## MOTION CAPTURE MIDDLEWARE FOR DIRECT AVATAR CONTROL

XSens develops high-end wireless motion sensors that allow capture of movement. At the research group Ambient Intelligence, we use these sensors in various projects, for example to help elderly walk in a more stable manner, to provide children with a more fun way to do certain physical exercises, or to provide physical therapists with more insight into the progress of their patients over time.

At the moment we mainly use software developed in LabView to obtain and process the motion data. However, most of the AmI researchers and HBO-IT and CMGT students who work on projects with them have little to no experience with this proprietary graphical programming language. Therefore, we want to develop an alternative solution in Python which will be easy to use, extend and test, and which will be made openly available through GitHub.
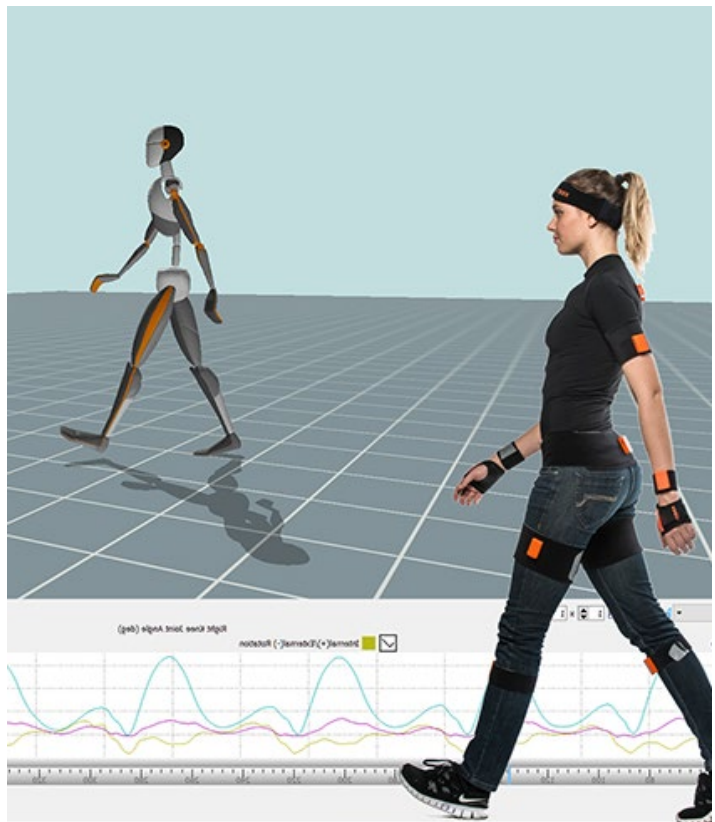
TASK DESCRIPTION

For this project, you will need to:

- **Develop Python middleware** to capture the XSens data, log it, and pass it on to a client application. This middleware should allow for multiple clients and should include easy interfaces for flexible sensor position setup, limb measurement setup, and a calibration procedure. All data logging and passing should be according to industry standards. It should work on both Mac OS and Windows.
- **Test the middleware** thoroughly and **publish it as open source**, so others within and outside our research group can reuse it.
- **Develop a minimal prototype client application in Unity** in which you see a virtual person moving their arms (and possibly more other limbs) matching the motions from the sensors.
- Optionally, **implement basic algorithms to reduce measurement errors** in the sensor data.

In this project, you will learn about motion capture, data processing, testing, Python, and Unity. Your solution will be used in follow-up research and student projects, and through its open availability by anyone else in the world who needs it!

PRACTICAL INFORMATION

- **Student profile:** HBO-ICT SE or CMGT-ENG, graduate student; knowledge of Python and Unity is a plus.
- **Duration:** February 2020 – July 2020.
- **Compensation:** 230 euro per month (before taxes).
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