

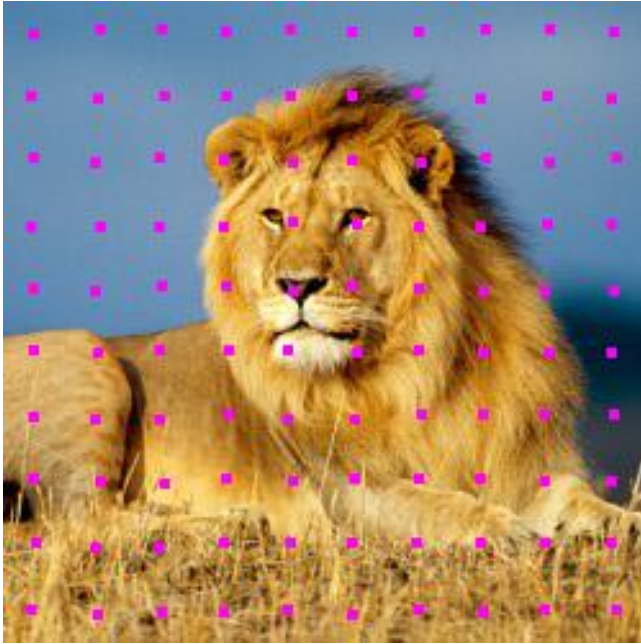
Solution 1

Figure 1: 100

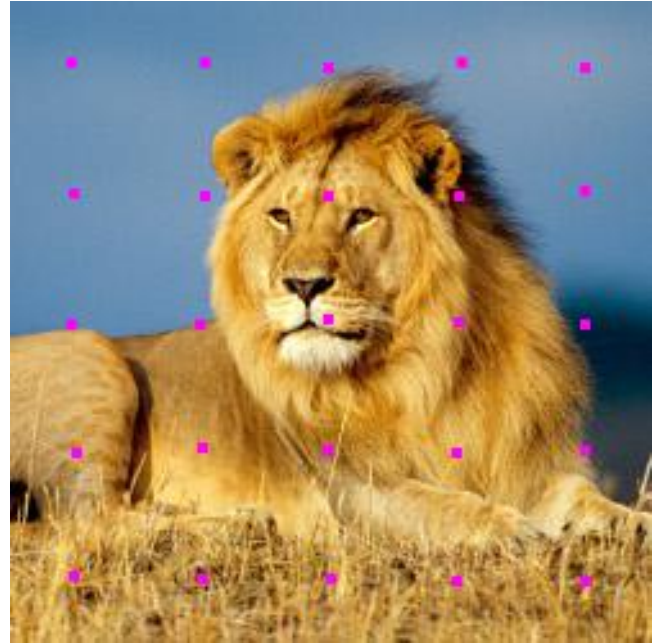


Figure 2: 25

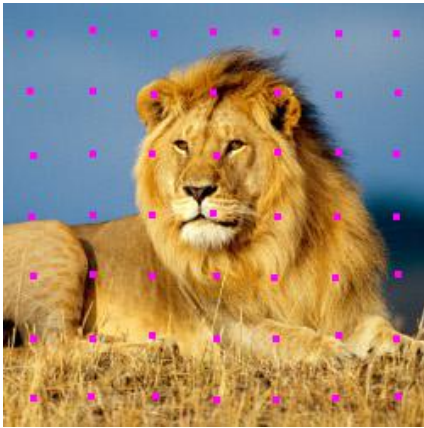


Figure 3: 49



Figure 4: 64

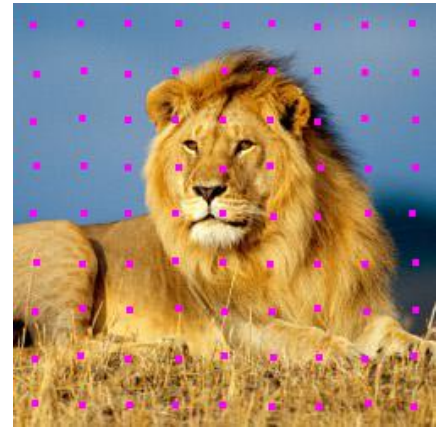


Figure 5: 81

(a)

(b) When the spatial weight is given high enough, the lion outline is not clear enough. So I choose 5 as the weight.

