

VAES ON GPU FOR PARTICLE PHYSICS APPLICATIONS

GSOC 2018 WITH **CERN-HSF**

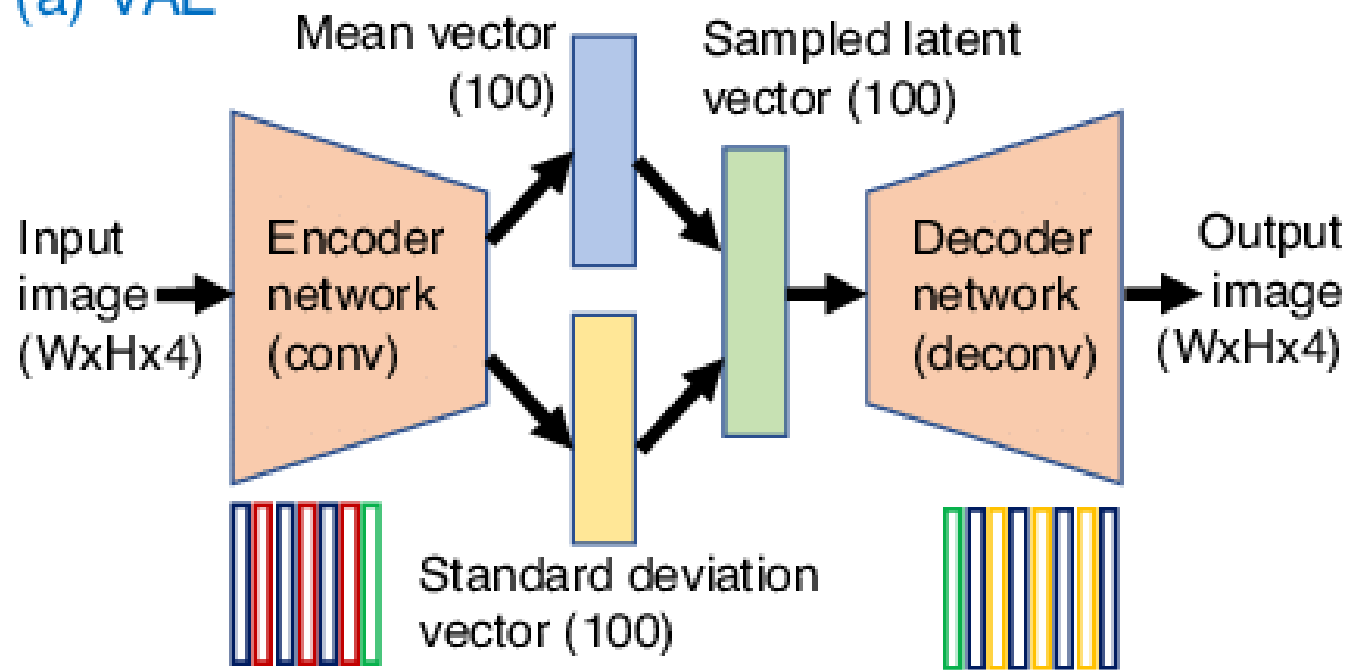
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WHAT ARE VARIATIONAL AUTOENCODERS?

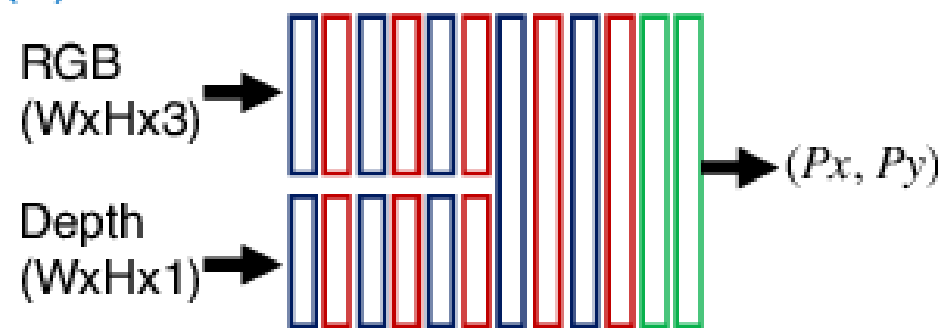
- Generative Models
- Enable latent space interpolation i.e Vector Arithmetic
- Powerful encoded representation

