Differentiable architecture search. Second project status report Review

Maria Ivanova [1]

1. Problem statement

This project[1] is dedicated to the one the most prominent methods of the Neural architecture search - DARTS (Liu et al., 2018).

The goal of this project is to implement DARTS method and evaluate the learned model.

The project objective include the choice of the appropriate convolutional architecture and a resonable search space, implementations of one-level and bi-level optimization and evaluations of the learned architecture on a dataset of a small size (CIFAR10, MNIST).

The project statement is well-described.

2. The main idea of the project

In the report well described the main idea of the project. The main aspects of the DARTS algorithm: search space, continuous relaxation and optimization, approximate architecture gradient.

The search space is described in the subsection 2.1, the continuous relaxation and optimization is described in the subsection 2.2, approximate architecture gradient is described in subsection 2.3.

3. A comparison with relevant methods is present

NAS mostly vary in the three components: search space, search strategy and performance estimation strategy. A comparison with relevant methods in terms of these three components is present in the section 3 of the Project report - Literature Review.

[1]Skoltech, Moscow. Correspondence to: Maria Ivanova <maria.ivanova@skoltech.ru>.

[1]https://github.com/VoronkovaDasha/project_darts/blob/main/DARTS_project.pdf

4. Clarity, format and styling

The clarity of the report is high, there is no even a single part of the report that is not clear. The format and styling of the report is very close to the top-level conference papers.

5. Reproducibility

I have tried to launch the code as explained in the Readme of the repo. I have obtained results which are very closed to the results which are described in the report.

Cell architecture was trained with $train\_arch.py$. I followed the training setup, except the parameter amount of epochs. My results are presented in Table 1

	Number of epochs	Train accuracy	Validation accuracy
Report results	40	99.97%	74.64%
Reproduced	10	85.54%	68.56%

Table 1. Evaluation of the learned cells reproduced

The final network architecture was trained with $train\_network.py$ on CIFAR10 dataset. I followed the training setup, except the parameter amount of epochs and cells learned as well in the lower amount epochs scenario. My results are presented in Table 2

	Number of epochs	Train accuracy	Validation accuracy
Report results	40	99.95%	79.67%
Reproduced	10	93.51%	72.61%

Table 2. Evaluation of the learned cells reproduced

.

6. Overall report performance

Each part of the report is described clearly and all the necessary for understanding information is provided. Nothing is missing or left uncovered.

Styling, quality and structure of the report are done well.

Overall report performance of the Project report is excellent.

References

Liu, H., Simonyan, K., and Yang, Y. Darts: Differentiable architecture search. *arXiv preprint arXiv:1806.09055*, 2018.