Viterbi Internship - Random Ideas

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Contents

1 Face Detection

1.1 NN for finding what the hidden layers of the Net are doing

- Can try to analyze the hidden layers, to find which nodes are the ones which are capturing illumination invariant features and stuff like that.

Comments : Already been done by many researchers. See : Keras Vis

2 NN

2.1 Filtering automatically with CNN

- Can try to remove the data bias from the database, by physically removing them using another NN
- Or perhaps automatically learning that these are not exactly relevant.

2.2 Training NN

- To do a task, we can think of how a normal human being would approach that task.
- Can ask the machine learner to do that on its own.
- This would implicitly lead to learning objects on its own.

2.3 Labels rather than Folders

- Instead of a dataset which includes only classes, ie image1 either goes to class A or to class B, we can do some slight variations.
  - Have tags instead of classes. Each image can be classified into more than one sets. The idea is that the sets are no longer disjoint, rather they have some intersection.
  - Heirarchial classes. Instead of 1D output neural network, we can have multi dimensional neural network.

2.4 MediFor

2.4.1 Approach 1

- One thing that could be done is to divide the problem into two halves.
- The first is to get the annotations about the image. Something describing some kind of action being performed.
- Next is to use those annotations to make out if there is anything semantically incorrect.

2.4.2 Approach 2

- Can try to use an inpainting based approach. Once the bbox is identified, use a black box around it, and ask the cnn to complete it.
- Not a very interesting idea though.

2.5 Kind of Transfer Learning : Modular CNNs

- Suppose that I have a CNN model, and I train that for Scale Invariance. Now suppose that I also have another model and I train that for Illumination invariance.
- Now suppose I need both the properties. I should be able to do this directly cascading one after the other. Not sure if this is done yet, but I find this to be a pretty cool idea.
- In fact if this can be achieved, then we can actually in some sense get more of an understanding how the thinking process actually takes place.
- Also making things modular will let people simply use all the pre-computed nets as a black box and let that be added as a prefix to many vision applications.

3 Important Tips : By Prof. Ram Nevatia

- Whatever written in the paper, is written very nicely. Do not change the work flow for poster, or even the content or representation. Has happened with the prof said that pains in changing the course plan from one assignment to another.