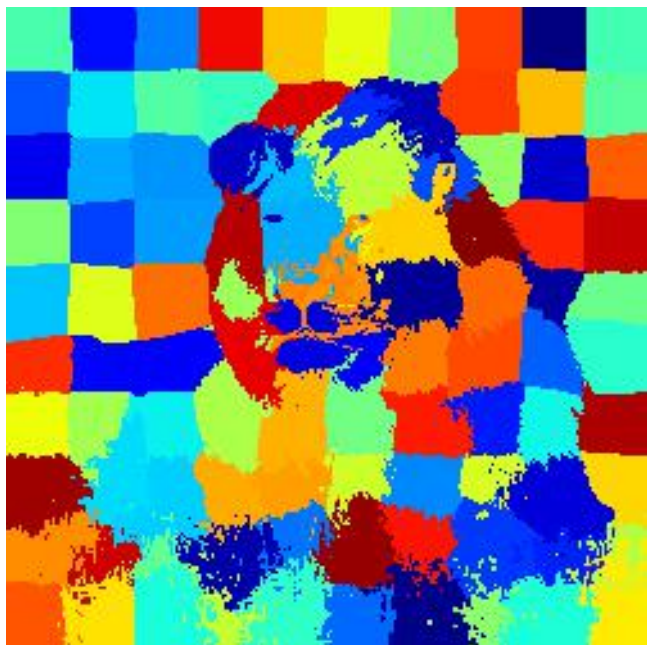


Figure 6: 100

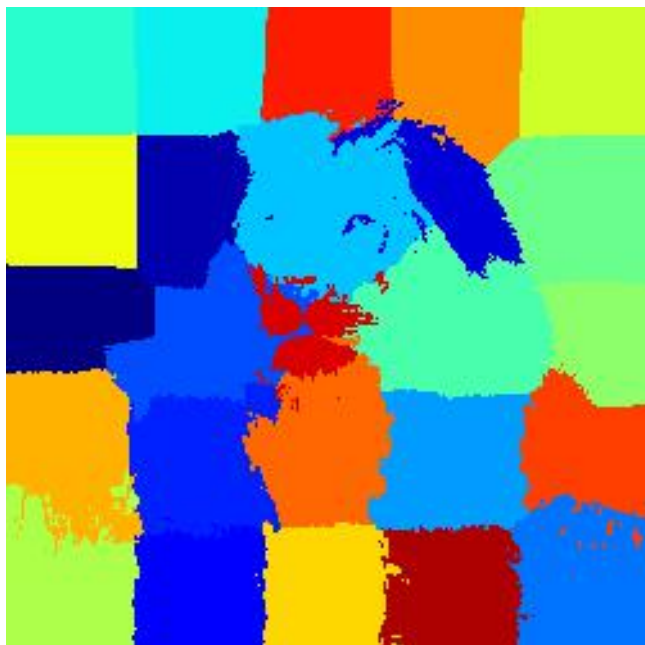


Figure 7: 25

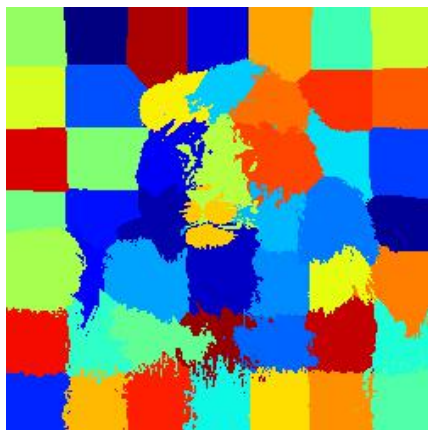


Figure 8: 49

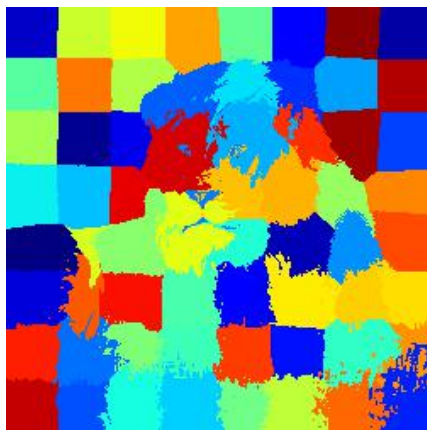


Figure 9: 64

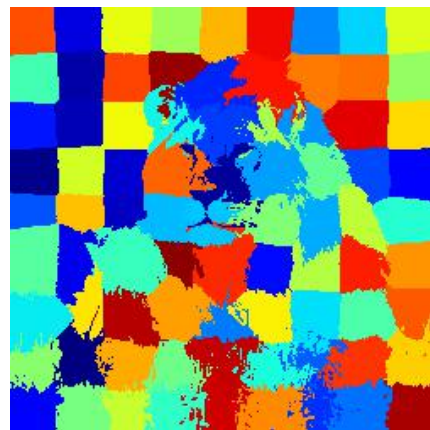


Figure 10: 81

Solution 2

- (a) The limit of xavier uniform distribution was chosen that way to keep variance stay in a small range when passing layers.
- Increasing the learning rate will increase the convergence rate and accuracy.
 - Increasing the hidden unit will increase the convergence rate but not affect accuracy rate.
 - Increasing the batch size will decrease the convergence rate and decrease the accuracy rate.
- (b) After applying the momentum, the performance of the mnist.py has a better convergence rate and a better accuracy.

Solution 3

	1 convolution layer	2 convolution layers
0	6.10%	7.10%
1	68.60%	76.00%
2	80.90%	89.50%
3	83.50%	90.70%
4	86.40%	92.70%
5	87.50%	92.90%
6	88.40%	93.40%
7	89.00%	93.40%
8	89.40%	94.40%
9	89.90%	94.20%
10	90.00%	95.30%

All the implementation are within the code folder.

Information

This problem set took approximately 40 hours of effort.

I discussed this problem set with:

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I also got hints from the following sources:

- <https://wiseodd.github.io/techblog/2016/07/16/convnet-conv-layer/>