

An Investigation of Energy Consumption in Fused Deposition Modelling using ESP32 IoT Monitoring System

Abstract

Energy price and availability have become an urgent global challenge. Manufacturers need to model and reduce energy consumption and cost. To enable energy smart manufacturing using Industry 4.0, there is a need to develop a framework for energy monitoring using Internet of Things (IoT). In this paper, an energy-monitoring device has been developed using ESP32 as IoT system to monitor energy consumption on the fused deposition modelling machine. The energy consumed is measured and categorised according to its manufacturing process states. This paper proposes an IoT system capable of simultaneously measuring the energy consumed in the machine's components during the printing process into idle state, warm-up state, printing state and cool-down state. This platform technology can be a basis for simultaneous monitoring of multiple machines in a production system.

Keywords

Energy Monitoring; Fused Deposition Modelling; Industry 4.0; Internet of Things