

### Internship offer 2021

<b>Title</b>	<b>Smart plinths: connected and intelligent plinths for the detection of human activities</b>
<b>Internship level</b>	Master 1, Master 2, Engineer 2 <sup>nd</sup> or 3 <sup>rd</sup> year
<b>Start date and duration</b>	4 to 6 months until the end of July. Internship of a long privileged duration.
<b>City, Country</b>	Annecy, <i>France</i>
<b>Laboratory</b>	LISTIC - Computer Science, Systems, Information and Knowledge Processing Laboratory <a href="https://www.univ-smb.fr/listic/en/pages-en/ambient-intelligence-in-the-habitat/">https://www.univ-smb.fr/listic/en/pages-en/ambient-intelligence-in-the-habitat/</a>
<b>Description of the internship subject</b>	<p><u>Keywords</u>: sensors, Internet of Things, Artificial Intelligence, mqtt, nodered</p> <p>The context of this internship topic relates to <b>ambient intelligence</b> for the measurement of human activities indoor. It is part of a research program combining <b>sensors, artificial intelligence</b> for the analysis of <b>human indoor behavior</b>, particularly actimetry. Devices composed of non-intrusive, inexpensive but not very accurate sensors are likely to be able to provide useful information.</p> <p>The objective of the internship is to produce a prototype of a connected and intelligent plinth. Integrating different environmental sensors (luminosity, CO2) as well as light strips (led), it will be able to identify human activities such as counting people, detecting the speed of movement of a human, the distance of steps.</p> <p>The internship integrates the implementation of sensors and actuators by IoT, the processing by IA and must provide a demonstrator "showcase" at the end of the internship. The use cases of the demonstrator could be a customizable light path, the case of an alarm with a light path leading to the exit as well as people counting.</p> <p>The subject of the internship is divided into different steps:  1<sup>st</sup> step: getting to know the tools related to the IoT (nodered, mqtt) and the implementation of the sensors and actuators provided.  2<sup>nd</sup> step: Development of the prototype for a plinth unit. Realization of a first demonstrator integrating the evaluation of the actimetry capacities using the present sensors. A variety of sensors will be available: luminosity sensors, presence sensor, low-resolution thermal camera, etc. Their integration will be done by step and relevance.  This step will be able to integrate learning campaigns.  Integration and implementation of actuators (led strips). Developments will be based on APIs to be created.  3<sup>rd</sup> step: Study of the integration of other plinth units in the device: length extension and opposite plinths; the latter case involves information fusion mechanisms.  4<sup>th</sup> step (following progress): integration in the learning process of the "ground truth" provided from 3D sensors, the study of which is the subject of another parallel training course.  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.</p>
<b>Required skills</b>	Autonomy, creativity, rigor. The desire to learn. Good ease in programming, knowledge/experience in machine learning, deep, IoT appreciated.
<b>Gratification</b>	Paid internship in the order of 520 € / month.
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