

Development of Agricultural Robotic Platform for Inter-Row Plant: An Autonomous Navigation Based on Machine Vision

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Abstract : In Egypt, management of crops still away from what is being used today by utilizing the advances of mechanical design capabilities, sensing and electronics technology. These technologies have been introduced in many places and recorm, for Straight Path, Curved Path, Sine Wave ded high accuracy in different field operations. So, an autonomous robotic platform based on machine vision has been developed and constructed to be implemented in Egyptian conditions as self-propelled mobile vehicle for carrying tools for inter/intra-row crop management based on different control modules. The experiments were carried out at plant protection research institute (PPRI) during 2014-2015 to optimize the accuracy of agricultural robotic platform control using machine vision in term of the autonomous navigation and performance of the robot's guidance system. Results showed that the robotic platform' guidance system with machine vision was able to adequately distinguish the path and resisted image noise and did better than human operators for getting less lateral offset error. The average error of autonomous was 2.75, 19.33, 21.22, 34.18, and 16.69 mm. while the human operator was 32.70, 4.85, 7.85, 38.35 and 14.75 mm Path, Offset Discontinuity and Angle Discontinuity respectively.

Keywords : autonomous robotic, Hough transform, image processing, machine vision

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