

Tutorial on Sensors and Pattern Recognition for Localized Control of Weeds in Agriculture

Prof. Dr. Paulo E. Cruvinel, Brazilian Corporation for Agricultural Research (Embrapa) and Invited Professor - Federal University of São Carlos (UFSCar),
Brasil

Summary: Today, agriculture is being developing by combining science, technology, production, value aggregation, environmental and social responsibility. The sector is primarily responsible to supply food for people in the whole world, as well as to contribute to jobs in the planet. To keep these results, farmers have faced the need to seek increasingly the rational use of inputs, as is the use of pesticides, plant regulators, and liquid fertilizers. This tutorial presents the needs and importance of sensors to get such approach, i.e., allowing the development of methods for precision spraying for controlling weed species in agriculture. Actually, the crop's yield is quite dependent of the species of invasive plants. In fact, the presence of weeds promote competition with agricultural crops by area, stage of development, soil use, light, nutrients, soil water content, among others. The tutorial presents fundamental concepts related to sensors, geomatics, image processing, precision agriculture, as well as an example of a method for weed control in agriculture. Furthermore, an approach for pattern recognition of a weed specie and its occupancy rate in an agricultural area is presented, i.e., taking into account the herbicide application at variable rates based on management zones. Finally, agricultural economic gain and the minimization of environmental impacts are also discussed.