

Enhanced Indoor Location Tracking Through Body Shadowing Compensation

This paper presents a radio frequency (RF)-based location tracking system that improves its performance by eliminating the shadowing caused by the human body of the user being tracked. The presence of such a user will influence the RF signal paths between a body-worn node and the receiving nodes. This influence will vary with the user's location and orientation and, as a result, will deteriorate the performance regarding location tracking. By using multiple mobile nodes, placed on different parts of a human body, we exploit the fact that the combination of multiple measured signal strengths will show less variation caused by the user's body. Another method is to compensate explicitly for the influence of the body by using the user's orientation toward the fixed infrastructure nodes. Both approaches can be independently combined and reduce the influence caused by body shadowing, hereby improving the tracking accuracy. The overall system performance is extensively verified on a building-wide testbed for sensor experiments. The results show a significant improvement in tracking accuracy. The total improvement in mean accuracy is 38.1% when using three mobile nodes instead of one and simultaneously compensating for the user's orientation.