PROJECT

Machine Learning Capstone Project

A part of the Machine Learning Engineer Nanodegree Program

PROJECT REVIEW | CODE REVIEW | NOTES

Meets Specifications

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This is a solid solution to an interesting problem, and your report clearly demonstrates a strong foundational understanding of deep learning techniques. Your work is well documented, and your results thoroughly analyzed. Overall, great work here. Congratulations on passing your capstone!

Definition

✓ **Student provides a high-level overview of the project in layman's terms. Background information such as the problem domain, the project origin, and related data sets or input data is given.**

- Solid introduction to the problem you're solving and techniques you're using, with a good focus on introducing the research that precedes yours
- Your goals for the project are clearly stated, nicely setting up the scope of the project right from the start

✓ **The problem which needs to be solved is clearly defined. A strategy for solving the problem, including discussion of the expected solution, has been made.**

- The input and output are well defined, which makes for a solid problem statement
- It's clear from your discussion here why deep learning could be an appropriate solution

✓ **Metrics used to measure performance of a model or result are clearly defined. Metrics are justified based on the characteristics of the problem.**

- Your evaluation metrics and cost function are precisely defined here in clear mathematical terms, and this is accompanied by an intuitive explanation using a diagram. This is a well rounded approach to considering your metrics
- The evaluation process is laid out clearly, step by step. Nice job

Analysis

✓ **If a dataset is present, features and calculated statistics relevant to the problem have been reported and discussed, along with a sampling of the data. In lieu of a dataset, a thorough description of the input space or input data has been made. Abnormalities or characteristics about the data or input that need to be addressed have been identified.**

- The important characteristics of a machine learning dataset are accurately identified here, showing that you have a solid understanding of the deep learning environment
- Your data checks all the boxes, and it certainly appears fit for the problem. You've done a nice job of addressing each necessary characteristic

✓ **A visualization has been provided that summarizes or extracts a relevant characteristic or feature about the dataset or input data with thorough discussion. Visual cues are clearly defined.**

- While the directory snapshots don't really constitute visualization, the bar graphs at the end of the section certainly do, and these are highlighting important characteristics of the dataset
- The visualizations themselves are well put together and nicely labelled

✓ **Algorithms and techniques used in the project are thoroughly discussed and properly justified based on the characteristics of the problem.**

- Every technique and chosen algorithm is discussed in detail and your choices are solid
- There's a good focus in this section on the practical aspects of your model, which means less on the theoretical side, but that's fine. The important takeaway from this project is that you know how and when to use the tools you're learning

✓ **Student clearly defines a benchmark result or threshold for comparing performances of solutions obtained.**

Methodology

✓ **All preprocessing steps have been clearly documented. Abnormalities or characteristics about the data or input that needed to be addressed have been corrected. If no data preprocessing is necessary, it has been clearly justified.**

- There's many key transformations made here, and one at a time you've explained them in a way that is easy to follow

✓ **The process for which metrics, algorithms, and techniques were implemented with the given datasets or input data has been thoroughly documented. Complications that occurred during the coding process are discussed.**

- Nice step by step breakdown of how you approached the problem. And each step has a solid amount of explanatory details, making for a solidly reproducible paper (an important, and sometimes rare, quality in published work)

✓ **The process of improving upon the algorithms and techniques used is clearly documented. Both the initial and final solutions are reported, along with intermediate solutions, if necessary.**

- The hyperparameters changed, the values tried, and the final results are all given, fully characterizing the refinement process
- With deep learning problems, understanding your network architecture is also key for reproducibility, so the visualization at the end summarizing this is a good addition

Results

✓ **The final model's qualities — such as parameters — are evaluated in detail. Some type of analysis is used to validate the robustness of the model's solution.**

- Nice use of learning curves to depict performance and the training process
- I really like the development here from the initial results through each of your changes and into the final model. The discussion along the way nicely shows some natural progression and clearly documents your thought process

✓ **The final results are compared to the benchmark result or threshold with some type of statistical analysis. Justification is made as to whether the final model and solution is significant enough to have adequately solved the problem.**

Conclusion

✓ **A visualization has been provided that emphasizes an important quality about the project with thorough discussion. Visual cues are clearly defined.**

- Examining individual predictions, especially with image data where we can analyze it manually with our own vision as well, is an excellent way to further evaluate the robustness of a model. Good choice for this section

✓ **Student adequately summarizes the end-to-end problem solution and discusses one or two particular aspects of the project they found interesting or difficult.**

- Solid recap of the overall process. You've done well to highlight the key points to take away from your work

✓ **Discussion is made as to how one aspect of the implementation could be improved. Potential solutions resulting from these improvements are considered and compared/contrasted to the current solution.**

Quality

✓ **Project report follows a well-organized structure and would be readily understood by its intended audience. Each section is written in a clear, concise and specific manner. Few grammatical and spelling mistakes are present. All resources used to complete the project are cited and referenced.**

✓ **Code is formatted neatly with comments that effectively explain complex implementations. Output produces similar results and solutions as to those discussed in the project.**

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