Performance-Aware Energy-Efficient GPU Frequency Selection using DNN-based Models

Artifact Description

The environment.txt file in `AD` directory includes the environment data of the NVIDIA GA100 node which is generated by machine using the bash script available at: https://github.com/SC-Tech-Program/Author-Kit.

Artifact Description

The data collection, deep learning-based model development, analyses and evaluations can be reproduced using the constructs available in `AE` directory. The description of each construct is as follows:

- **Data Collection:** allows acquisition of data for real applications (`LAMMPS, NAMD, GROMACS, LSTM`), `SPEC ACCEL`, `DGEMM,` and `STREAM`. The key components involved in data collection are `launch.sh`, `profile.py`, and `control.sh`.

- **Datasets:** A placeholder to include the aggregated data set for real applications, `SPEC ACCEL`, `DGEMM`, and `STREAM` (the dataset is removed due to size concerns).

- **Figures:** contains the diagrams produced in this study. All figures are reproducible using the data in datasets and `analysis.ipynb` notebook.

- **Models:** include the code to train, validate, and predict the power and performance models for different architectures.

- **Predictive analyses:** `analysis.ipynb` Jupyter notebook consists of the Python code which uses data in datasets and generates the plots available in `figures` and stores evaluated data in `results` directory.

- **Results:** contain numeric data generated during evaluation. These include optimal profiles (power, performance, frequency, energy, energy savings, performance degradation) for each application.