

# Just an Idea

February 5, 2023

# Input Histograms

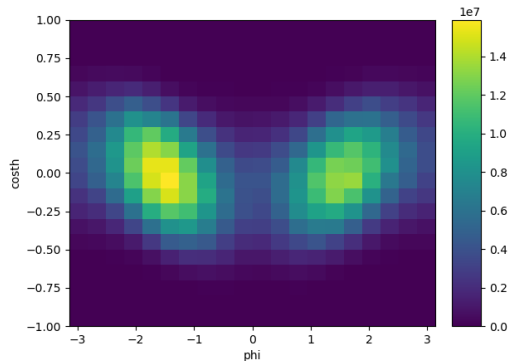


Figure 1: 2D histogram used for training.

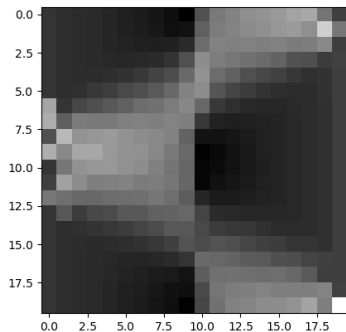


Figure 2: Image of the 2D histogram. This is considered as a 20 x 20 pixel image. Each histogram is scaled by the standard scalar.

» 100K histograms were generated randomly with  $\lambda, \mu, \nu$  (as targets) in range  $[-1.0, 1.0]$  and they are split in to train: validation = 70:30.

# CNN Architecture

- » Feature extraction;
  - » 2 convolutional layers.
  - » 2 max pooling layers.
  - » activated by ReLu activation function.
- » Regression layers;
  - » 3 linear layers.
  - » Activated by ReLu activation function.
- » Learning rate = 0.001 and L2 regulation =  $1.0e-04$ .
- » CNN was trained for 50 epochs.

# Loss Curve

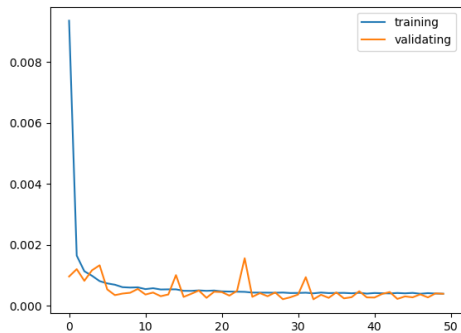
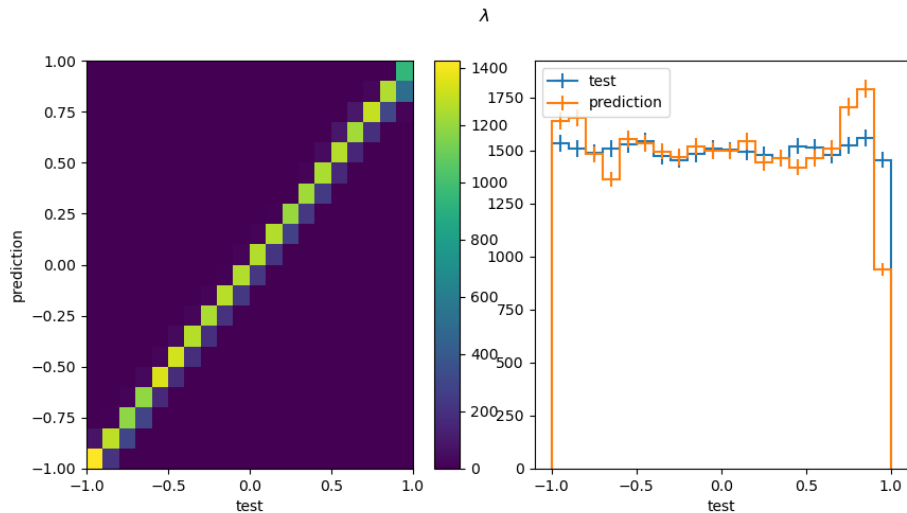
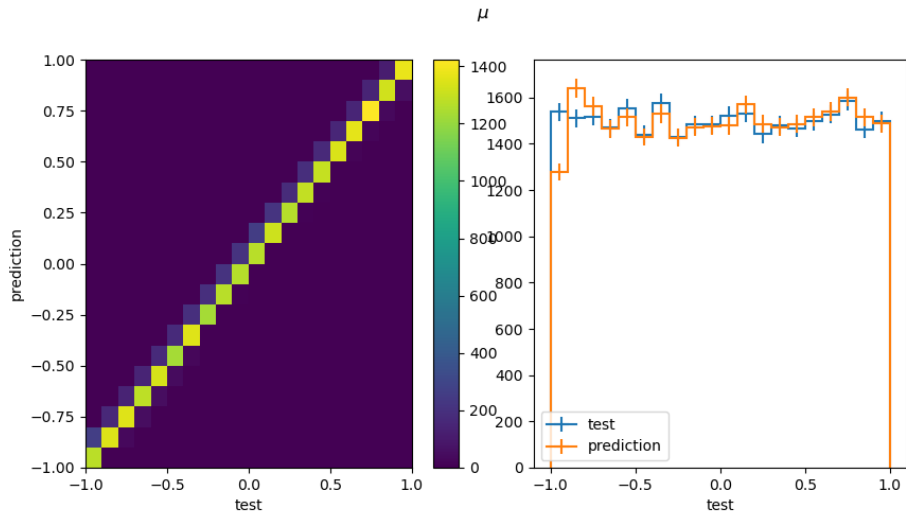


