ECE 492-45 Homework 1 (Fall 2021)

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Material Covered: Machine Learning Overview, Basic commands of Python/R

Problem 1 (40 points) Watch the video: *NOVA Wonders Can We Build a Brain?* Write a concise summary for machine learning/artificial intelligence from both the technical perspective and the ethical perspective. Elaborate each perspective using 3–5 sentences.

Problem 2 (20 points) You will need to work on the task using one of the two languages: Python or R.

(a) Coding Environment Setup for Python. Option (i): Use a cloud interpreter of Python on `Google Colab`, which allows you to execute Python scripts through a web browser. Option (ii): Use locally installed Python interpreter. Download and install `Python` and an IDE such as `PyCharm`.

Coding Environment Setup for R. Install `R`, a statistical programming language, and `RStudio`, an integrated development environment (IDE) for `R`. I suggest you use `RStudio` since it allows you to complete the tasks more efficiently.

(b) Complete *ISLR-2.3 Lab: Introduction to R*. Please write a report, include source code, plots, and provide concise explanation for nontrivial commands and results. For example, what does `attach()` do? In what cases do we need to use `as.factor()`? What do various components of a boxplot mean? Additional hints:

- Data files such as `Auto.data` and `Auto.csv` can be downloaded under Data Sets from ISLR's webpage: https://www.statlearning.com/resources-second-edition
- When data files are loaded, they should be placed in the same folder as displayed in the bottom-right panel of the `RStudio`.
- Try not to reuse a variable name to avoid difficult-to-debug issues. For example, `auto = na.omit(auto)` is bad. Try `auto = na.omit(auto_raw)` instead.
- To finish executing the `identify()` function, you need to click the "Finish" button at the top-right corner of the plot for which the function is called.

- Function `q()` for exiting R may not work in `RStudio`.

For Python users, please follow the text book's instructions while referring to *the "equivalence" Python code*. Note that it is not possible to create strict one-to-one correspondences between these two programming languages. The"equivalence" Python code is our best effort to replicate the key tasks in R.

Problem 3 (20 points, bonus) Complete *ISLR-2.4.8* and write a report.

For Python users, please follow the text book's instructions while referring to *the "equivalence" Python code*, where you may find the sample code and the comments useful.