Summary

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Abstract

As I have watched all lessions of cs229 and cs231n and finished all homework of them, I finally put my trainning period to an end. I am going to briefly review the knowledge I have learnt and have a reflection on myself.

1 Review

1.1 Machine learning

In cs229, I learned some basic method of machine learning.

- Logistic Regression
- SVM
- Naive Bayes
- Debugging learning models
- Error analysis

1.2 Deep learning

In cs231n, I learnt many models and algorithm of deep learning.

- DNN
- CNN
- RNN
- GAN
- Deep learning method and hardware

1.3 Reinforcement learning

In cs231n, I learnt some models of Reinforcement learning.

- Strategy gradient
- Q-Learning

1.4 Homework

Compared with the video lessions, I think the homework is more attractive to me and I deeply agree with the saying – talk is easy, show me the code. (My code can be found here.) It may be a piece of cake to exprienced researchers, but I got really excited when I finish even just a little part of my

homework, especially when I saw that I got a low loss, a high accurracy, the visualized result, and the cool output. It's really really cool! And I also learned some important tricks for trainning models from the homework which can help to save time:

- gradient check
- loss error check
- model over fitting pre-training

2 Reflection

2.1 Reflection

Although doing research is as cool as doing homework, I know that, doing research is not like doing homework. There is not always a right answer, and there is not always an existing solution to ask for help. And these courses just open the door of machine learning and deep learning for me, and the next period is to go on the research road. And how far I can get is determined by myself.

2.2 Question

During my learning, I have some questions that annoyes me a lot.

1. What annoyed me most was that sometimes it was hard for me to have a good command of some mathematics thesis or expression, for example, the calculation of back propagation, which cost me a lot of time to understand and to convince myself that it does work. But when I finally got through the time when I had to write the calculation by hand and began to use pytorch, which calculates back propagation automatically, I often wonder whether we need to master the bottom principle. And will the command of the bottom principle determines how high I could get in scient research?

2. Then, sometimes I feel afraid to read the original paper and I am more willing to read some blogs related to the the paper. I do know the importance of reading paper, but I just find it hard for me to understand the theories in English. I wonder whether there are useful methods to overcome the impatience of reading paper and get accustomed of getting answer from paper.

3. Another question is that, when I studied the famous and popular algorithms, like CNN and GAN, I got very surprised and admired the authors who had come up with these ideas a lot. But then I began to think, though these ideas are exquisite and authors had made a great contribution to machine learning by proposing these mehtods, it's not so difficult for others to come up with these methods. So why them, not others? Not me?... Should we pay more attention to the life and try to let our neural network imitate the biological behavior or the human thinking to get closer to the summit of the machine learning?

4. Last but not least, looking at some amazing models, such as ResNet, I am so curious how successful researchers build and optimize their models. Just follow their intuition and establish a set of theories and then do experiments and finally prove that their intuition does work? Or try all prossibilities of the combination of the existing modules untils they get a good result and finally try to explain why it works? From my limited perspective, sometimes it's a good idea to apply a method which does a good job in a field to another related field. Such as apply lstm to video processing after we know lstm works well in sentences processing; combine lstm with GAN, combine CNN with GAN, combine self-attention with GAN and a lot of other combinations as long as we can imagine...
   So as a new researcher, should I choose to fly my imagination boldly and freely to think up a new method to solve an existing problem, or to try some new combinations that haven't been tried by others to find a better solution to the problem?