

Application of Bim Model Data to Estimate ROI for Robots and Automation in Construction Projects

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Abstract : There are many practical, commercially available robots and semi-autonomous systems that are currently available for use in a wide variety of construction tasks. Adoption of these technologies has the potential to reduce the time and cost to deliver a project, reduce variability and risk in delivery time, increase quality, and improve safety on the job site. These benefits come with a cost for equipment rental or contract fees, access to specialists to configure the system, and time needed for set-up and support of the machines while in use. Calculation of the net ROI (Return on Investment) requires detailed information about the geometry of the site, the volume of work to be done, the overall project schedule, as well as data on the capabilities and past performance of available robotic systems. Assembling the required data and comparing the ROI for several options is complex and tedious. Many project managers will only consider the use of a robot in targeted applications where the benefits are obvious, resulting in low levels of adoption of automation in the construction industry. This work demonstrates how data already resident in many BIM (Building Information Model) projects can be used to automate ROI estimation for a sample set of commercially available construction robots. Calculations account for set-up and operating time along with scheduling support tasks required while the automated technology is in use. Configuration parameters allow for prioritization of time, cost, or safety as the primary benefit of the technology. A path toward integration and use of automatic ROI calculation with a database of available robots in a BIM platform is described.

Keywords : automation, BIM, robot, ROI.

Conference Title : ICCISE 2023 : International Conference on Construction and Infrastructure Systems Engineering

Conference Location : New York, United States

Conference Dates : June 05-06, 2023