

EE3020 Python Assignment 1 & Report.

30th January 2023

Ireland's COVID-19 Data Hub (<https://covid-19.geohive.ie/>) has detailed data and statistics on the COVID pandemic. An example of a datafile from the 30th January 2023 is available on Canvas, along with a Jupyter Note book/Google Co-Lab notebook to read and display the data.

During the pandemic there was a link between the number of cases and the number of deaths, with a time lag between an increase/decrease in cases and the subsequent increase/decrease in the number of deaths. This link between cases and deaths also changed throughout the pandemic due to, better testing, vaccination and different variants. Working individually carry out the following tasks:

1. In python use Linear Regression (or any appropriate method) to develop a model (or models) that relates the number of cases to deaths.
2. Use the model(s) to answer following Questions:
 - Given the large number of deaths in the first stage of the pandemic, if extensive testing was in place how many cases would have been diagnosed?
 - If the vaccines had been ineffective against "Omicron", how many deaths would have occurred?
3. Use the Layout facility in Jupyter or Google Colab Notebooks to present your work as a report. You should use Python to generate the appropriate figures for the report.
https://colab.research.google.com/notebooks/markdown_guide.ipynb
4. The report should include the following sections:
 - (a) Summary. Write a concise summary, abstract or synopsis that accurately and succinctly tells the reader what is contained in the report.
 - (b) Description and justification for use of any data manipulation employed, such as calculation of time lag and use of moving average.
 - (c) Description of models used to answer the questions. The choice of models and the parameters used must be justified through the use of performance metrics. The metrics used must be explain and justified. The relevance of any particular metric must be explained.
 - (d) Description and justification of any additional data and/or methods used to answer the questions posed.
 - (e) Analysis of performance and discussion.
 - (f) Conclusion.

5. Please ensure that

- You have fully commented your Python code so that it includes a description method used and is clear what each step is. You need to demonstrate an understanding of what the code does in your commenting.
- You have fully explained all the parameters of the python functions you have used.
- You have automated as much of the process as possible.
- You have labeled the plots correctly.

6. Python Code can be developed in any of the following two environments

- Google Colaboratory
<https://colab.research.google.com>
- Anaconda with Jupyter notebooks
<https://www.anaconda.com/products/individual>

7. Submission is a File that can be Run in:-

- Google Colaboratory [filename.ipynb](#)
- Jupyter Notebooks [filename.ipynb](#)

8. You can use any Python Library or Code available. References to code or libraries used must be included.

Submit your Notebook on Canvas of a single Python notebook (filename.ipynb) by 17.00 on Friday 17th February.

Please note the UCC Policy on Plagerism which can be found at:

<https://www.ucc.ie/en/exams/procedures-regulations>

Professor Liam Marnane