

Shepherding: Biologically inspired Distributed AI-Enabled Human Swarm Teaming

Sheepdogs are the loyal smart actuators that augment humans in physical, cognitive and information sense. They transform a farmer's wish to smart vectors to muster sheep. The training of sheepdogs encode lessons for adaptation; their command list is a cognitive task analysis of the building blocks required to achieve farmers' objectives; and their decision making is a beautifully organised architecture that brings uncertainty, optimisation theory, planning, ontology and knowledge representation, machine learning, game theory, human factors, ethics, and cognitive architectures into a coherent whole to challenge our state-of-the-art in designing AI-powered autonomous systems. The resultant human-Swarm Teaming (HST) Smart-Systems-of-Smart-Systems is the most complex Industry 4.0 endeavour. This talk will present our work on designing a swarm of unmanned and ground vehicles to herd sheep, the AI that goes into the design, and the computational intelligence algorithms used to create efficient guidance. In addition, the talk will cover on contemporary topics including transparency, explainability, and ethics of AI systems.