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(57) Abstract :
HOMOMORPHIC ENCRYPTION-BASED FEDERATED LEARNING FRAMEWORK FOR SECURE AND PRIVACY-PRESERVING COLLABORATIVE DATA ANALYSIS ABSTRACT The Homomorphic Encryption-Based Federated Learning Framework (HEBFLF) described by reference numerals 100 is tailored for secure and privacy-preserving collaborative data analysis. The framework incorporates a plurality of distributed computing devices 108, each equipped with homomorphic encryption modules 110 to secure model updates and aggregated data without disclosure. A central server 112 facilitates coordination and aggregation of encrypted model updates, leveraging a secure communication channel 106 between computing devices and the central server. The method for secure federated learning involves steps with reference numerals: a) Encrypting model updates and data contributions, b) Transmitting encrypted data to the central server, c) Aggregating encrypted model updates, d) Decrypting aggregated updates at the central server using a decryption key, and e) Updating a global model based on decrypted aggregated updates. This innovative approach, denoted by reference numerals, addresses the crucial requirements for privacy in collaborative data analysis through a secure federated learning solution.

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