Internship offer 2021

Title	**3D Camera, Ambient Sensors and Artificial Intelligence for the Measurement of Human Activity**
Internship level	Master 1, Master 2, Engineer 2nd or 3rd year
Start date and duration	4 to 6 months until the end of July. Internship of a long privileged duration.
City, Country	Annecy, *France*
University, Laboratory	University of Savoie Mont Blanc LISTIC - Computer Science, Systems, Information and Knowledge Processing Laboratory https://www.univ-smb.fr/listic/en/pages-en/ambiant-intelligence-in-the-habitat/
Description of the internship subject	Keywords: 3D camera, Internet of Things, Artificial Intelligence The context of this internship topic relates to **ambient intelligence** for the measurement of human activities indoor. It is part of a research program combining **sensors**, **artificial intelligence** for the analysis of **human indoor behavior**, particularly actimetry. https://www.univ-smb.fr/listic/pages-fr/intelligence-ambiante-dans-l-habitat/ Devices composed of non-intrusive, inexpensive but not very accurate sensors are likely to be able to provide useful information. For this purpose, it is necessary to calibrate them and to learn the relationship between their signals and the activity in the 3D scene. This step can be performed using more accurate sensors such as 3D cameras. Thus, eventually, it will be possible to perform these measurements without a 3D camera, in a non-intrusive and anonymous way. The objective of the internship is to make this learning possible; the expected result is the real-time labeling of human movements in a scene using 3D cameras. This will include detecting the presence of people, measuring relevant parameters such as movement speed, step distance, step placement or laterality identification. The subject of the internship is broken down into different steps: 1st step: getting to know the development tools and the realsense 3D camera (L515), including the library related to the "skeleton" (https://www.intelrealsense.com/skeleton-tracking/), definition of a set of movements or postures to be recognized. 2nd step: Development of a real-time identification and measurement system based on 3D sensors. Realization of a demonstrator. Experimental estimation of measurement uncertainties. 3rd step: Study of the needs for learning non-intrusive devices. This step will integrate the 3D shared knowledge of the scene to make the detections and localizations made by the 3D camera coincide with the position of the other sensors. 4th step: Implementation of the learning process. Note: powerful (NVIDIA PC+GPU) and lighter (NVIDIA Jetson Nano or NX) computing platforms will be made available. Continuation of the internship as a PhD project is possible.
Required skills	Autonomy, creativity, rigor. The desire to learn. Good ease in programming, knowledge/experience in machine learning, deep, 3D libraries appreciated.
Gratification	Paid internship in the order of 520 € / month.
Tutors / Contacts	Stéphane Perrin / Eric Benoit stephane.perrin [@] univ-smb.fr eric.benoit [@] univ-smb.fr, Alexandre Benoit : alexandre.benoit[@]univ-smb.fr