Graduate Module: Introduction to Control Systems for Applications in Agriculture

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Offering: Fall Semester October 2019

Background: The module will introduce multiple elements required to build a real-time data acquisition system and controller for agriculture applications. Topics will include: 1) sensor selection and calibration; 2) interface and communication protocols; 3) actuators and drivers; 4) feedback control systems and analog controllers; 5) real-time computer control using single board computers; and 6) programmable logic controllers with emphasis on industry applications.

Prerequisites:
Engineering undergraduate degree or equivalent.

Delivery: This module will be comprised of 6 weeks of 2-hour lectures, discussions, and lab work. The students will discuss the data acquisition and control system they build, choose sensor, simulate the system response and develop a control algorithm.

Evaluation: Assessment of this module will be in the form of participation in the lectures, one report on building a control system for agriculture application delivered at the fourth week and project demonstration at the end of module.

Class Participation: 10%
Assignments: 20%
Report: 40%
Project demonstration: 30%
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<tr>
<th>Week</th>
<th>Topic</th>
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<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; Week</td>
<td>Sensor selection and calibration</td>
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<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Week</td>
<td>Interfacing and communication protocols</td>
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<td>3&lt;sup&gt;rd&lt;/sup&gt; Week</td>
<td>Electric; hydraulic; pneumatic actuators</td>
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<td>4&lt;sup&gt;th&lt;/sup&gt; Week</td>
<td>Feedback control systems and analog controllers</td>
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<td>5&lt;sup&gt;th&lt;/sup&gt; Week</td>
<td>Real-time computer control</td>
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<td>6&lt;sup&gt;th&lt;/sup&gt; Week</td>
<td>Programmable logic controllers</td>
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