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LEDs Based Indoor Positioning by Distances Derivation from Lambertian Illumination Model

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Abstract : This paper proposes a novel indoor positioning algorithm based on visible light communications, implemented by light-emitting diode fixtures. In the proposed positioning algorithm, distances between light-emitting diode fixtures and mobile terminal are derived from the assumption of ideal Lambertian optic radiation model, and Trilateration positioning method is proceeded immediately to get the coordinates of mobile terminal. The proposed positioning algorithm directly obtains distance information from the optical signal modeling, and therefore, statistical distribution of received signal strength at different positions in interior space has no need to be pre-established. Numerically, simulation results have shown that the proposed indoor positioning algorithm can provide accurate location coordinates estimation.

Keywords : indoor positioning, received signal strength, trilateration, visible light communications
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