mailto:martin.jacobsson@sth.kth.se)