(a) VAE

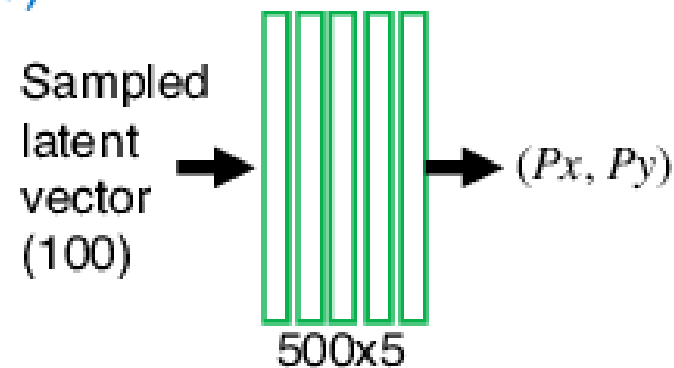


- Convolutional layer
- Max pooling layer
- Fully connected layer
- Up sampling layer

(b) CNN

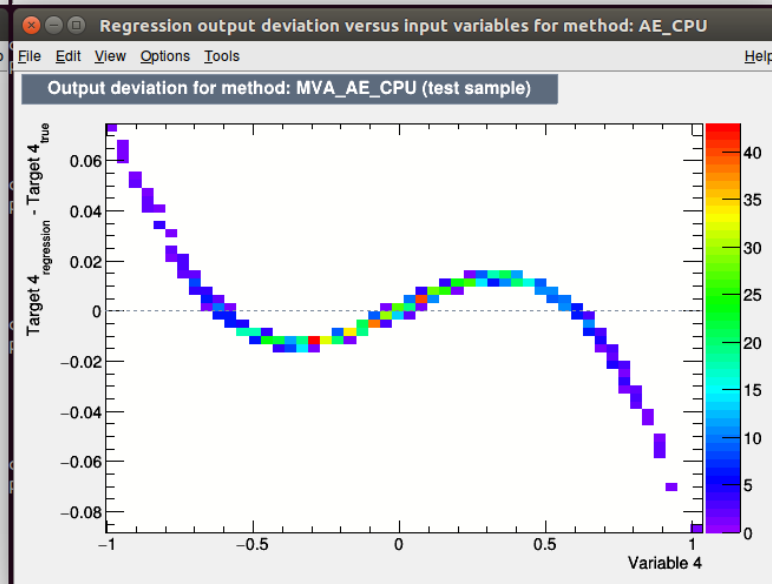
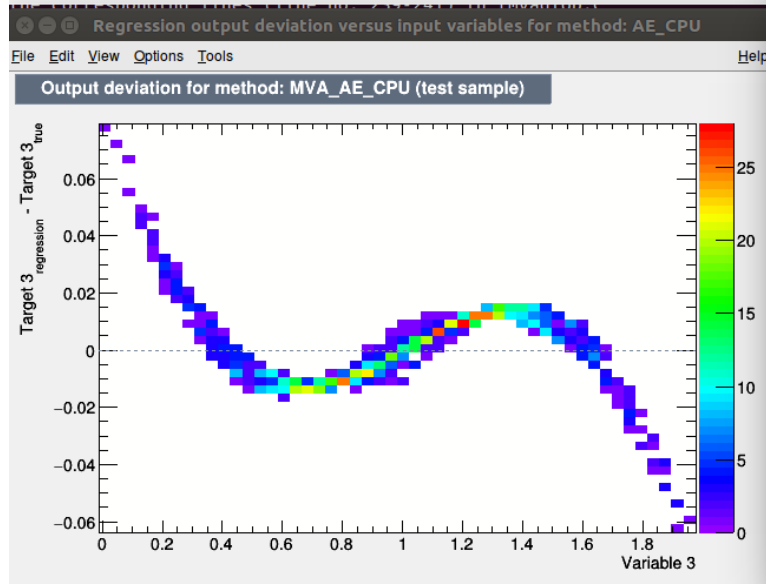
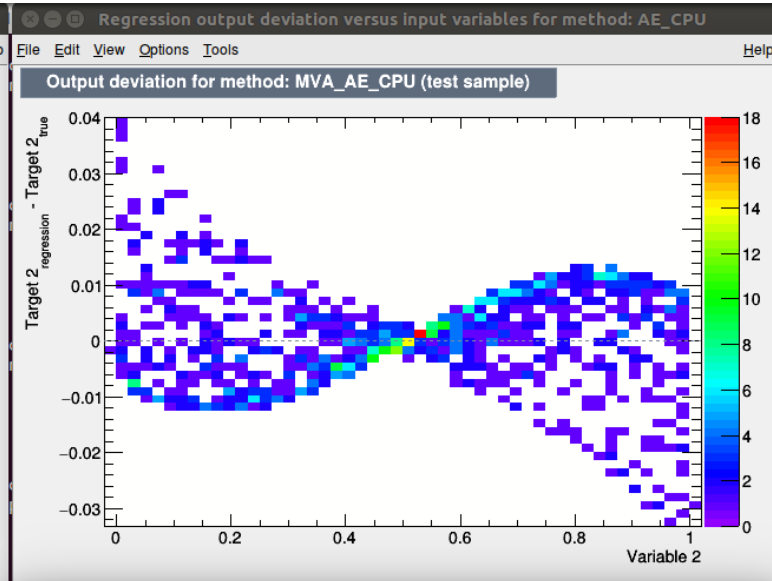
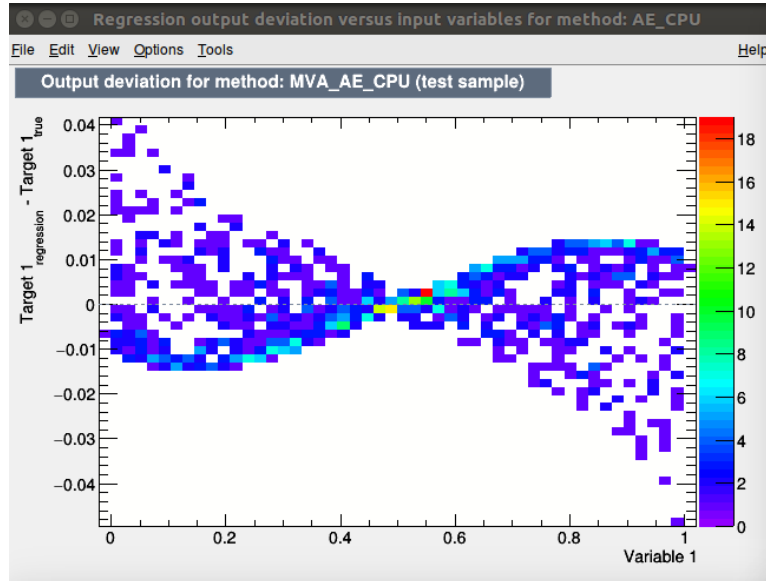


(c) MLP



METHOD AE

- A simpler way to construct Auto Encoders in TMVA-DNN
- `Layout=Encoder={RESHAPE|1|1|2|FLAT,DENSE|128|TANH,DENSE|64|TANH}Decoder={DENSE|128|TANH,DENSE|2|LINEAR,LINEAR}`
- Implementation of KL Divergence as a loss function for training and Regression Support for MethodDL and MethodAE



PADDING LAYER

- Allowing arbitrary padding in convolution causes trouble during backpropagation especially when the stride is greater than 1.
- Arbitrary padding for retaining size and concatenating feature maps of different size.
- **PADDING2D|topPad|bottomPad|leftPad|rightPad**

THANK YOU