Figure 3: Loss curve.

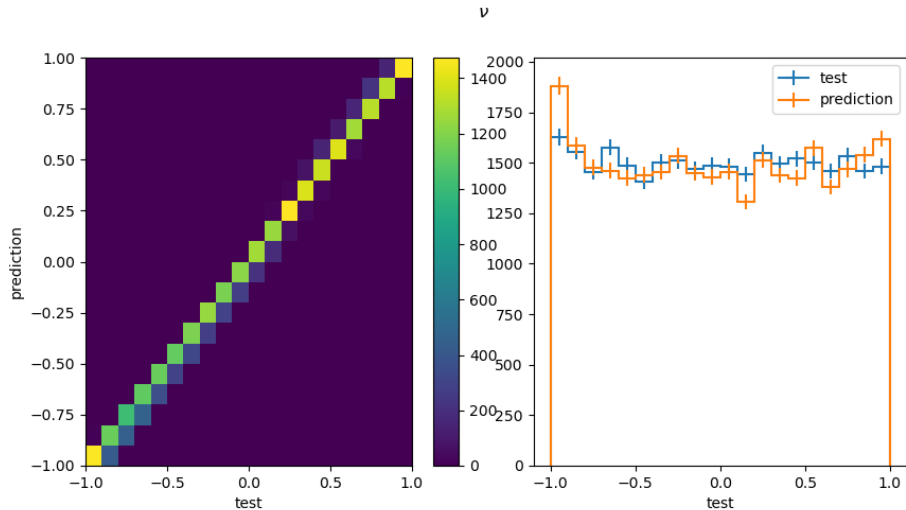
Test:  $\lambda = \text{uniform}(-1., 1.0)$



