

Manipulator automation for fresh fruit bunch (FFB) harvester

ABSTRACT

The need to mechanize major field operations that are labor intensive in oil palm industry of Malaysia has led to the study on agricultural machine automation. In general, study was on machine automation to reduce the number of workers required for harvesting as well as to provide comfortable ergonomic for the operator of oil palm harvester. The objective of the study was to perform interfacing between the oil palm tree and hardware (harvester) as well as to compare the harvesting efficiency between the mechanical and automated manipulator. Kinematic analysis was calculated based on the D-H configuration for the position and orientation of harvester arm using high resolution webcam and ultrasonic sensor to obtain 3D coordinates required by the D-H notations. PCB design and fabrication as well as testing and implementation of concept of camera vision operation system for FFB harvester with fully developing a Graphical User Interface (GUI) was conducted to assist the automation of the harvester manipulator. The automation of 5DOF manipulator harvester operation proves to be faster than the manually operated mechanical harvester with an approximation of 60 percent significant decrease in speed of the manipulator with 70 percent of accuracy.

Keyword: Manipulator; Automation; Interface; FFB