

## HW Assignment 2 (Due by 10:00am on October 16)

### 1 Implementation (100 points)

Implement the softmax regression model in Python, using PyTorch, and evaluate them on two 2D non-linear classification tasks: flower and spiral. Starter code and functions for generating the datasets are available in hw2.zip on Cougar Course. The provided code also displays and saves images of the datasets and the trained model's decision boundaries. Make sure that you organize your code in folders as shown in the table below. Write code only in the Python files indicated in **bold**.

```
hw2/  
  softmaxExercise.py  
  utils.py
```

### PyTorch Implementation (100 points)

*Coding effort: my implementation has 14 lines of code in softmaxExercise.py.*

You will need to write code for the following:

1. **Variables:** Create pytorch variables for the input data and the model parameters. Specify that gradients are to be computed w.r.t. parameters only. Initialize the bias vector with zeros, and the weight matrix with a standard Gaussian multiplied with 0.01.

2. **Loss:** Write code that computes the loss variable, based on the current values of the parameters. Once the loss is computed, the gradient w.r.t. the parameters will be automatically computed by calling `loss.backward()`. You are supposed to write the code for computing the loss yourself. In particular, do not use functions from PyTorch (e.g. from the `torch.nn` module) that compute the cross entropy loss.
3. **Predictions:** Use the trained softmax model to compute labels for the training examples.

## 2 Submission

Electronically submit on Cougar Course a `hw2.zip` file that contains the `hw2` folder in which you write code **only in the required files**.

On a Linux system, creating the archive can be done using the command:

```
> zip -r hw2.zip hw2.
```

Please observe the following when handing in homework:

1. Structure, indent, and format your code well.
2. Use adequate comments, both block and in-line to document your code.
3. Make sure your code runs correctly when used in the directory structure shown above.