



# **EAST WEST UNIVERSITY**

## **Study on Localization in Wireless Sensor Networks: A Survey on Algorithms, Measurement Techniques, Applications and Challenges**

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**This Project submitted in partial fulfilment of the Requirement for the Degree  
of  
Bachelors of Science in B.Sc. in Information and Communications  
Engineering**

**To the**

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# Declaration

We, hereby, declare that the work presented in this thesis is the outcome of the investigation performed by us under the supervision of Dr. Anup Kumar Paul, Assistant Professor, Department of Electronics and Communications Engineering, East West University. We also declare that no part of this thesis has been or is being submitted elsewhere for the award of any degree or diploma.

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# Acceptance

This research report presented to the department of Electronics and Communications Engineering. East West University submitted to partial fulfilment to the requirement for the degree of B.Sc. in Information and Communications Engineering under complete supervision of the undersigned.

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# Abstract

With the exponential development in the innovation of small scale electromechanical framework (MEMS), remote systems administration and remote sensor systems (WSN) are subsequently improving. Restriction is an imperative perspective in the field of remote sensor systems (WSNs) that has created noteworthy research enthusiasm among the scholarly community and research network. WSN is developed of different remote sensor hubs, which shape a sensor field and a sink. These arrangements of fields and sinks have the capacities to detect their encompassing condition, play out a compelled estimation and convey remotely to frame WSNs. Wireless sensor network is formed by a large number of tiny, low energy, limited processing capability and low-cost sensors that communicate with each other in ad-hoc fashion. In WSN, hubs can be characterized into three classes: a stay (otherwise known as reference point), restricted and obscure. The grapple hub can distinguish its present position utilizing a prepared GPS gadget. The limited hub is restricted physically utilizing system designs. finally, the area of obscure hub is obscure, neither precisely nor by estimation. The undertaking of deciding physical directions of sensor hubs in WSNs is known as restriction or situating and is a key factor in the present correspondence frameworks to appraise the spot of birthplace of occasions. The implicit highlights of WSNs make the hub's area a critical factor in deciding their state. The data identified with the hub position speaks to a crucial factor for most WSN applications. In such applications, the evaluated data is futile without knowing the precise position from where it was obtained. As the prerequisite of the situating precision for various applications shifts, distinctive limitation techniques are utilized in various applications and there are a few difficulties in some extraordinary situations, for example, woodland fire recognition. In this paper, we survey different measurement techniques and strategies for range based and range free localization with an emphasis on the latter. Further, we discuss different localization-based applications, where the estimation of the location Information is crucial. Finally, a comprehensive discussion of the challenges such as accuracy, cost, complexity, and scalability are given.

**Keywords:** localization; range free; wireless sensor network; mobile anchor, classification, range based technique, range measurements, sensor node

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