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Recent Advances in Visible Light Communication (VLC)-Based Indoor Localization

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Message from the Guest Editors

Dear Colleagues,

Visible light communication (VLC) uses light-emitting diodes (LEDs) for both illumination and data transmission. VLC-based indoor localization leverages this dual functionality to provide highly accurate positioning within indoor environments. The increasing use of LEDs in modern lighting makes VLC an attractive option for indoor localization. Traditional techniques such as Angle of Arrival (AoA) and Time of Arrival (ToA) have been refined to improve localization accuracy, and even phase-based ranging has been employed to achieve millimeter-level accuracy by measuring the phase difference of received signals. New modulation schemes such as orthogonal frequency division multiplexing (OFDM) and color shift keying (CSK) have been developed to enhance data transmission rates and improve signal-to-noise ratios.

Recent advances in VLC-based indoor localization have significantly enhanced the accuracy, reliability, and practicality of these systems. Integration with machine learning, hybrid technologies, and error mitigation strategies has broadened the scope of VLC applications.

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