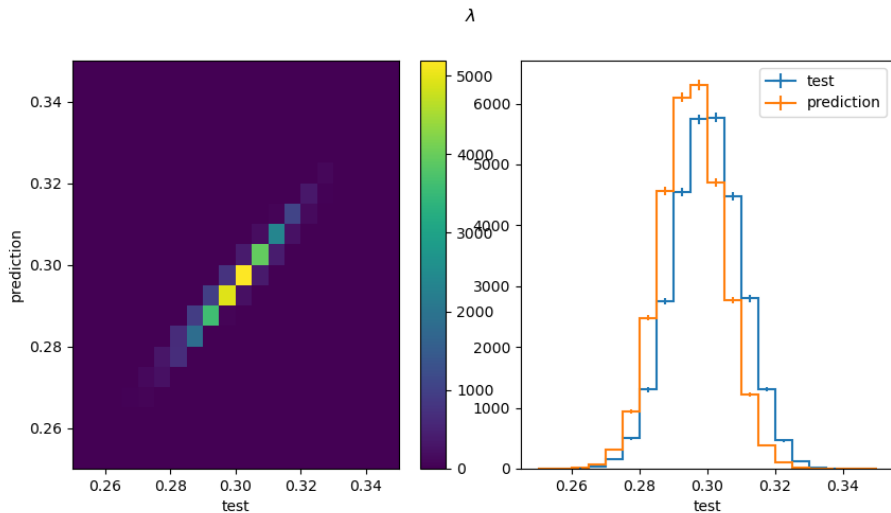
Test:  $\mu = \text{uniform}(-1., 1.0)$



Test:  $\nu = \text{uniform}(-1., 1.0)$

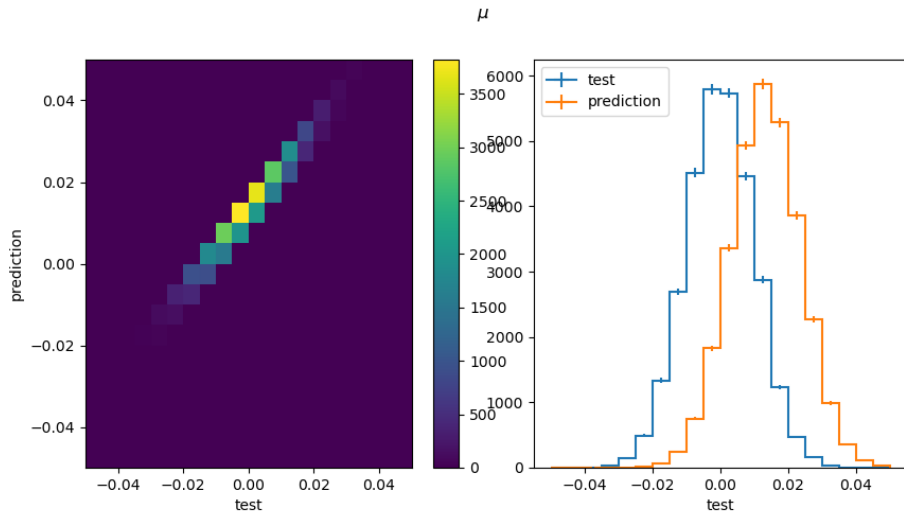


Test:  $\lambda = \text{gaus}(0.3, 0.01)$

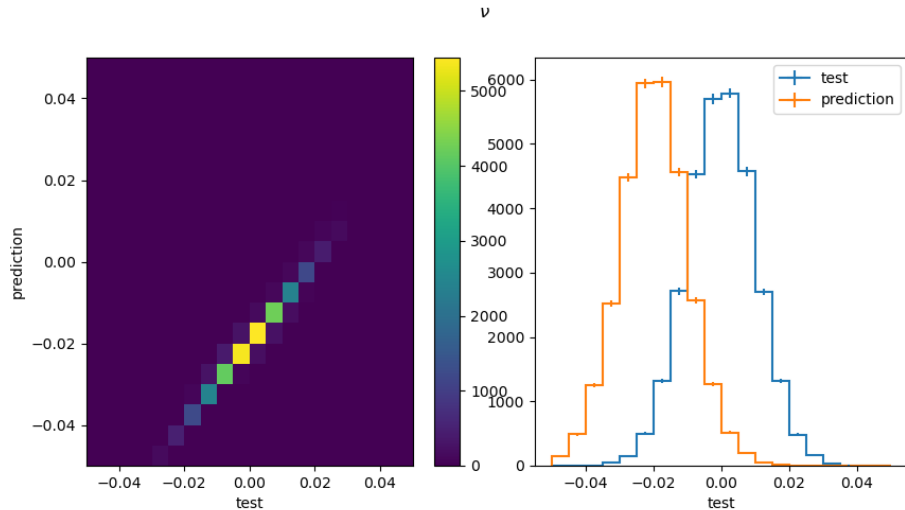




