Implementation of Digital Twin-Based Metaverse Safety Service Technology for RTO Predictive Preservation

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Abstract :

  In this paper, a metaverse-based safety operation service platform is implemented for safe maintenance and operation of RTO devices. Most RTO systems operating 24 hours a day have limitations in responding immediately to a failure over a long distance, resulting in inefficient maintenance situations. In particular, the aging of field personnel, inexperience in equipment operation, and lack of transition due to the turnover of professional personnel cause many problems in equipment operation. Therefore, long-distance monitoring and safety training are required.

  A virtual space is constructed based on the metaverse, and the equipment structure, circuit diagram, part characteristics, and detailed configuration are constructed in a 3D shape using digital twin technology. To this end, 3D modeling technology generates a mesh based on the design data of the RTO equipment and generates the texture of the equipment based on the actual picture.

Low latency and high-quality data should be provided to multiple users in remote locations. It is delivered to XR devices, PCs, and smartphones to build a 3D virtual space on the site. At this time, the location of the remote user is shared with the site as location data using AR glasses (smartphones). Therefore, monitoring, which was operated as an existing 2D screen, is combined with 3D space to provide an environment and efficiency that can be intuitively and visually recognized.

(Pt9)Keyword— **RTO, maintenance, edge-IoT, virtual space, monitoring**
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