

(54) Title of the invention : IOT-BASED SMART GRID MANAGEMENT SYSTEM EMPLOYING MACHINE LEARNING FOR EFFICIENT ENERGY DISTRIBUTION

<p>(51) International classification :G06N0020000000, G06Q0010060000, G06Q0050060000, H02J0003000000, H02J0003140000</p> <p>(86) International Application No :NA Filing Date :NA</p> <p>(87) International Publication No : NA</p> <p>(61) Patent of Addition to Application Number :NA Filing Date :NA</p> <p>(62) Divisional to Application Number :NA Filing Date :NA</p>	<p>(71)Name of Applicant :</p> <p><b>1)Ashish Grover</b> Address of Applicant :Manav Rachna International Institute of Research and Studies -----</p> <p><b>2)MANISHA</b></p> <p><b>3)Richa Adlakha</b></p> <p><b>4)Priya Dahiya</b></p> <p><b>5)Yaduvir Singh</b></p> <p><b>6)Gaurav Dubey</b></p> <p><b>7)Anurag Mishra</b></p> <p>Name of Applicant : NA Address of Applicant : NA</p> <p>(72)Name of Inventor :</p> <p><b>1)Ashish Grover</b> Address of Applicant :Manav Rachna International Institute of Research and Studies -----</p> <p><b>2)MANISHA</b> Address of Applicant :Noida Institute of Engineering &amp; Technology, Greater Noida -----</p> <p><b>3)Richa Adlakha</b> Address of Applicant :Manav Rachna International Institute of Research and Studies -----</p> <p><b>4)Priya Dahiya</b> Address of Applicant :Noida Institute of Engineering and Technology, Greater Noida -----</p> <p><b>5)Yaduvir Singh</b> Address of Applicant :Noida Institute of Engineering and Technology, Greater Noida -----</p> <p><b>6)Gaurav Dubey</b> Address of Applicant :KIET Group of institutions -----</p> <p><b>7)Gaurav Dubey</b> Address of Applicant :KIET Group of Institutions, Ghaziabad -----</p>
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(57) Abstract :

The IoT-Based Smart Grid Management System Employing Machine Learning for Efficient Energy Distribution is a pioneering technological solution that addresses the challenges of modernizing and optimizing energy distribution within smart grids. This innovative system integrates the Internet of Things (IoT) and machine learning to create a dynamic, self-adapting grid infrastructure capable of enhancing energy efficiency, reliability, and sustainability. The system is founded on a multi-faceted approach, encompassing the deployment of IoT sensors and devices across the grid to capture real-time data on energy consumption, equipment performance, and grid conditions. This data is then harmoniously integrated and stored within a centralized repository. Machine learning models, meticulously trained on historical data, are employed to conduct real-time analysis, detect anomalies, forecast energy demand, and predict equipment failures. Subsequently, automated decisions and recommendations are made, equipping grid operators and maintenance teams with invaluable insights for prompt, proactive action. The benefits of this invention are manifold. It enables predictive maintenance, reducing costly downtime and enhancing grid reliability. Furthermore, real-time anomaly detection and response mechanisms ensure grid stability and minimize energy wastage. Demand forecasting and load balancing capabilities facilitate the optimization of energy distribution, contributing to grid efficiency. Additionally, IoT-enabled consumer energy consumption monitoring and behavior analysis provide consumers with valuable insights into their usage patterns, fostering energy conservation. The IoT-Based Smart Grid Management System offers a robust and adaptable solution to the complex challenges posed by the modern energy landscape. By marrying IoT technology and machine learning, it presents a path towards more efficient, sustainable, and responsive energy distribution systems, contributing to a brighter and greener energy future.

No. of Pages : 18 No. of Claims : 4