

Machine Vision Applications in Weed Control

David C. Slaughter and D. Ken Giles

Biological and Agricultural Engineering, University of California, Davis

Machine vision technology has the potential to produce precision weed maps for use in weed targeted herbicide application. Machine vision can be used to distinguish crop plants from weeds using leaf or whole plant shape, and leaf color. When coupled with microspray technology, machine vision has the potential for spot spraying of individual weed leaves. The concept of a machine vision based microsprayer is shown in figure 1a. The spray map shown in figure 1b was produced by a machine vision system that distinguished nutsedge weeds from cotton plants using the distance from the margin to the center of the leaf. Spray results based upon the machine vision map are shown in figure 1c. This method could distinguish broadleaf plants from narrow leaf plants with an average accuracy of 87% in commercial cotton fields¹.

¹ Lamm, R. 2000. Robotic Weed Control for Cotton. Ph.D. Dissertation. UC Davis.

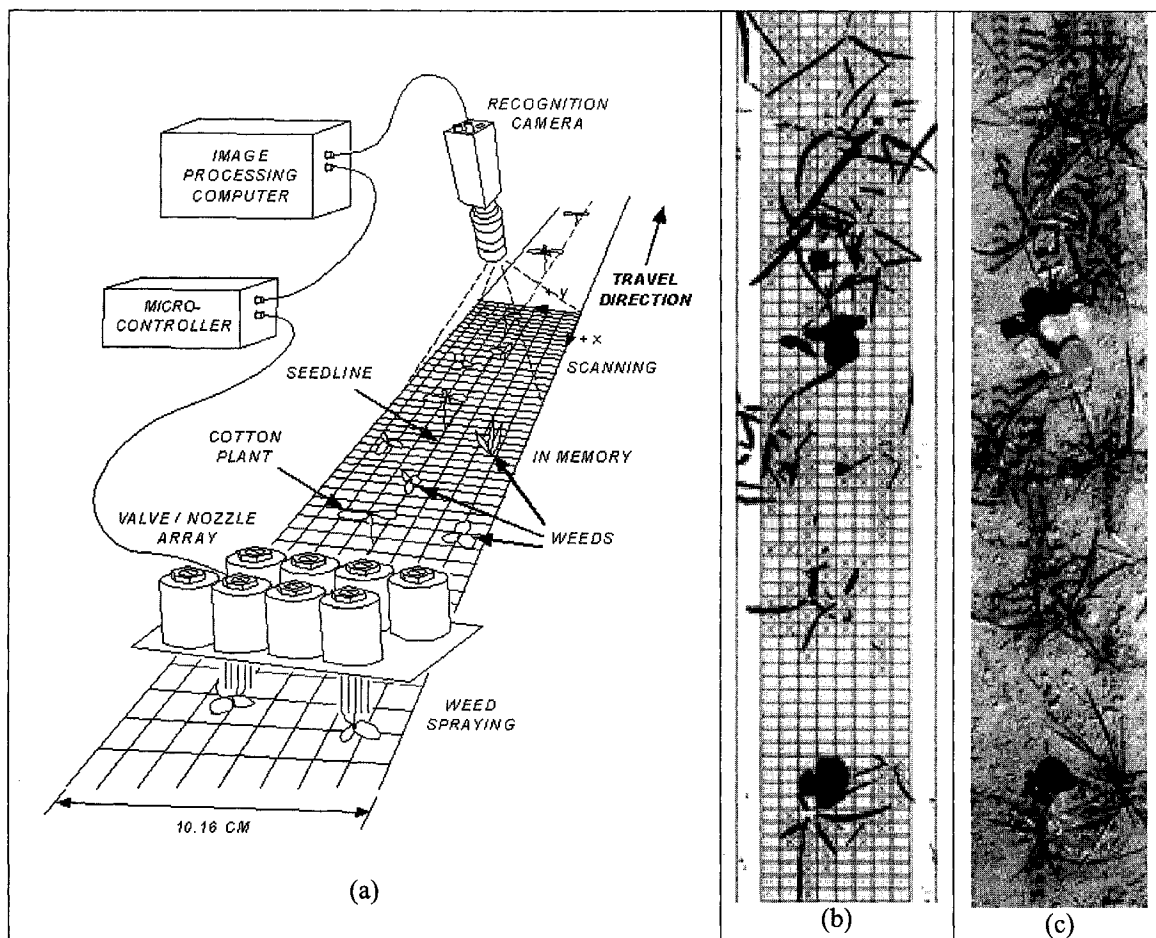


Figure 1. a) Concept diagram of machine vision system and precision microsprayer², b) machine vision produced spray map of cotton and nutsedge. X=cells to be sprayed, c) photograph of microspray deposition (in black).

² Lee, WS, DC Slaughter & DK Giles. 1999. Robotic weed control system for tomatoes. Precision Ag. 1(1):95-113.