PhD proposal

« Development of a sensor system for evaluating the position and orientation relating to two bodies in space: integration in a humanoid robot »

University: *Université de Versailles Saint-Quentin en Yvelines, FRANCE*

Laboratory: LISV: *Laboratoire d'Ingénierie des Systèmes de Versailles, Université de Versailles Saint-Quentin*

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Title of the proposal: *« Development of a sensor system for evaluating the position and orientation relating to two bodies in space: integration in a humanoid robot »*

Skills: electronics, mechanics, optoelectronics, embedded electronics (VHDL, FPGA, etc), automatics and informatics

Subject:

The PhD student will work at the LISV/UVSQ laboratory which is specialized in robotics, especially in humanoïd robotics. The human robot called HYDROID is developing new technology with hydraulic actuators to perform outstanding performances.

The humanoïd robot HYDROID aimed to develop also the use of a set of sensors to perform a control sensors referenced with information redundancy. The PhD work will aim to create a system of measurements by laser tracking for evaluating the position and relative orientation of two bodies in space. This system will be integrated in particular on both legs HYDROID to know at any moment the position and relative orientation of a foot relative to the other during walking. The integration will be a important topic, in order to as less as possible invasive.

The device will consist of a set laser transmitter - optical receiver judiciously placed on the robot body. The work is structured around three distinct points:

- Installation of the device sensors, electronics, calibration, signal processing,
- Theoretical calculations: spatial geometry, reconstruction of a position and orientation from measurements from the sensor,
- Integration on the HYDROID robot.

Other aspects will be integrated during the PhD work such as the use of these data collectors as homogeneous matrices for dynamic control of both legs based on optimized dynamic model of the robot.