

## Graduation Design Project Proposal Form

Project # C11

<b>Project Title:</b> Game Theoretic Secure Localization in Wireless Sensor Networks
<b>Professor(s) Name(s):</b> Dr. Yahya Al-Harhi (King Saud University) and Dr. Khalid Al-Muzaini (KACST)
<b>Number of Students:</b> Two
<b>Students Qualifications</b> <ul style="list-style-type: none"><li>• Fundamentals of communication networks</li><li>• Good knowledge in MATLAB software</li></ul>
<b>Statement of Problem</b> <p>Wireless sensor networks (WSNs) have gained attention in the last several years. Determining the location of sensors is a basic and essential knowledge for most WSN algorithms and protocols including data tagging, routing, node identification, among others. Localization or positioning problem of sensors in wireless sensor nodes (WSNs) have been heavily investigated. Recently, secure localization become very important issue to tackle especially in the new boom of Internet of things (IoT). In this project, different algorithms will be worked on to securely determine the location of a sensor node. Secure, we mean that adversaries cannot easily affect the accuracy of the localized sensors, so the localization algorithm must be robust under several attacks.</p>
<b>Brief Description of the Project</b> <p>This project is basically a fundamental design problem where students will practice and need different skills to meet the objective. Beside the fundamental understanding of communications engineering and networks, students need to have a good programming skills using MATLAB software or similar libraries (R package). So, they can code the selected algorithms and run different comparison tests.</p>
<b>Objectives</b> <p>The objective of the project is:</p> <ol style="list-style-type: none"><li>1. Understand the concept of localization and its main categories (range-based and range-free).</li><li>2. Understand different measures for estimating the distance (RSS, ToA, ... ).</li><li>3. Study different secure localization methods, including location Verification.</li><li>4. Performance analysis of two or three known algorithms using MATLAB.</li></ol> <p>In this section, you would discuss more fully what you mean by the different design objectives.</p>
<b>Technical Approach and Expected Deliverables</b> <p>The student should cover all the aspects of the problem and should work hard on literature review of the problem. The students are expected to prepare kind of survey paper or report. Also,</p>

they should study and understand few recent algorithms and lastly do a performance analysis and comparison between them. The result of the comparisons could be a publication as well.