(SD2023-334) Accurate Multi-object Tracking for Extended Reality Systems

Tech ID: 33582 / UC Case 2021-Z08-1

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OTHER INFORMATION

KEYWORDS

wireless, sensing, ultrawide-band, VR tracking, Virtual reality, full body tracking

CATEGORIZED AS

- **Communications**
  - Wireless

RELATED CASES

2021-Z08-1

BACKGROUND

Extended Reality (XR), broadly encompassing virtual, augmented, and mixed reality technologies, can potentially revolutionize fields such as education, healthcare, and gaming. The primary ethos for XR is to provide immersive, interactive, and realistic experiences for users. A key component of delivering this user experience is to transfer the physical world into the virtual space. For example, our everyday spaces and objects can be transformed into video game assets (like tennis racquets, swords, or chess pieces) for interactive gaming applications. To enable these applications, we find a common thread — any XR system should localize and track objects in an environment.

Extended Reality (XR), broadly encompassing virtual, augmented, and mixed reality technologies can potentially revolutionize fields such as education, healthcare, and gaming. Applications include VR gaming, full body tracking, warehouse automation.

Understanding the location of objects and people in the real world is key to enabling a smooth cyber-physical transition. However, most localization systems today require the deployment of multiple anchors in the environment, which can be very cumbersome to set up.

TECHNOLOGY DESCRIPTION

Researchers from UC San Diego have developed a system, providing an accuracy of a few centimeters in many real-world scenarios. This invention will delineate the key ideas which allow us to overcome the fundamental restrictions that plague a single anchor point from localization of a device to within an error of a few centimeters. This technology achieves 2.4 cm median accuracy and 5.3 cm 90th percentile accuracy in dynamic scenarios, performing at least 8× better than state-of-art localization systems. Additionally, this technology implements a MAC protocol to furnish these locations for over 10 tags at update rates of 100 Hz, with a localization latency of 1 ms.

This new patent-pending technology overcomes the fundamental challenges arising from geometric dilution of precision to deliver cm-level accurate localization by developing an easy-to-deploy and low-latency localization module. Through this development, we are one step closer to achieving immersive XR experiences.

APPLICATIONS

ADVANTAGES

STATE OF DEVELOPMENT

INTELLECTUAL PROPERTY INFO

RELATED MATERIALS

▶ Aditya Arun, Shunsuke Saruwatari, Sureel Shah, and Dinesh Bharadia. 2024. XRLoc: Accurate UWB Localization to Realize XR Deployments. In Proceedings of the 21st ACM Conference on Embedded Networked Sensor Systems (SenSys '23). Association for Computing Machinery, New York, NY, USA, 459–473. - 04/26/2024

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