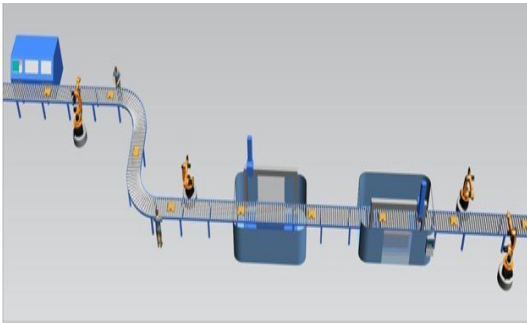


AIGC Services – Digital Twin

Case Study: Digital Twin Simulation effectiveness in a Manufacturing Factory

The Opportunity



A manufacturing factory integrated data from IoT with the Digital Twin tool to analyze the effectiveness, efficiency and accuracy of the system without affecting the real-world system. Digital Twin can collect the information from IoT sensors, and conduct a series of repeated trial-and-error experiments for the purpose of either understanding the behavior of the system and/or evaluating various strategies for operation of the system.

The factory simulation software permits the exchange of data and information between the physical systems and the virtual machine. Simulation models are updated with the data gathered, based on the frequency, and exhibit the key performance indicators for user analysis.

The architecture comprises the Sensors and Devices, IoT Gateway, Cloud Databases and the Application Interface (Socket) which is available in the plant simulation software.

The photo above is for a typical model of production line in a manufacturing plant where Plant Simulation software is integrated with the IoT system to collect real time data from the production line. The model consists of a conveyor with a set of machines, robots and operators. Each resource has designated operations and all the products have to follow the same sequence. Let us assume, there is a sudden increase in demand within a short period. The company has to increase production by analyzing the current process flow, and resource capacity and its utilization. It has to decide whether current resources are enough to reach the expected demand or additional resources are required.

For gathering complete process flow and resource specification and statistics, the production manager and the team use IoT-driven sensors, actuators and other devices and integrate it with plant

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simulation software for validation. The Plant Simulation Software replicates virtual 3D model as per the real world system. By using in-built Socket application, the interface communicates the information between plant simulation and IoT. By analyzing the current scenario, it can generate number of experiments without affecting the real system.

The Benefits

Based on the results, the digital twin can estimate if current resources are sufficient to meet the demand or not. If not, how many resources are required? Thus, this eliminates machine downtime, and increases throughput by predicting machine failure.