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Robots and humans: Learning, interaction, and remote operation

Intelligent coordinated robot teams allow for the inspection of large infrastructures on land, air, water and subsea, combining robotic precision and speed with human intuition and abstract thinking. By recently unifying a priori system dynamics knowledge with efficient machine learning, robots are now able to learn complex manipulation tasks at a fraction of the computational power and energy within minutes instead of hours or days. Based on such abilities, smart robot assistants will play a central role in modern future industry and in our daily lives in the coming years. Using high fidelity remote telepresence combined with learning and interaction, mobile robots will extend human presence beyond physical limits, in essence becoming the human remote avatar to sense and act at a distance. By dynamically shifting the degree of autonomy depending on the task at hand—ranging from operating under full autonomy to complete control by a human via telepresence—flying robots like drones or underwater robots will enable humans a safe and immersive experience along the three spatial dimensions and beyond.