EIE2112 Lab 3
Supervised Learning: Regression Models

1. Objective

In this lab you will learn about Linear Regression, Polynomial regression, and Ridge regression and how to implement them using scikit-learn.

2. Instructions

- Carefully read this document and the instructions in the Jupyter Notebook (see below).
- Complete the TWO tasks described in Jupyter Notebook.
- Write a report following the instructions detailed in the tasks.
- Submit the report (PDF) + your modified Jupyter Notebook (ZIP) on Blackboard **by 11.59pm on the 3rd of December**.
- The report must be in PDF format. No other formats will be allowed. DO NOT include your PDF report in the ZIP file with the code. The file name of the report must be 12345678x.pdf, where 12345678x should be replaced by your student id.
- Failing to follow these instructions may result in a zero mark.

3. Jupyter Notebooks

This lab requires you to run code using a Jupyter Notebook[1]. Depending on if you know how to use Jupyter Notebooks or not, follow the instructions in subsection 3.1 or 3.2, respectively.

3.1 I already know how to use Jupyter Notebooks.

If you are already familiar with Jupyter, all you need to do is to first download the file 'Lab_3_Regression.ipynb' from Blackboard and then launch this notebook in your browser. Then follow the instructions therein to prepare your report. However, note that you will also need to install scikit-learn in order to be able to execute the code in the notebook (follow the instructions at https://scikit-learn.org/stable/install.html).

3.2 I don't know how to use Jupyter Notebooks.

If you are new to Jupyter and want to save some time, a simple solution is to use the online service to execute Jupyter Notebooks provided by Google, also known as Google Colab[2]. This is a cloud service where you can make use of computational resources made available by Google for free. Not only this doesn't require you to install any software (scikit-learn is already pre-installed), but you can also use their GPUs (provided that they are available) and several pre-installed deep learning libraries (I'll say more about this in the last lecture). Follow the instructions below to learn how to setup your Google Colab environment.

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[1] https://jupyter.org/
[2] https://colab.research.google.com/

1. Open the Google Drive (https://drive.google.com/drive/) page in your browser. Create the following directory structure in your Google Drive:

   My Drive/ EIE2112/Lab 3/

2. Download the file 'Lab_3_Regression.ipynb' from Blackboard and put it in 'My Drive/EIE2112/Lab 3/' in your Google Drive.

3. Go to 'My Drive/EIE2112/Lab 3/'. Double click on 'Lab_3_Regression.ipynb'.

4. You will see a mix of text and Python code. These are called text and code 'cells'. Read the text carefully, as it contains the learning material and instructions for this lab.

5. For the code cells, you can press 'Enter + Shift' or click the Run button  to execute the code. When you run the code, if any output is generated this will appear under the code cell. Note also that you can edit the code in the cells just like in a normal text editor.

6. If you want to clear the restart runtime (e.g., to reset all the local variables that have been set in the code cells), you can click on 'Runtime' and then 'Restart runtime'.

7. If you have more questions about how to use the notebook, you can ask them during the lab to the assistants or directly to me.

8. When you are ready to submit your report (PDF) and Jupyter Notebook (ZIP) on Blackboard, you can click on 'File', then 'Download', and 'Download .ipynb' to download a copy of the Jupyter Notebook on your local machine.