

IoT Based Predictive Maintenance System for Spot Welding Machine

Anurag S. Bhalerao, Dishant S. Bagul, Sarthak G. Bhabad

Students, Department of E&TC Engineering
KK Wagh Collage of Engineering, Nashik, India

Abstract: *Predictive maintenance is a vital task in the present industrial settings, which aims at retaining the reliability of equipment for reducing downtime and overall operational cost. This project presents an IoT-based Predictive Maintenance System for Spot Welding Machines that will focus on real-time monitoring of critical machine parameters using embedded systems and integrating them with the cloud. At the heart of the system is the STM32 microcontroller, which is used as the main data acquisition device. It receives the critical parameters such as the flow rate of the cooling water, the water temperature, and electrical parameters like voltage and current variations during the welding processes. These parameters are vital indicators of the health of the machine and can be used to predict possible failures or inefficiencies. The ESP32 microcontroller is used for wireless communication to enable remote monitoring and data analysis. It transmits the sensed data to a cloud server, which is then made available on a user-friendly web interface in real time. The website presents visual information, historical trends, and alerts to help maintenance personnel make intelligent decisions. The system constantly monitors these parameters for any anomalies, such as decreased cooling efficiency, overheating, or abnormal power consumption, all of which are precursors to machine wear or failure. This allows for proactive maintenance, which prolongs the life of a spot welding machine by enhancing production quality and minimizing sudden downtimes.*

Keywords: Predictive maintenance, IoT, Spot Welding Machine, Real time monitoring, Industrial automation

