UDACITY

PROJECT

Machine Learning Capstone Project
A part of the Machine Learning Engineer Nanodegree Program

PROJECT REVIEW
CODE REVIEW
NOTES

SHARE YOUR ACCOMPLISHMENT!

Meets Specifications

This is a solid solution to an interesting problem, and your report is quite well written. There's tons of detail, and plenty of examples to demonstrate your model's performance. I wish I had more in the way of constructive feedback, but nothing has fallen short of the specifications. Overall, excellent job on this. Congratulations on passing the 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, with a good focus on the practical importance of a good solution
- It's clear how machine learning is a viable solution in this situation, based on your discussion here
- Nice summary of the related research that has been previously published. This gives nice context for what the reader can expect of yours

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
- Your approach to the problem is clear, and certainly suitable

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

- These metrics make sense for the problem, and are well defined here
- You've done a good job of justifying each choice based on the characteristics of the problem

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 source of the data, its size, the images and their structure are all clearly described, which makes for a solid overview of the key characteristics
- A data sample is provided as required
- Some abnormalities are explicitly addressed and you've demonstrated that you've done good exploratory work

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.

- These are important data qualities and certainly things well worth visualizing; good use of this section here
- The visualizations themselves are clean and well presented, and they really demonstrate your grasp of image processing techniques. Good work

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

- This is a well written, detailed, and most importantly intuitive and easily understood explanation of the algorithms that you're using. It's most important that we give our readers a solid grasp on the techniques that we're presenting as our solution, and you've done that well
- I appreciate that you were able to explain these complex concepts in clear terms without needing to rely on mathematical notation; this makes your report more digestible and accessible for readers

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

- Comparing to well defined, objective, concrete models / results is always the best approach for obtaining a baseline for our own work, and that's what you have here. Good choice

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.

- This is a solid step by step overview of the work required to prepare your data for proper training, and again it's written in a way that's clear and detailed
- It's easy to see what the structure of the data would be before and after each of these transformations

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.

- The goal of this section is to make our work as reproducible as possible; for any future researchers that read your work and wish to expand on it, they'll have to start by re-implementing what you have done, and they can only do that if your explanation of your work through this report is detailed and accurate. You've certainly met that requirement with your discussion here
- One of the main ways we help with reproduciblity is by clearly documenting the challenges we faced, and how we overcame them. This helps out those that are following our work not to get stuck on the things that we got stuck on. The way you introduced each concept makes it clear what the potential pitfalls are and how you dealt with the process
- Specific examples that show your model's performance are an excellent way to dig into the initial results

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 tuned, the values tried, and the results obtained are all clearly and cleanly recorded, fully characterizing the refinement process

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.

- Your final results are presented in a way that's easy to analyze and compare, with good surrounding discussion
- Examining learning curves and confusion matrices gives us a direct look at the robustness / generalization ability of a model, as we can get to understand whether it's overfitting, whether it has trouble with certain classes, and whether there's still improvement to potentially be made. So this point is covered quite well by your examination

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.

- Many examples are given throughout the report of processed images and how they look, as well as specific predictions
- One of the nice things about image data is that we have the ability to "manually" classify it by examining it for ourselves and figuring out what the label should be; we can compare this to our model's output to get an intuitive understanding of what it's seeing

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
- It's great to see how much you learned from this work and how much you benefitted from it. Ultimately, the capstone is a learning experience, so your personal takeaways are the most important lasting effect

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.

- A number of logical ideas are given to improve the quality of the model and they're all well justified

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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