

### Question 5:

(a)

According to the former experiments, I notice AdamOptimizer + Softmax\_cross\_entropy\_with\_logits does really good job, and the result is similar to the result gained by the model which combined by MomentumOptimizer and kl\_divergence\_ml. Therefore, this time I want to choose AdamOptimizer + Relu + kl\_divergence\_ml + CNN as my model, and choose 1. AdamOptimizer + Relu + Softmax\_cross\_entropy\_with\_logits + CNN and 2. MomentumOptimizer + Relu + kl\_divergence\_ml + CNN as comparison.

(c)

The result satisfied my expectations. AdamOptimizer + Relu + kl\_divergence\_ml + CNN achieves the best result, the validation error and test error it gets finally is only 35 and 66 respectively. However, compared to the other 2 models, this result does not improve too much.

(d)

I try to apply these three models on the CIFAR-10 data set. However, this time the result achieved by AdamOptimizer + Relu + kl\_divergence\_ml + CNN is totally awful. The validation error and test error remained unchanged during train period. AdamOptimizer + Relu + kl\_divergence\_ml + CNN model gets nice result this time, the accuracy this model achieved finally is about 58%. (You can check the result in 5\_cifar\_demo.txt)