

# An Improved Hybrid Localization Scheme for Wireless Ad Hoc and Sensor Networks

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**Abstract**—Localization of wireless ad hoc and sensor networks has gained research attentions for several years. This paper proposes a hybrid localization scheme which exploits Received Signal Strength (RSS)-based ranging and Self Organizing Maps (SOM)-based range free localization methods to obtain the tradeoff between cost, power and location accuracy. By utilizing RSS-based distance estimation and connectivity information of 2-hop neighbors in learning steps of SOM-based localization, the proposed scheme achieves more accurate location estimates while reducing the number of learning steps. For the RSS-based distance estimation, a thorough empirical analysis of the radio propagation model has been presented. Solution for the impact of obstacles and irregular network shapes has also been incorporated in the proposed hybrid scheme. Results from extensive simulations prove that our proposed hybrid scheme outperforms several existing localization schemes in both isotropic and anisotropic network environments.

**Keywords-component; RSS; SOM; Localization;**