IOT Based Transformer Health Monitoring System

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Abstract: *Communication Power transformers must work well and be reliable to keep the flow of electricity stable and uninterrupted. Standard periodic maintenance often does not find problems in their early stages, which can lead to insulation breakdown, oil breakdown, thermal stress, overloading, and unexpected outages. This paper proposes an IoT-based Transformer Health Monitoring System to address these limitations. The system can continuously and in real time monitor important operating parameters. The system uses sensors for temperature, oil level, load current, and input voltage that are connected to a microcontroller. The microcontroller processes the data and sends it to a cloud-based monitoring platform. The data analyzed by the IOT platform ensures early fault detection for maintenance planning. To support predictive maintenance, the suggested framework provides threshold-based alert notifications, historical logging, real-time data visualization, and remote access. The system creates automated alerts to stop overheating, insulation failure, and possible transformer failures when anomalous conditions are identified. This system monitors multiple transformers at different distributed substation. This IoT- enabled strategy prolongs transformer lifespan, lowers maintenance costs, minimizes downtime, and improves operational safety. The solution offers a scalable architecture for intelligent monitoring across substations and distribution networks and is in line with efforts to modernize smart grids.*

Keywords: Transformer Health, IOT-Monitoring, Sensor Integration, Microcontroller, Self-Healing Transformer