Artificial Intelligence and Topology for autonomous wheelchairs.

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Abstract. In this talk, we will introduce the European project REXASI-PRO (REliable & eXplAinable Swarm Intelligence for People with Reduced mObility), an interdisciplinary initiative focused on the development of artificial intelligence systems that are not only safe, trustworthy, and explainable, but also energy-efficient and environmentally sustainable. The project's main application is the deployment of a fleet of autonomous wheelchairs capable of navigating safely within closed environments such as hospitals and nursing homes. We will briefly present the contributions of the CIMAgroup research group from the University of Seville, which has concentrated on two key areas within the project. First, the exploration of data-centric techniques aimed at reducing energy consumption during the training of machine learning models. Second, the use of computational topology to analyze the behavior of various navigation algorithms, with the goal of identifying those that produce more orderly and efficient movement patterns across different scenarios.