Using neural networks and Active RFID for indoor location services

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Abstract

Indoor RTLS (Real Time Location Systems) are the foundations of promising context-aware and ambient intelligent services. In this work the feasibility of applying Active RFID and neural networks to develop a RTLS service is discussed. In most of the Active RFID systems available on the market, the Readers can measure the Received Signal Strengh (RSS) from a beacon transmitted from a Active tag and send the data gathered to a location server. The RSS measurements can be processed to infer the position of a tag by means of a positioning algorithm. In this research work we discuss and show how to use RSS measurements from the Readers to calculate the tag position by means of a neural network, based on a Multilayer Perceptron which is trained and tested with a radiomap and learns to compute the tags position. By means of simulation, we study the proper MLP architecture and the mean error positioning estimation and precision that is achieved depending on the number of Readers. With 8 Readers deployed in an indoor area of 576 m_2 we get an error less than 1.75 meters in the 75% of the target area.