Review of the Second Project Report: TopoHyperDrive

1. Problem Statement

The problem statement in the report is well-defined. It discusses that complexity and computational demand of neural networks are increasing and it is necessary to generate efficient hyperparameter optimization techniques. The report notes that traditional approaches generally treat neural networks as black boxes leading to inefficiency in optimization.

2. Main Idea Description

The main idea on leveraging topological features of model embeddings for speeding up hyperparameter search is innovative and clearly described. The report outlines a new technique called TopoHyperDrive which optimizes the process of searching for hyperparameters using Representation Topology Divergence (RTD). The explanation is full enough, gives background information and reasons for selected methodologies.

3. Comparison with Relevant Methods

Author compares with other common hyperparameter optimization methods such as Grid search, Random Search, Bayesian Optimization, Hyperband and BOHB. He discusses strengths and weaknesses of each method while bringing to introduction of TopoHyperDrive as a better option. So, the structure and the content of this part is clear and well-delivered.

Clarity and Completeness:

Every section is easy to understand and they have all important details about concepts and methodologies.Yet some technical terms and concepts like Representation Topology Divergence (RTD) may be difficult to understand for readers who are not familiar with topological data analysis. So, some additional discussion could be made to broaden readers' understanding of this field. Some illustrations could help with understanding of the main experimental pipeline, as well.

Reasonableness of Presented Results:

The presented results are reasonable and align with the objectives of the study. Author shows validation and test accuracy metrics and this provides a clear measure of the method’s effectiveness. Some qualitative results could be presented to improve a reader’s understanding in the model’s prediction ability change

Github:

Well-structured and beautiful with all execution code included. Results can be nicely reproduced on both gpu and cpu with the explained launch command and necessary data and arguments prepared and provided.