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(54) **Title:** PRIVACY-PRESERVING NEURAL NETWORK MODEL AND PRIVACY-PRESERVING PREDICTION USING THE PRIVACY-PRESERVING NEURAL NETWORK MODEL

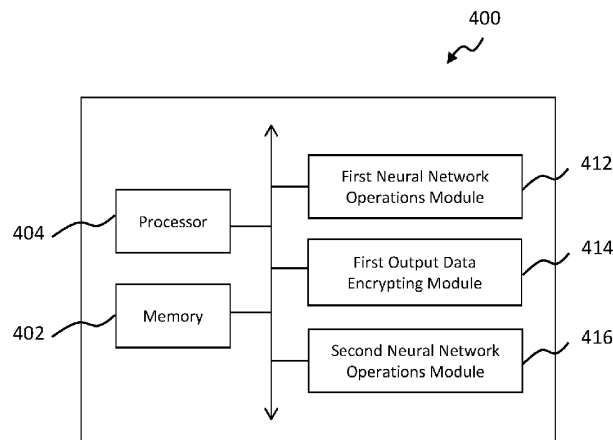


FIG. 4

(57) **Abstract:** A method of building a privacy-preserving neural network model is provided. The method includes: performing first neural network operations using a non-private neural network of the privacy-preserving neural network model based on first input data in plaintext to produce first output data in plaintext, whereby the non-private neural network is pre-trained and learnable parameters of the non-private neural network are fixed while performing the first neural network operations; encrypting the first output data from the non-private neural network using a homomorphic encryption method to produce first encrypted data; and performing second neural network operations homomorphically using a private neural network of the privacy-preserving neural network model based on the first encrypted data to produce second encrypted data, whereby learnable parameters of the private neural network are trained while performing the second neural network operations. There is also provided a corresponding system for building a privacy-preserving neural network model, as well as method and system for performing privacy-preserving prediction using the privacy-preserving neural network model built.

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