Project I Description

Project Name: Irrigation monitoring and control robot – RIEGO Robot

Sponsor: LAU

Team Size: 3 MEE Students

Project Overview

Improper agricultural practices are leading to numerous fallouts such as soil erosion and impoverishment, depletion of underground water resources due to excess water consumption from irrigation, surplus and unattended energy use, and health impacts from inappropriate use of pesticides and fertilizers. All of these factors lead to a deficiency in the crops produced starting from the quantity to the quality itself, along with the implications on the environment.

RIEGO Robot aims at proposing an innovative solution through a comprehensive approach to agricultural management, incorporating the water-energy-agriculture relationship. The robot will be self-navigating through agricultural areas planted with trees and fruits, where it sets up itself in a specific positon in the field and collects data from trees, soil and atmosphere using several high-accuracy sensors. A smart algorithm will be integrated inside RIEGO Robot that interprets the data collected from the sensors and upon that, valves and pumps for irrigation will operate automatically, along with the appropriate use of fertilizers accordingly.

Project Areas and Majors needed

- Kinematics/CAE (1 MEE Student)
- Instrumentation (2 MEE Students)

Project Deliverables

Design and Build the following component of the system:

- Adapt a robot design to be used throughout the project for operation on rough terrain.
- Integrate a GPS system that enables the robot to wander throughout the field and set up itself in specific positions.
- Equip the robot with obstacle and object detectors to avoid collision and a 360-proximity camera sensor for motion detection.

- Integrate the robot with sensors used for trees, soil and atmosphere. An algorithm uses the readings of all sensors and creates an efficient well organized irrigation schedule and fertilizers use.
- The robot will be equipped with a solar panel for charging the batteries.