Combining Neural Nets

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Abstract

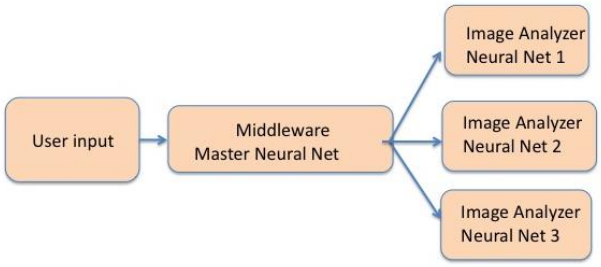
To date many papers have been published describing neural networks' successes at classifying medical images. Our work seeks to combine these neural nets into a web service so that a client can submit a file (or files) and receive one or more analyses of their images. Our poster will show results from experiments testing the effectiveness of our combined neural nets on a variety of images. We see this as a step towards developing decision support software for medical image analysis

Introduction

Patients as well as clinicians would usually like to consult multiple specialists when there is a tricky issue to resolve. Many papers have been published showing useful results from applying neural networks to medical images[1,2]. We propose to bring these results to life by creating a web of neural nets which embody this knowledge. These neural nets will provide analyses to our clients of images they upload to our web service. To explore this architecture, we are first implementing our system to analyze images outside the medical domain. We are using the MNIST[3] and CIFAR[4] datasets. Our work will then progress to analyzing medical images.

System Description

Our Neural Net Web system consists of three main parts: (1) the user interface; (2) middleware; (3) and the individually trained neural nets. The user interface collects a file to be analyzed from the user. The middleware, or master neural net, uses s pre-trained convolutional net framework from torchvision[5] to select individual neural nets should analyze the image. The middleware also converts the image if necessary to a common image format that all the individual neural nets have been modified to accept. The individual neural nets are built on top of a generic neural network which has been trained on a dataset collected from the web. When the selected neural nets have analyzed the image, their results are passed back through the middleware to the user.



Conclusion

We developed a model for decision support software for medical image analysis that integrates neural nets into an online system for image classification. Our software achieves 78% accuracy on the CIFAR-10 dataset and 99% accuracy on the MNIST dataset.

References

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