Final Project Progress Report - 1

Team name: MaxMarginDB

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Project

As a recap, **Unsupervised Visual Domain Adaptation: A Deep Max-Margin Approach** [1] (MMDB) tackles the visual domain adaptation problem, where one learns from source-domain data and aims to perform well in target-domain data.

- What is your project idea?

    - We intend on training against two new datasets; datasets yet to be determined.
    - We are investigating opportunities to improve MMDB performance by the use of alternate distributions in place of the current Gaussian Process.
    - We are investigating opportunities to improve MMDB performance by the use of alternate optimization methods.
    - We are investigating opportunities to improve MMDB training time by running it on multiple GPUs.
    - We are investigating opportunities to improve MMDB performance by fine tuning hyper-parameters using a grid search.
    - We are investigating opportunities to map the MMDB process to a practical application.

- What has each team member contributed thus far?

    - Jun and Nick have independently reviewed and assessed the MMDB method
    - Jun has provided an excellent seminar on the derivation and mathematical basis of MMDB
    - Jun and Nick have set up and run the code provided with MMDB
    - Jun and Nick have have met for a brainstorming sessions
    - Jun and Nick have established methods for remote collaboration over various channels provided by the internet
    - Jun and Nick have provided input for the required project reporting.

- What intermediate results have you generated?

    - We have successfully run the MMDB code on MNIST and SVNH and discussed performance of the out of the box run.

- What problems have you faced or still have to consider?

  - Default hyper-parameters provided by the authors do not yield the results they claimed in [1]. We will be spending some time on finding the set of hyper-parameters that achieve results close to what they report.

  - MNIST data was not available from the codebase. Seems to have different format as the one they use. As a result, we may not be able to exactly reproduce the results as claimed in the paper.

  - PyTorch version improvement. Using PyTorch v1.2 now.

  - MMDB is not immediately susceptible to parallelization. It may be that the best we can do is run parallel grid search.

  - Visualization of results is required.

References

[1] M. Kim, P. Sahu, B. Gholami, and V. Pavlovic. Unsupervised visual domain adaptation: A deep max-margin gaussian process approach. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, pages 4380–4390, 2019.