ERC Consolidator Grant

MINERVA

Όνομα: eMergINg coopERatiVe Autonomous systems - information for control and estimation (MINERVA)

Περιγραφή: Nowadays, attention is drawn towards a new generation of intelligent mobile cooperative autonomous systems (CASs), built with increasingly powerful sensors that allow them to cooperate with other autonomous systems and humans, in order to accelerate the industrial ecosystem and better exploit the potential of flexible automation. The cooperation of autonomous systems, which is an emerging technology in many areas (e.g., intelligent transportation systems and factory automation) is done over a wireless network. The use of a wireless network to connect spatially distributed systems enables flexible architectures with reduced installation and maintenance costs to existing applications, while supporting the development of new applications that would otherwise be impossible. The unprecedented tight coupling between control and communication, due to the use of a shared wireless network and distributed decision-making to orchestrate such systems, introduces new challenges. Current modular design approaches and incremental improvements can only provide limited performance gains and may result in inefficient solutions, which may lead to failures during practical deployments. To effectively leverage the vast space of possibilities enabled by CASs, we need to fundamentally rethink how functionally complex CASs are interconnected and operate cooperatively. Bridging the gap between the fields of control, estimation, and information/communication theories, MINERVA will follow a bottom-up approach to develop a fundamental, yet realistic, framework to establish the foundations for real-time control, estimation, and localization in environments where autonomous systems and humans interact. MINERVA goes beyond the state-of-the-art and targets the fundamental bottlenecks of demanding systems, using methodologies fundamentally different from the existing ones, aiming towards real-time control applications with communication constraints.

Website: https://minerva.themistoklis.org/