

Multipurpose Agricultural Robot Platform: Conceptual Design of Control System Software for Autonomous Driving and Agricultural Operations Using Programmable Logic Controller

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Abstract : This paper discusses about the conceptual design and development of the control system software using Programmable logic controller (PLC) for autonomous driving and agricultural operations of Multipurpose Agricultural Robot Platform (MARP). Based on given initial conditions by field analysis and desired agricultural operations, the structural design development of MARP is done using modelling and analysis tool. PLC, being robust and easy to use, has been used to design the autonomous control system of robot platform for desired parameters. The robot is capable of performing autonomous driving and three automatic agricultural operations, viz. hilling, mulching, and sowing of seeds in the respective order. The input received from various sensors on the field is later transmitted to the controller via ZigBee network to make the changes in the control program to get desired field output. The research is conducted to provide assistance to farmers by reducing labor hours for agricultural activities by implementing automation. This study will provide an alternative to the existing systems with machineries attached behind tractors and rigorous manual operations on agricultural field at effective cost.

Keywords : agricultural operations, autonomous driving, MARP, PLC

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