

Internship 2025

Title	Measuring human gait using AI and non-intrusive, diffuse sensor networks
Level of study	Master
Date de début et durée	4 to 6 months. Start date:1st half of 2025 Long internship preferred
City, country	Annecy, <i>France</i>
Laboratory	LISTIC - Computer Science, Systems, Information and Knowledge Processing Laboratory https://www.univ-smb.fr/listic/pages-en/ambient-intelligence-in-the-habitat/
Topic	<p>Keywords: Internet of Things, human measurement, habitat, AI, embedded systems</p> <p>This internship is about ethical ambient intelligence for measuring human activity in housing. It is part of a research programme combining sensors and artificial intelligence to analyze indoor human behavior, particularly actimetry. The application context is helping vulnerable people to remain in their homes. A measurement system developed in the laboratory, consisting of a network of non-intrusive sensors connected via IoT, which is inexpensive but not very accurate, takes anonymized measurements in the home. The aim is to be able to measure higher-level modalities linked to actimetrics, such as walking speed and distance, or reproductions of balance tests (TUG), with sufficient accuracy, using the imperfect data delivered by this device combined with an artificial intelligence system.</p> <p>To achieve this, it is necessary to go through a learning stage. This establishes the model linking the elementary quantities measured by the device to the actimetric quantities. The chosen method is machine learning, using the measurement results from the sensors and reference measurements obtained by means of a 3D camera capturing the scene in which the network of electrostatic sensors is placed.</p> <p>The aim of the internship is, once the training has been carried out using the 3D camera, to make the measurement of walking operational using the electrostatic sensors alone. Then study the impact of sensor density on the accuracy of the system.</p> <p>The steps to achieve this are:</p> <ul style="list-style-type: none"> • Prise en main de la plateforme expérimentale IoT et fonctionnelle constituée de Handling of the experimental IoT and functional platform consisting of: <ul style="list-style-type: none"> ○ 20 sensors interconnected via an arduino-type board ○ 1 communicating 3D camera ○ 1 MQTT communication server ○ 1 no-sql database server • Obtaining a set of training data: <ul style="list-style-type: none"> ○ Organization of an acquisition campaign for apprentice training <i>This stage may have been completed before the start of the course..</i> • Model development using AI technology • Study of sensor density (i.e. undersampling) on system accuracy <p>The person in charge will be able to draw on the following preliminary work Tutorials or existing programs will help to understand the technical aspects of MQTT, data storage and sensor operation. Continuation of the project as a PhD is possible.</p>
skill requirements	Autonomy, inventiveness, rigor. Very good programming skills, mastery of a computer language. Knowledge of machine learning techniques highly appreciated. Familiarity with embedded systems such as arduino and raspberry pi is required. The desire to learn
Compensation	Internship paid at around €4.35/hour (approximately €620/month).
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