

Development of an Autonomous Vehicle for Smart Irrigation

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[T. L. Oluwabunmi](#); [O. Adenugba](#); [I. A. Ayoade](#); [J. Azeta](#); [C. A. Bolu](#)

[All Authors](#)

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Abstract:

Creating a reliable means of supplying water for irrigation in regions with little or no rainfall across a year is a form of precision agriculture. The compounding problem, however, is the inability to efficiently and conservatively manage the external water source to irrigate the soil. Most times, the amount of water supplied exceeds what crop roots need. To this end, An Autonomous Vehicle for Smart Irrigation System was developed to provide water, herbicide, pesticide, and water to agricultural cultivation to meet the demand for root crops crop roots. This project captures the design, simulation, development, and performance evaluation of the application of Autonomous Vehicles for Smart Irrigation using an Intelligent reprogrammable controller. The soil moisture sensors measure and transmit in real-time, the value of specific soil nutritional requirements to a receiver the autonomous vehicle dispense based on the requirement of soil nutrients to a specific location. With the use of transceivers, these moisture levels are then transmitted to an autonomous vehicle which is set in action when the moisture values are lower than what is required for the growth of the crops. The stress analysis of the Autonomous Vehicle was also carried out to optimize the working operation of the Autonomous Vehicle.

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I. Introduction

The application of control and automation is visible in different areas in our present world today. From transport systems like airplanes, spacecraft, ships, trains, and vehicles, to static facilities such as buildings, and telecommunication equipment, the role of automation has left its footprints. This has been the result of the work of researchers who deal in the study of systems and control. The discipline of automation has helped in changing the level of technology. This is evident in the evolution of machinery like steam engine trains to electrically controlled trains, wired devices to wireless devices, and manual mail handling communication to virtual meetings [1].

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Authors

[T. L. Oluwabunmi](#)

Department of Mechanical Engineering, Covenant University Ota, Ota, Nigeria

[O. Adenugba](#)

Department of Mechanical Engineering, Covenant University Ota, Ota, Nigeria

[I. A. Ayoade](#)

Department of Mechatronics Engineering, First Technical University Ibadan, Ibadan, Nigeria

[J. Azeta](#)

Department of Mechanical Engineering, Covenant University Ota, Ota, Nigeria

[C. A. Bolu](#)

Department of Mechanical Engineering, Covenant University Ota, Ota, Nigeria

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