

IMPEE PhD Opportunity

Project title: Cyber-physical Systems (CPS) for knowledge discovery, data exploration and human factors research

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Abstract

CPS is an engineering discipline focused on technology. The key challenge of CPS is integrating the abstract models of physical processes, human affect, and control and feedback loops to create a create an epistemic, semiotic and ergodic system. This research forms the basis of developing a multi-sensory virtual environment for design, analysis and data exploration. The objective is to exploit collaborations of computational elements and human affect to control physical entities so as to provide functionality for a multitude of human/nature, machine and human-machine input to create, manipulate, interact, discover and learn in virtual/augmented/mixed reality spaces. R&D interests include (but not limited to): Aural or narrative guidance for product design in CAD and virtual worlds and Pseudo haptics as a low cost physics-based design interface. The aim is to investigate mimetic haptics in the virtual environment for assembly planning. This approach is based on mimicking the physical illusions of forces, mass, inertia etc. of the manipulated parts by exciting the human neuro-musculoskeletal system as a response to optical tactility. The work integrates virtualization and mimetic haptics establishes a bridge between human behavioural science, gestures, product engineering and product documentation.

Requirement

BEng 1st Class, MEng. Core skills required will be programming (e.g. C++), physical process models, software and networking, and knowledge of virtual engineering environments. Any experience and knowledge of haptics, virtual reality, drama/storytelling, gesture/tone recognition, body area networks, biophysiological recording and signal processing methods will be beneficial.