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(51) International classification	:H02J3/00, H02J13/00, G16Y10/35, G16Y40/10, G06Q50/06	(71)Name of Applicant : 1)Mr. N.Anil Address of Applicant :Mr. N.Anil , Assistant Professor, Department of EEE, Malla Reddy(MR) deemed to be University, Maisammaguda, Gundlapochampally, Medchal-Malkajgiri-500100 , aniljitsee@gmail.com , Mobile No.9908117369 Telangana India 2)Mr. Devesh Jaiswal 3)Mr. Sreenivasulu Madduru 4)Dr. Y. Nasir Ahmed 5)Dr. Srinivasan Nagaraj, 6)Dr.P.Upendra Kumar 7)Dr. Ravi H Talawar 8)Ms. K. Sudha 9)Mr. C. Sudhakar
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(57) Abstract :

Abstract The invention provides a novel system and method for real-time monitoring and control of power grids by integrating Internet of Things (IoT) devices with artificial intelligence (AI) technologies. Modern power grids face increasing challenges due to rising electricity demand, aging infrastructure, and the growing integration of renewable energy sources. Traditional monitoring systems, such as SCADA, offer limited data granularity, slower response times, and rely heavily on manual interventions, making them insufficient to ensure grid stability, efficiency, and reliability under dynamic conditions. The present invention addresses these limitations by enabling continuous, intelligent, and adaptive monitoring and control of electrical networks. The system employs a network of IoT-enabled sensors distributed across transmission and distribution networks, substations, and renewable energy generation points. These sensors collect real-time data on voltage, current, frequency, temperature, and equipment health, providing detailed situational awareness of the entire grid. The collected data is processed using AI-driven analytics, including machine learning and predictive models, to detect anomalies, forecast potential faults, optimize load distribution, and implement proactive maintenance schedules. By learning from historical and real-time data, the system can autonomously recommend or execute corrective actions, enhancing operational efficiency and minimizing downtime. In addition, the invention supports the integration of renewable energy sources by continuously balancing supply and demand, forecasting energy generation, and managing distributed energy resources. A secure communication framework ensures reliable and safe transmission of data and control signals between IoT devices and analytics platforms, reducing latency and improving resilience against cyber threats. Overall, the invention represents a transformative approach to smart grid management, combining real-time IoT monitoring, AI-based predictive analytics, adaptive control, and renewable energy integration. It offers a scalable, reliable, and efficient solution for modern power grids, significantly improving grid stability, operational efficiency, fault management, and energy sustainability.

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