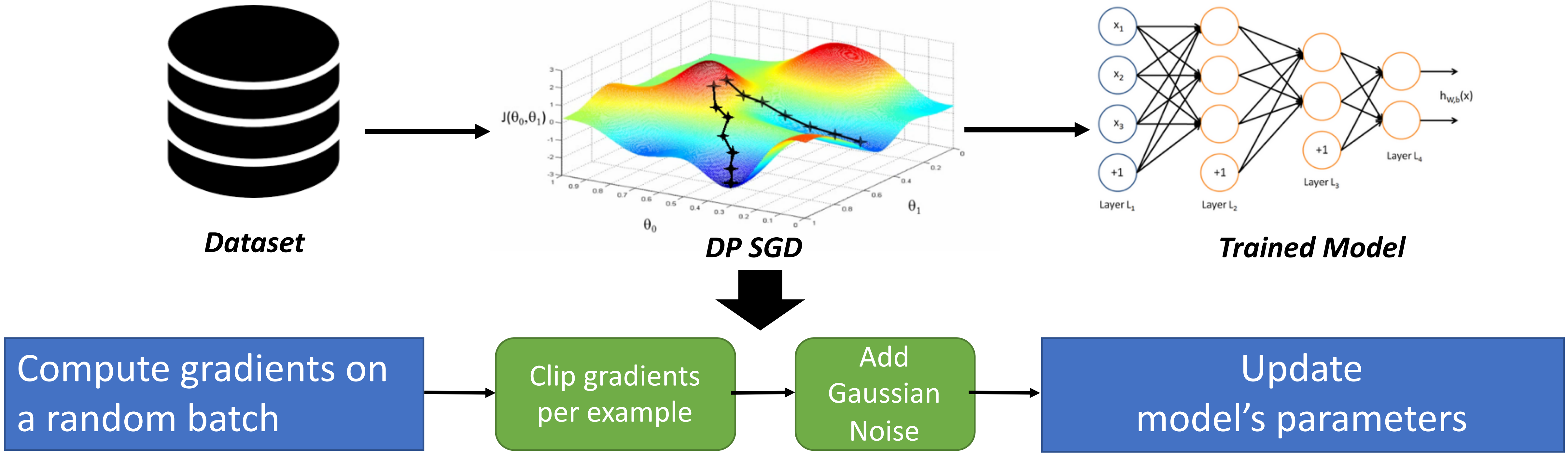
Differentially Private SGD

Adaptive selection of the norm bound for gradients clipping



Dataset

DP SGD

Trained Model

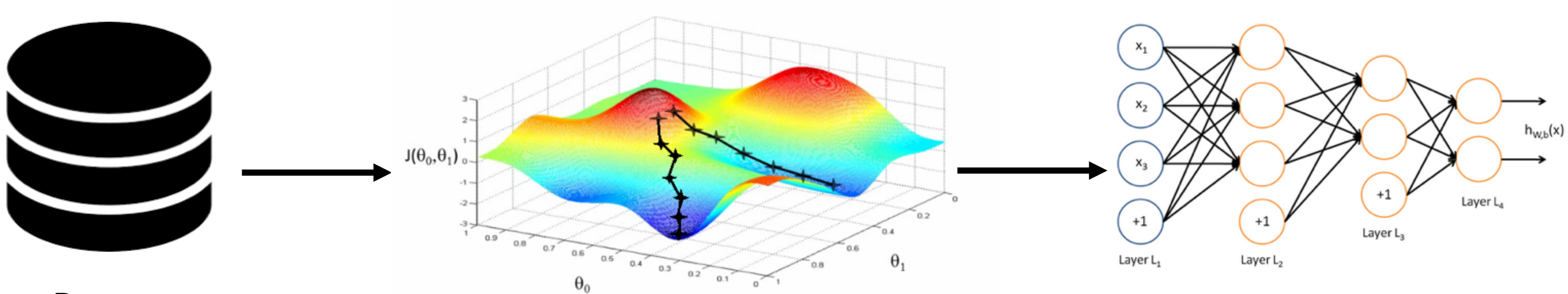
Compute gradients on a random batch

Clip gradients per example

Add Gaussian Noise

Update model's parameters

Differentially Private SGD



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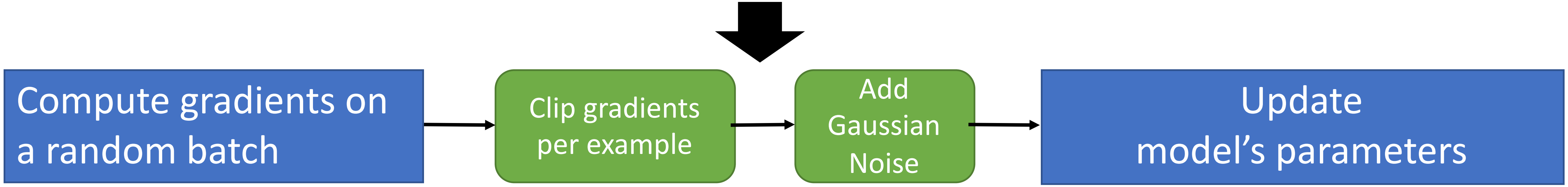
DP SGD

Trained Model



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Experimental Evaluation

Numerically compute privacy guarantees (privacy budget)

Test on two Generative NN Models:

- Restricted Boltzmann Machines (RBM) [200 hidden neurons]
- Variational Auto-Encoder (VAE) [200 hidden neurons, 2d latent space]

Evaluate quality of generated samples (digits) on MNIST

Use Case: Counting Queries on synthetic data