

***DESIGN AND TESTING OF AN ARDUINO-BASED AUTOMATIC ROLLING  
DOOR SYSTEM WITH VARIATIONS IN DOOR LOAD AND PASSIVE  
INFRARED (PIR) MOTION SENSOR DETECTION DISTANCE***

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***ABSTRACT***

*The use of rolling doors in shops, warehouses, and garages requires a system that is practical, responsive, and safe. This study designs and analyzes the performance of an Arduino-based automatic rolling door, focusing on PIR sensor detection distance and door load. The system consists of a microcontroller, a PIR sensor, an electric motor, and two limit switches that safeguard the fully open and closed positions. The system operates when the sensor detects motion, after which the motor opens the door until the upper limit switch is activated. After a 30-second delay, the motor closes the door until the lower limit switch is activated. A descriptive-conceptual analysis was conducted because testing data was unavailable. The analysis indicates that as the distance between the object and the PIR sensor increases, consistency of detection and the system response become slower. These conditions are also influenced by the sensor installation angle, temperature, and environmental conditions. An increase in door load also raises the motor's torque and current requirements, resulting in lower movement speed and longer operating time. Overall, the system demonstrates a logical interaction among the sensor, control unit, motor, and limit switches. However, direct testing is still required to determine the optimal performance limits of the system.*

***Keywords : Arduino, Automatic Rolling Door, Door Load, PIR Sensor***