

Apimuk Muangkasem 2010: Precision Herbicide Applicator over Between-row of Sugarcane Fields. Master of Engineering (Information and Communication Technology for Embedded Systems), Major Field: Information and Communication Technology for Embedded Systems, Department of Electrical Engineering. Thesis Advisor: Assistant Professor Somying Thainimit, Ph.D. 41 pages.

Uniform herbicide application system applied herbicide substances uniformly regardless of weed density. This increases farmer's production costs and is prone to ground water contamination. Precision herbicide application system is introduced to address this problem. More effective precision herbicide system is present in this paper. The proposed system is a vision based system. It consists of two main parts: weed detection part and controller part.

In this thesis, color-based weed detection is proposed. Background component of an input image is segmented using the proposed Non-Green Subtraction (NGS) technique. The NGS segregates an image into two classes, which are background and non-background. The non-background is further segmented into weed and non-weed pixels using Over Excessive Green (OEG) technique. The experimental results indicate significant improvement on the false accepted rate and overall correct segmentation rate, especially with sparse weed images comparing to the results obtained using only the OEG technique. In controller part, our experiments inspect a feasible processing time of our system. The system requires at maximum 106 millisecond of processing time including capturing an input image, detecting weeds and sending spraying command to the controller. The results indicate real-time processing capability. By providing constant speed of the system vehicle, our applicator can control sprayed area as minimum as nozzle's capacity. The minimum area is approximately 11.67 centimeters.

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Student's signature

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Thesis Advisor's signature