The Impact of Artificial Intelligence on Digital Factory

Authors : Michael Maher Sedky Attia

Abstract : The method of factory making plans has changed loads, in particular, whilst it's miles approximately making plans the factory building itself. Factory-making plans have the venture of designing merchandise, plants, tactics, organization, regions, and the constructing of a factory. Ordinary restructuring is turning into the greater essential for you to preserve the competitiveness of a manufacturing unit. Regulations in new regions, shorter lifestyle cycles of product and manufacturing era in addition to a VUCA global (Volatility, Uncertainty, Complexity and Ambiguity) cause extra common restructuring measures inside a factory. A digital factory model is the planning foundation for rebuilding measures and turns into a critical device. Furthermore, digital building fashions are increasingly being utilized in factories to help facility management and manufacturing processes. The principle research question of this paper is, therefore, about the type of virtual factory model which is suitable for the exclusive regions of utility during the operation of a manufacturing unit. First, exclusive styles of digital manufacturing unit fashions are investigated, and their residences and usabilities to be used instances are analyzed. Within the scope of research point cloud fashions, building statistics fashions, photogrammetry fashions, and those enriched with sensor information are tested. It investigates which digital fashions permit a simple integration of sensor facts and what the variations are. In the end, viable application areas of virtual manufacturing unit models are determined by a survey and the respective digital manufacturing facility fashions are assigned to the application areas. Ultimately, an application case from upkeep is selected and implemented with the assistance of the best virtual factory version. It is shown how a completely digitalized preservation process can be supported by a digital manufacturing facility version through offering facts. Among different functions, the virtual manufacturing facility version is used for indoor navigation, facts provision, and display of sensor statistics. In summary, the paper suggests a structuring of virtual factory fashions that concentrates on the geometric representation of a manufacturing facility building and its technical facilities. A practical application case is proven and implemented. For that reason, the systematic selection of virtual manufacturing facility models with the corresponding utility cases is evaluated.

Keywords : augmented reality, digital factory model, factory planning, restructuringdigital factory model, photogrammetry, restructuringbuilding information modeling, maintenance

Conference Title : ICDF 2025 : International Conference on Digital Factory
Conference Location : New York, United States
Conference Dates : January 30-31, 2025