

Unlocking the Potential of Green IoT: Towards Sustainable Development and Environmental Stewardship

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Abstract: *The Internet of Things (IoT) is a revolutionary network in which autonomous physical items connect, creating amazing opportunities to improve many facets of daily life, including environmental sustainability. Resource management and efficiency are maximized by the integration of IoT technology with environmentally sensitive practices, often known as Green IoT or Sustainable IoT. This study examines the fundamentals, uses, difficulties, and potential future paths of the green internet of things. Energy efficiency, resource conservation, waste reduction, ecosystem preservation, lifetime sustainability, and data privacy and security are all included in the principles of Green IoT. Green IoT applications include precision agriculture, smart transportation, smart building automation, smart grid management, and remote monitoring of renewable energy sources. Developing energy-efficient routing protocols, putting in place regulations for energy recycling, and optimizing hardware and software components are among the difficulties in making the switch to green IoT. However, the use of IoT technology in a number of industrial verticals has sparked the creation of greener solutions, such as waste management systems, smart utility meters, energy-efficient homes, shared mobility services, and air quality monitoring. Designing zero-energy IoT devices, putting smart routing schemes into place, including machine learning and adaptive AI, introducing intelligent sleep modes, and advancing wireless charging technologies are some of the future possibilities for Green IoT. All things considered, Green IoT has a great deal of promise to improve environmental sustainability and usher in a more sustainable future.*

Keywords: Internet of Things (IoT); Green IoT; Environment sustainability; Energy efficiency; Resource conservation; Zero-energy IoT devices; Sustainable solutions; Real-world impact

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