

Integration of Immersive Environment and RULA for Real-Time Study of Workplace Related Musculoskeletal Disorders in the Upper Limb

ABSTRACT: The assessment of musculoskeletal disorders prevalent among industrial workers involved in manual tasks is a difficult and time-consuming process. This paper presents the integration of the rapid upper limb assessment (RULA) algorithm, a well-established ergonomic tool, with a virtual assembly tool (VADE), to facilitate the identification of potential upper limb injuries in assembly processes and identification of potential solutions. In this context, a parametric human model was embedded into the virtual assembly system. The posture of the worker is analyzed continuously (at each frame) in real-time, as he/she performs the task. This allows the engineer to try out different postures and assembly processes quickly to identify the best work environment set-up. One pilot study is presented in this paper to demonstrate the application of this concept. This pilot study (conducted jointly with an industry partner) clearly illustrates the validity and utility of this method in identifying and reducing manual assembly process related musculoskeletal stresses.