

ABSTRACT

The process of transferring gallon water can be done manually by human power or using a robot that carries gallon water which operates semi-manually. The use of human power in this transfer can pose health risks, especially if ergonomic principles are not taken into account. However, the semi-manual method with the help of a robot carrying gallon water is considered more efficient and reduces the physical burden and risk of injury to the spine. This research aims to design and implement a water gallon carrying robot with Arduino Mega based wireless control. The main problem faced was the health risk due to manually moving gallons of water and the difficulty in controlling the trolley. To solve this problem, and used a robotic system design method consisting of an Arduino Mega 2650, NRF24L01+PA+LNA module, Joystick Shield, DC motor, and battery. The robot is controlled manually using a joystick that is connected via wireless communication. The test results show that the robot was designed and implemented well. The robot can move according to joystick input. The robot can also operate up to 300 meters away inside and outside buildings with consistent performance. The motor control system implemented allows controlling motor speed and direction accurately using Pulse Width Modulation (PWM) signals. Data analysis shows that the use of these components successfully achieved the research objectives. The NRF24L01+PA+LNA module proved effective in maintaining system performance up to a distance of 300 meters, while the joystick shield provides very precise control with stable analog values. Using PWM in the motor control system allows the robot to move precisely according to input from the joystick.

Keywords: Arduino Mega, DC Motor Driver, Microcontroller, NRF24L01 + PA + LNA Module, Gallon Water Carrying Robot.