ECE 590 – Object Oriented Programming & Machine Learning
Summer 2025

Project 1: NumPy and EasyNN

Due: Sunday, June 8th, 2025, 11:59 PM Beijing Time

I. Summary

In this project, we will implement a few functions in Python to learn the basics of NumPy and EasyNN. NumPy is a popular Python package for scientific computing. It is used in our course projects to create a reference design for our machine learning library EasyNN. As we will discuss in the lecture, EasyNN allows us to define and capture a data-flow graph (DFG) in Python to represent a complex computation, e.g. a machine learning algorithm, and to evaluate the DFG with given inputs.

This project should be done individually. Discussions are encouraged. However, all the programs (except those from the lectures) and writings should be by yourself. COPY without proper CITATION will be treated as PLAGIARISM and called for DISCIPLINARY ACTION.

II. Working with Your Projects

Please read the **ECE 590 Guide to System Setup and Workflow PDF** before starting work on your projects and follow the instructions there to obtain the initial project package.

Here is a brief introduction of the files we will use for Project 1.

- **easynn.py**: This is the EasyNN library that allows you to define and capture DFGs in Python. You should not modify this file.
- **easynn_golden.py**: This is the reference design of the EasyNN library based on NumPy. You should not modify this file.
- **prj01.py:** This file includes 10 Python functions that you need to implement. You will need to modify this file.
- **grade_p1.py:** This is the grading script to locally verify if your implementations in prj01.py are correct or not. You should not modify this file.
- **ece449.code-workspace:** This is used by VS Code to locate your project

Simply run the grading script to see if all functions pass:

python3 grade_p1.py

Please do not modify grade_p1 when testing your code as your grades will be tested with the original grade_p1 file provided to you from the initial git repository.

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III. Deliverables and Grading

We obtain a copy of your source file **prj01.py** as you push the changes to the central Dasan Git repository so there is no need for you to submit it to us using any other mechanisms. Please be advised that since learning the use of Git is among the objectives of this course, we will NOT accept project submissions outside the central Dasan Git repository, e.g. via emails. If you have difficulty accessing the central Dasan Git repository, it is your responsibility to act promptly to seek help from us well before the project deadlines; otherwise, not being able to access the central Dasan Git repository is NOT an excuse for late submissions.

Project 1 will have a full grade of 100 points. Each function, if passed, will give you 10 points. A failed function will earn 0 points. Please make sure that git push your latest code to the Dasan Git repository for proper grading considerations. Note that there is no report required for this project.

- Run **python3 grade_p1.py** in VM to make sure all 10 tests pass.
- Commit and push your changes to the Dasan Git repository.