

Real-Time Rigid-Body Visual Tracking in a Scanning Electron Microscope

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Abstract: Robotics continues to provide researchers with an increasing ability to interact with objects at the nano scale. As micro- and nanorobotic technologies mature, more interest is

given to computer-assisted or automated approaches to manipulation at these scales. Although actuators are currently available that enable displacements resolutions in the subnanometer

range, improvements in feedback technologies have not kept pace. Thus, many actuators that are capable of performing nanometer displacements are limited in automated tasks by the

lack of suitable feedback mechanisms. This paper proposes the use of a rigid-model-based method for end effector tracking in a scanning electron microscope to aid in enabling more precise automated manipulations and measurements. These models allow the system to leverage domain-specific knowledge to increase performance in a challenging tracking environment.