

(12) PATENT APPLICATION PUBLICATION

(19) INDIA

(22) Date of filing of Application :19/01/2026

(21) Application No.202641005464 A

(43) Publication Date : 30/01/2026

(54) Title of the invention : AN IOT AND MACHINE LEARNING ENABLED ENERGY-EFFICIENT ADAPTIVE COMMUNICATION SYSTEM FOR ADVANCED 6G NETWORKS

(51) International classification	:H04W 24/02, H04W 52/02, H04W 24/08, H04W 4/70, H04W 72/04	(71)Name of Applicant : 1)Mrs. Bammidi Deepa Address of Applicant :Assistant Professor, Department of ECE, Anil Neerukonda Institute of Technology and Sciences Sangivalasa, Visakhapatnam, Andhra Pradesh, India Andhra Pradesh India 2)Dr. Deepak Kumar Behera 3)Mr. Jallu Sateesh 4)Dr. Ipseeta Nanda 5)Dr. Lizina Khatua 6)Mr. Ram Krishna Verma 7)Dr. Babji Prasad Chapa 8)Dr. M. AnanthaLakshmi 9)Dr. Jami Venkata Suman
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(32) Priority Date	:NA	
(33) Name of priority country	:NA	
(86) International Application No	:	
Filing Date	:01/01/1900	
(87) International Publication No	: NA	
(61) Patent of Addition to Application Number	:NA	
Filing Date	:NA	
(62) Divisional to Application Number	:NA	
Filing Date	:NA	

(57) Abstract :

[038] An IoT and machine learning enabled energy-efficient adaptive communication system for advanced sixth-generation (6G) networks is disclosed. The system integrates distributed IoT devices, edge communication nodes, and an intelligent network optimization engine to continuously collect and analyze real-time network, traffic, mobility, and energy-related data. Machine learning models are employed to predict network conditions, traffic demand, and energy consumption patterns, enabling proactive and autonomous optimization of communication parameters including transmission power, spectrum allocation, routing paths, and node activation schedules. Edge-level intelligence and cooperative learning mechanisms reduce latency, signaling overhead, and energy usage while preserving scalability and data privacy. The invention provides a self-optimizing, scalable, and sustainable 6G communication framework capable of supporting ultra-dense IoT deployments, heterogeneous service requirements, and future next-generation communication technologies. Accompanied Drawing [FIGS. 1-2]

No. of Pages : 16 No. of Claims : 10