

Group 12: Review

October 19, 2019

1 Summary

In this report, the authors run experiments to compare the efficacy of feature extraction from deep CNNs and classification using Support Vector Machines, Random Forests and Linear Discriminant Analysis with feature extraction using scattering nets, VGG16, and ResNet, and using the aforementioned models for hand written digit recognition (on the MNIST dataset). The report is a concise description of the results. The authors also employ transfer learning to fine-tune the last layer of VGG19 and Resnet on MNIST.

2 Strengths

The report is pleasingly concise. There is a good intuitive explanation of Scattering Nets, VGG19 and ResNet which aids the reader in understanding the motivation better. The language is precise and the grammatical errors are to the minimum.

3 Weaknesses

The report seems to rush past the conclusion without offering any good explanation of why the results are as they are. Implementation details are also missing.

4 Evaluation on Clarity and quality of writing

Overall: 4/5 (good)

As mentioned before, the report clearly explains the models used, methodologies used, data used in clear language. The visualizations are appropriate and not overpowering. Grammatical errors, as stated before, are reduced to the minimum, thus denying misinterpretations of the content.

5 Evaluation on Technical Quality

Overall: 4/5 (good)

Overall technical quality of the report is good. However, there is one item that stands out. In the section on Feature Extraction using Scattering Net, the authors mention that they collect all outputs from three layers of the scattering net to form feature vectors of shape 1×5425 . This is not in direct agreement with the output of a 2D scattering transform as done using the implementation in `kymatio` in Python. It would be nice to know how these feature vectors were arrived at i.e. what were the sizes of the layers, for instance. Note, that I am not claiming that this is wrong in any way, I am purely curious about the underlying parameter settings.

Another gripe with the technical content of the report, is the comparison between PCA and t-SNE. I generally do not think it is accurate to make statements like "t-SNE performed better than PCA". By saying things like this the authors are working on the implicit assumption that "best" performance somehow relates to euclidean distance between points in 2 dimensions. For instance, in 3D or 4D, the relative arrangement of feature vectors could be wildly different. While dimensionality reduction gives us a good representation of the vectors in a low dimension (which is easy for humans to visualize), I am not certain if it should be considered gospel in model comparison.

6 Overall rating

Overall: 4/5 (good)

Overall the report is well written with only essential information. It would have been nice to package some code/provide implementation details with the report. As such, I am not entirely certain how the results mentioned in the report can be verified independently.

7 Confidence on assessment

Overall: 3

I have read the report in detail. However, I have not been able to double check the results as the code is not linked or packaged with the report.