TITLE
"Model-based condition monitoring, fault diagnosis and control of autonomous systems"

TOPIC
Autonomous systems represent a key enabling technology for the digital transition. For a system to reach autonomy, it must be indeed capable of collecting and properly processing a large quantity of information, and possibly employ it to ensure its proper functioning as well as the safety of the people next to it. It is thus of utmost importance that unexpected internal problems, such as faults, can be diagnosed and possibly predicted so that they can be quickly addressed before degenerating into a total system failure, which may cause both economical and human losses. For instance, a faulty industrial robot should be at least able to stop before causing harm to a human operator. This may be achievable thanks to the information on the internal states of the system, on the signals detected by the system, and on the environment in which it operates This information also makes it possible to develop techniques to improve the kinematics and/or dynamics control of the system to further increase the system's level of autonomy. Starting from relevant models available in the literature, the PhD candidate, in relation to the class of autonomous systems addressed, will have to investigate state-of-the-art on condition monitoring and diagnosis, linear and non-linear kinematic and dynamic control techniques to improve system autonomy. These techniques will be then validated in one or more application scenarios, which may include unmanned vehicles, mobile robots, industrial manipulators and intelligent machines in general.

REFERENCE PERSONS

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