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5G-Advanced Promises Step Change for Extended Reality

Cross-layer collaboration tech could enable fivefold increase in simultaneous XR users

Tests of 5G-Advanced cross-layer collaboration technology have demonstrated that forthcoming cellular networks will be able to deliver highly immersive extended reality (XR) experiences. Conducted in Hangzhou, Zhejiang province, China, the tests explored how 5G-Advanced networks could support very high-resolution virtual environments generated by computer technologies and wearable devices.

HUAWEI 中国移动 China Mobile

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CASE STUDY LEAD:
HUAWEI & CMCC (CHINA MOBILE COMMUNICATIONS GROUP CO., LTD.)

CHALLENGE

The transmission of XR services can put great demands on wireless networks in terms of capacity and stability. Today, a 5G network cell can support five to 10 users simultaneously streaming XR video in 4K resolution at 60 frames per second (the throughput per user is about 70 Mbps). But Huawei believes, in future, fully immersive experiences will require XR videos in 16K to 24K resolution at 120 frames per second, so the transmission rate required by a single user will need to rise to between 1 Gbps and 10 Gbps in the medium term. In addition, interactive video services need a very responsive and robust network connection to resist signal fluctuation, to provide the user with a compelling experience, particularly if they are at the edge of the cell. Therefore, breakthroughs in wireless technologies are required to address both user experience and capacity challenges.

SOLUTION

In the second quarter of 2022, Huawei and China Mobile tested a prototype 5G-Advanced network that uses cross-layer collaboration technology to ensure the most important frames in XR video streams are transmitted with the highest priority. That will enable mobile operators to provide more users with fully immersive experiences with the same cell capacity. 5G-Advanced will further support large-bandwidth spectrum and extremely large aperture array massive MIMO, which will allow the network to deliver 10 Gbps and vey low latency connectivity, according to Huawei.

IMPACT & STATISTICS

Huawei says the tests in Hangzhou demonstrated that 5G-Advanced cross-layer collaboration technology can increase the number of satisfied XR users fivefold with the same cell capacity. That could accelerate the development of advanced XR services in many fields, including gaming, culture, travel, education, and industrial diagnostics, and help the Metaverse to go mainstream. Global shipments of XR devices are set to grow almost tenfold from 11 million units in 2021 to 105 million units in 2025, according to research firm Counterpoint.

WIDER IMPLICATIONS

Supported by sufficiently robust connectivity and XR applications, the virtual worlds that make up the Metaverse could become highly convenient places to interact and transact. Ultimately, 5G-Advanced could support multimodal XR that provides users with tactile experiences, as well as video and audio streams. In the consumer market, XR applications are likely to gradually expand from indoor home entertainment (movies, live broadcast and games) to outdoor in-car XR entertainment and AR navigation. In the business market, there could be a gradual shift from XR education and training to XR holographic conferences and collaboration. Huawei and CMCC plan to test how well 5G-Advanced networks support XR services in outdoor scenarios, such as inside vehicles.

SOURCES & FURTHER INFORMATION

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