

Virtual Environments for Strategic and Tactical Support of Critical Interventions: a Challenge in Integrating Computer Vision and (many) other Resources

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In recent years, an opportunity has been arising of using virtual environments for decision support and task supervision in a number of critical domains. This area of research builds on the convergence and the integration of a large number of issues and fields, including computer vision, advanced graphics, physical modelling, computing and communication architectures, man-machine interfaces, and others. In the past, the cost of required resources has been rather prohibitive; however the rapid advances in high performance computing is opening the way to expanding application areas. The presentation focuses on Vertex, a project whose acronym stands for "Virtual Environments: from 3D Representations to Task planning and EXecution" and which is underway within Phase III of the Institute of Robotics and Intelligent Systems, of the NCE program of Canada. Vertex targets the development of systems whereby critical, dangerous, costly, etc., interventions can be modelled, scenarized, optimized and rehearsed with high fidelity of detail before being undertaken. It also aims at providing real-time, tactical support while a delicate task is actually being performed. As a test bed, Vertex has selected the maintenance of large underwater structures involving the use of Remotely Controlled Vehicles. The presentation will outline the main challenges, how some of the issues are being approached, and the benefits that such systems could provide in the future.

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