EXPLORING THE BENEFITS OF THE INDUSTRIAL APPLICATIONS OF 5G ON SMART DEVICES

5GXR

Total Reality, an Enschede-based company specializing in Extended Reality (XR) solutions to improve industrial and operational processes, is collaborating with FIP-AM@UT on the 5GXR project. The project aims to explore the advantages and disadvantages of using 5G in augmented reality applications.

PROJECT CONSORTIUM

totalreality
xr solutions

TESTIMONIAL

"The 5GXR project has been a valuable opportunity for Total Reality to explore how 5G can enhance extended reality applications. It allowed us to test real-time solutions that make industrial processes more efficient and user-friendly, showing clear potential for practical use in manufacturing."

- Maurice Kruse
CEO, Total Reality

BENEFITS

✓ Increased efficiency allows faster task completion with real-time instructions

✓ Enhanced training uses XR guidance to reduce errors and speed onboarding

✓ Scalable connectivity with 5G enables seamless multi-device industrial operations

CHALLENGE

The transition to Industry 4.0 demands robust, real-time communication for innovations like IoT, augmented reality (AR), and edge computing in manufacturing. Traditional networks struggle to meet the low latency, high bandwidth, and capacity requirements for these advanced applications. Despite its potential, 5G's industrial utility, particularly in AR scenarios, remains underexplored.

The 5GXR project seeks to address this by evaluating 5G as the communication backbone for real-time extended reality (XR) applications. Using a manufacturing scenario as a testbed, it aims to demonstrate how 5G can enable interactive AR use cases, such as step-by-step maintenance instructions, improving operational efficiency. The project faces challenges in ensuring reliable connectivity, minimizing latency, and adapting AR systems to 5G-specific capabilities.

APPROACH

The 5GXR project employs a hands-on validation method to assess 5G's potential in enabling real-time XR applications for manufacturing. The project uses the "Wire Cutter" scenario, where operators receive step-by-step maintenance instructions via XR on tablets. Key features include integrating machine sensor data with AR visuals to dynamically guide users.

Validation compares the efficiency and error rates of XR-based instructions against traditional manuals. A combination of technical measurements and user feedback evaluates signal stability (RSRP, RSSI), throughput, usability, and latency. Tools like Total Reality's ILC Viewer and Editor are customized to align with 5G capabilities. The results aim to showcase a scalable, interactive XR solution powered by 5G, demonstrating its industrial viability.

5GXR

RESULTS

The 5GXR project successfully evaluated the feasibility and impact of integrating 5G connectivity with extended reality (XR) applications in a manufacturing environment. Through the validation of the "Wire Cutter" use case, the project assessed key performance metrics, including task efficiency, network stability, and user experience. The findings provide insights into the potential benefits and limitations of leveraging 5G for industrial XR applications.

The XR app reduced task completion time by 24% for inexperienced operators compared to traditional manuals

Participants preferred the XR app for its guidance and interactivity. No faults were recorded during validation tasks

Signal quality remained stable across the shop floor without additional antennas

Network throughput was 60–80 Mbps, which was below optimal levels. Further testing with different configurations is recommended

The XR app boosted user confidence and sped up learning, especially for less experienced workers

provincie Overijssel

Rijksoverheid

24%

reduction in task completion time for inexperienced operators

0 faults

recorded during XR validation tests

RSRP
-85dBm to -50dBm

Signal Stability indicating stable performance across the shopfloor