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(51) International classification	:G06F 9/50, G06F 1/32, G06F 11/30, G05B 13/02, H04L 12/24	(71) <b>Name of Applicant :</b> <b>1)NOIDA INSTITUTE OF ENGINEERING &amp; TECHNOLOGY</b> Address of Applicant :19, Knowledge Park-II, Institutional Area, Greater Noida – 201306, Uttar Pradesh, India. Uttar Pradesh India
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(57) Abstract :

An energy-efficient algorithm for a large-scale data center is disclosed. A telemetry collector (101) acquires compute and environmental measurements, a state modeling engine (102) generates actionable operating profiles, a prediction module (103) estimates near-term demand, and an optimization controller (104) selects coordinated control actions. An execution manager (105) applies workload migration, consolidation, and operating-state commands, while a feedback verifier (106) refines subsequent cycles using observed outcomes. The arrangement reduces electrical consumption and thermal imbalance across heterogeneous infrastructure while maintaining bounded service impact and stable operational behaviour.

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