Abstract: Improvement of the Position Estimation of Mobile Robot Using Multi-Sensor Fusion

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Abstract
In this paper, to implement a real time localization system, a new absolute position estimation method for a mobile robot in indoor environment is proposed in this paper. Design and implementation of the localization system comes from the usage of active beacon systems (based upon RFID technology). The active beacon system is composed of an RFID receiver and an ultra-sonic transmitter. The RFID receiver gets the synchronization signal from the mobile robot and the ultra-sonic transmitter sends out the traveling signal to be used for measuring the distance. Position of a mobile robot in a three dimensional space can be calculated basically from the distance information from three beacons and the absolute position information of the beacons themselves. In some case, the mobile robot can get the ultrasonic signals from only one or two beacons, because of the obstacles located along the moving path. Therefore, in this paper, as one of our dedicated contribution, the position estimation scheme with less than three sensors has been developed. Also, the Extended Kalman Filter algorithm is applied for the improvement of position estimation accuracy of the mobile robot.

Acknowledgements
This study was supported by research funds from Dong-A University.