

ROBOTIC DIGITIZATION AND DIGITAL TWINS FOR NUCLEAR DECOMMISSIONING

Siram Narasimhan
University of Waterloo

Abstract

Nuclear power plants are dynamic environments and their as-is conditions have evolved significantly over their operational life. As some of these assets are approaching their end-of-life, de-construction (a key step in decommissioning) of such facilities in a methodical way is of growing interest to utilities. While 3D geometric models exist for some of the components, in general, a digital twin that can inform and track the deconstruction process for the whole plant is generally unavailable. Manual collection of geometric data and the creation of asset information models from such data to enable deconstruction are time consuming and impractical in many cases.

In this talk, the speaker will introduce ongoing research at the University of Waterloo, specifically targeting deconstruction activities during decommissioning. The speaker will introduce robotic platforms that are being developed for rapid digitization of as-is geometric conditions using vision data and the creation of asset information models from such as-is information. The speaker will also introduce how such asset information models are being advanced into digital twins, which can better inform the deconstruction processes during decommissioning. These include non-destructive evaluation of the health of structural components and optimal packing of waste produced during the deconstruction process. The speaker will conclude with a summary of open problems and challenges to be overcome in fully realizing digital twins for decommissioning applications.