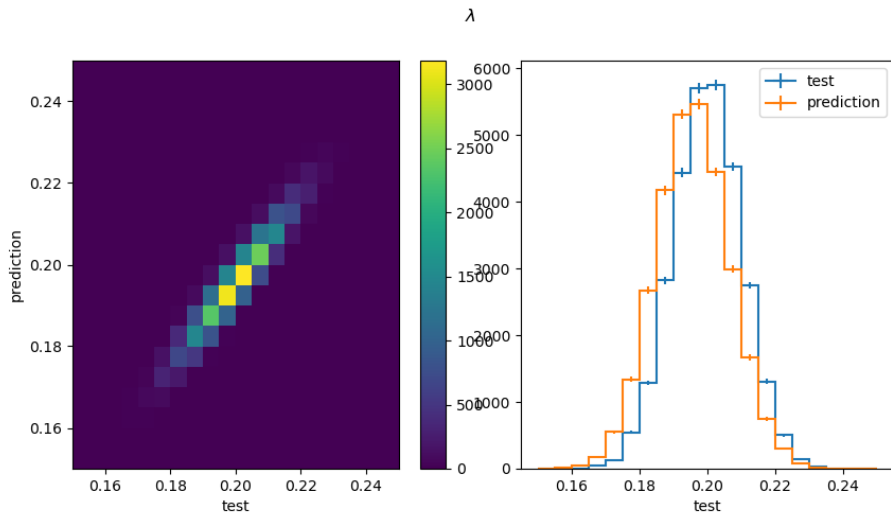
Test:  $\mu = \text{gaus}(0.0, 0.01)$



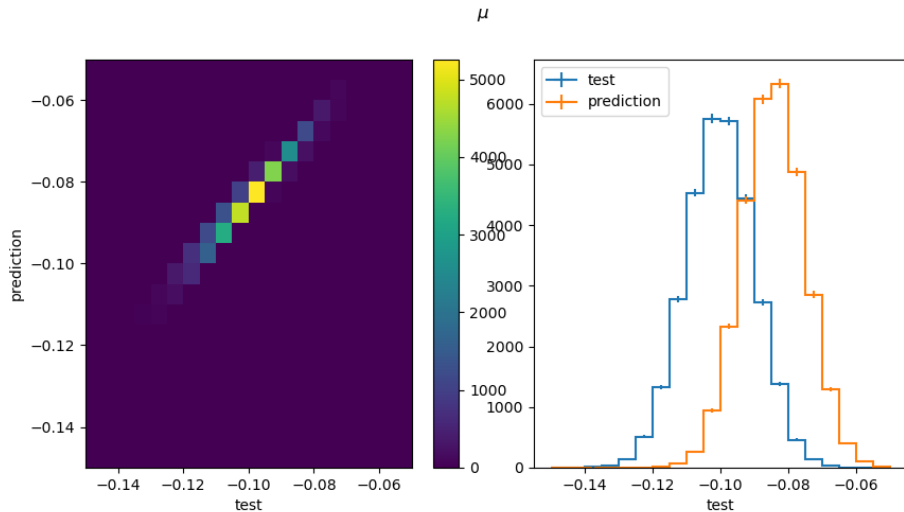
Test:  $\nu = \text{gaus}(0.0, 0.01)$



Test:  $\lambda = \text{gaus}(0.2, 0.01)$



Test:  $\mu = \text{gaus}(-0.1, 0.01)$



Test:  $\nu = \text{gaus}(0.1, 0.01)$

