

Title: Human Skills and the Evolving Human Machine Systems

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Automation and robotics are making their way into specialized areas of human skills, such as surgery. Human motor skills are complex behaviors, which are constrained by the power law of learning. This law implies that highly skilled operators, pilots, athletes, and surgeons require thousands of hours of dedicated training to achieve their expertise.

In my research, I have been interested in the system integration of perceptual, control, and planning mechanisms supporting versatile performance in complex spatial environments and tasks. The work has in particular focused on formal modeling methods based on principles of dynamics and controls. The detailed understanding of human skilled motor behaviors opens opportunities to use technology for human augmentation; rather than focusing entirely on replacing human skills, technology can also assist humans in acquiring their skills more efficiently and operating more safely.

In this talk, I will present results illustrating the mechanisms used by humans to organize and plan complex spatial behavior. These results make it possible to model attention and memory structure associated with learning new tasks. I will also discuss how this work can improve design of human-machine systems and lead to new research directions.