1   2021vj HTES 1 – UWB positioning Area 51

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Context

Area51 is an indoor urban sports in Eindhoven. Urban Sports Performance Center (USPC) is interested in professionalizing urban sports through the use of new knowledge, technology and innovation.

The SMC is a setup for BMX athletes to be able to take measurements permanently on BMX freestyle riders during training and competitions. TeamNL trains 3x a week in Area51, and with the measurement system and additional services, Area 51 and USPC expect to be able to attract other professional teams for high-quality movement analyzes (training camps, test days).

SMC also makes it possible to monitor interesting data during competitions; on screens in the venue and online (on site on mobile phones and via streaming for fans worldwide). To support jury members, but above all to increase the public experience (similar to how the images during Formula 1 or Tour de France are reinforced with data.

A previously implemented version of SMC consisted of 8 beacons and is temporarily hanging in Rotterdam. This setup may be used for the assignment, in consultation with USPC. The SMC setup at Area 51 (with 32 beacons) will start in January / February 2021.

Assignment

Developing a software solution for SMC to improve BMX sport by tracking the movements of athletes. This software system uses Unity3D and integrates the movement of BMX cyclists in this virtual environment. Use is made of UWB (Pozyx), but other sensors (e.g. IMU) can also be added to improve the sports analysis and / or experience.

Assume the existing Pozyx system on Area 51 (32 beacons). The first step is to restore / rebuild the existing software with the new Pozyx hardware and to determine to what extent with the new hardware everything still communicates well with each other, to define a regression test to further develop the system. The second part of the assignment is to experiment with the accuracy of the measurements (optimization signal processing, algorithms). This should lead to a stable and user-friendly (er) system. In this phase it is also important to translate the user requirements regarding sports analysis and sports experience into the software system to be delivered. In general, the users are not very skilled in ICT (athletes, coaches, sports scientists).

Aspects in carrying out this assignment are: being able to project interesting data in real time during competitions (on screens in the room and online) or possibly applying augmented reality: you would then be able to display movements on mobile phones next to (or instead of) on screens.

Technologies, a.o.:
- Pozyx UWB,
- Unity3D and or ARcore