ABSTRACT

In contemporary times, the prevalence of air pollution, a consequence of industrial activities, has emerged as a pervasive environmental predicament, inflicting detrimental effects on human health and ecological systems. In response to this crisis, this research endeavors to conceptualize a drone-based monitoring apparatus, equipped with solar panels as an autonomous energy supply, thereby extending the operational duration and augmenting the monitoring range.The methodology employed in this study encompasses experimental tests, encompassing sensor accuracy assessments, solar panel power metrology, and analytical evaluations of drone stability and flight functionality. The experimental findings indicate that the LM35 temperature sensor demonstrates an accuracy rate of 78.02% with an average error of 21.98%, while the MQ-135 smoke sensor exhibits consistent performance in detecting air pollution.Moreover, the solar panel generates an average voltage of 19.98V and a current of 0.34A, which is sufficient to support the drone's operation for an extended period. The stability of the drone was evaluated during flight tests, with satisfactory results observed at altitudes of 1.5 and 3 meters. At an altitude of 5 meters, however, a slight reduction in stability was noted.These findings collectively demonstrate the effectiveness of integrating Arduino sensors with solar panel-based drones for enhancing the efficiency of air quality monitoring in industrial settings.Future development prospects include enhancing solar panel energy capacity and optimizing data processing algorithms to ensure enhanced real-time monitoring accuracy.

Keywords: air pollution, arduino sensor, drone, environmental monitoring, solar panel.