

# A Localization Algorithm based on RSSI for Wireless Sensor Network

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**[Abstract]** A Localization algorithm based on RSSI for Wireless Sensor Network has been proposed. A RSSI (Received Signal Strength Indicator) model is established based on the study for the ribbon region entertainment. It is proved that the method is appropriate to apply to wireless sensor networks.

**[Key Words]** Wireless Sensor Network; RSSI; Anchor node; Un-anchored node;

## 1. Introduction

Recent years, there have been huge concerns on safety problems in industries. For example, coal mining industry imposes extensive concerns on miners' life. How to improve safety coefficient and reduce the hidden danger is very important. Since there are a number of dangerous industrial environment that involves fire, gas, or any other hazards, researchers are trying to develop localization techniques that can be used as a tracking system for staff members in real time when they are working in the hazardous industrial environment.

The GPS (Global Position System) is the most extensive and popular localization system in the world. It provides satellite time service and finds high precision range to users. However, the GPS is only suitable for outdoor environment as well as the energy consumption of the GPS system is high and the cost is expensive. Hence, the GPS is not very suitable for the wireless sensor network. At present, the localization system using RFID technology is tried out in many industries [1]. However, it has limited functions and its accuracy is very low. For example, the error may reach up to 100-200 meters. If any accident occurs, lifeguards must search in a large range. For this reason, aforementioned methods do not have great practical value.

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\* This research was supported by the Ministry of Knowledge Economy, Korea, under the HNRC(Home Network Research Center) - ITRC(Information Technology Research Center) support program supervised by the Institute of Information Technology Assessment.

Wireless sensor network technology can overcome these shortcomings. Firstly, the WSN does not need complicated hardware, and therefore the cost is low; Secondly, it has accurate positioning function when sensor nodes are deployed densely in the industry environments.

In this paper, we propose a localization algorithm using RSSI (Received Signal Strength Indication) based on wireless sensor network for hazardous industry environments. In section 2, we describe related work, and we present our proposed localization algorithm in section 3, followed by experimental result in section 4. Finally, we conclude the paper in section 5.

## 2. Related work

The localization technique in wireless sensor network is utilized in a large variety of applications such as environment monitoring, vehicle tracking, and geographical information system depending on location of sensor nodes [2]. In addition, location-based routing protocols can save significant energy by eliminating the need for route discovery [3, 4, 5] and improve caching behavior for applications where requests may be location dependent [6]. Security can also be enhanced by location awareness (for example, preventing wormhole attacks [7, 8]). However, putting GPS receivers in every node or manually configuring locations is not cost effective for most sensor network applications.

There are some localization techniques proposed in literature.