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(57) Abstract :
The present invention relates to an IoT and deep learning-driven system and method for optimizing energy efficiency in edge-centric computation environments within next-generation 6G networks. By leveraging predictive analytics and cloud computing, this invention addresses the significant challenge of energy consumption in distributed networks, especially where edge devices play a crucial role in data processing and communication. The system utilizes an integrated framework combining IoT devices, deep learning algorithms, and predictive models to monitor, analyze, and predict energy usage patterns in real-time. IoT devices gather data on energy consumption and network performance across various nodes in the 6G network. This data is then processed by edge devices using advanced deep learning techniques to predict energy demands and identify potential areas for optimization. The method further incorporates cloud computing resources to enhance the computational efficiency of the predictive models, allowing for scalable and dynamic energy management strategies. This enables the system to balance the load across edge devices and cloud resources effectively, minimizing energy waste while maintaining optimal network performance. By predicting energy needs and adjusting resource allocation proactively, the invention ensures a sustainable and cost-effective operation of 6G networks. Additionally, the proposed system includes a feedback mechanism that continuously refines the predictive models based on historical data, further enhancing accuracy and adaptability over time. This innovative approach not only reduces energy consumption but also extends the lifespan of network infrastructure, making it a critical advancement for energy-efficient management in future communication networks.

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