Design and Development of 3 DoF Solar Powered Smart Spraying Agricultural Robot

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Keywords: Agricultural Robot, Wireless Controller, Spraying, Pesticide, Agricultural System

Abstract:

In recent years, use of autonomous vehicles like robots in various agricultural activities are increased to minimize the labor cost and to increase the speed and accuracy of the work. This project proposes a new approach to replace the exciting pesticide/insecticide spraying agriculture robots to a flexible, solar powered, semi-automated three degrees of freedom robot there by providing safety to the farmers and increasing the precision in agriculture. The robot consists of Three Degrees of Freedom (DoF) robotic movement and Arduino controlled sprinklers, operated by an android app with Bluetooth. This system will minimize the risk of injury, significantly save manpower and deliver the spray with maximum accuracy thereby reducing chemical disposure. The robot can directly apply pesticide to individual lesion area and improve pesticides efficiency, reduce production costs and protect the environment. The objective of this project is to highlight the beginning of a revolution in the field of agriculture, international competition in agricultural sector, advancement in technology and wide spread application of intelligent machines in agriculture, which will become inevitable in future.

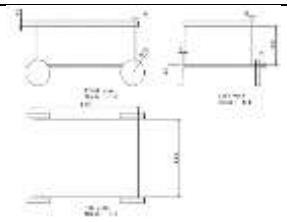

Figure 1: CATIA design

Figure 2: Chassis design

Figure 3: Android App

Figure 4: Side view

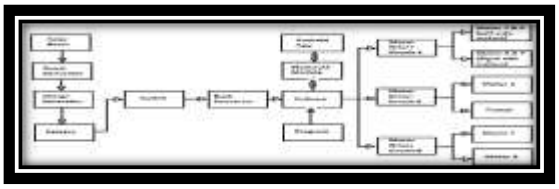

Figure 5: Block diagram of the system

Figure 6: Front view

Conclusion: The project demonstrates the implementation of solar powered three degrees of freedom pesticide spraying robot in the field of agriculture. The model gave a fairly good rate of area coverage and the cost of operation as calculated was also reasonably low. In addition, the safety and long term health of the farmers is ensured by eliminating human labour completely from this process. It reduces the discomfort to the operator while spraying and it creates the awareness about renewable energy to the farmers.