CMEE Masters: Miniproject Assessment

February 14, 2022

Assignment Objectives: To address on a model-fitting problem using computational methods, and produce a written report, all in a coherent, reproducible, modular workflow under version control.

Student's Name: Junyue Zhang

Overall Miniproject Mark: 71%

Overall Project Organization

All your directories are in place, though you keep some figure files for your Latex report in a separate subdirectory outside of the code or results folder. These could ideally go in to a dedicated Latex subdirectory that also contains Latex source files and pdf in one place. We would encourage this for your final dissertation.

You have included a `readme` file which briefly describes the project, lists the programming languages used (though no version numbers) and dependencies/packages, and gives an overview of the project structure and the key files/functions and their roles. dditionally, pick a naming convention and stick with it! CamelCase is great, and so is snake_case, a mix of both is not ideal (naming comes with practice, so don't worry too much, but do bear it in mind).

Overall your project organization and documentation are clean and logical, the things you could improve on are fairly minor and will come with practice.

The Code

Your coding tools are generally appropriately chosen. Having a preferred language is fine but do keep Python and C in mind for future projects, especially those with more computational complexity. You have been very judicious in your choice of packages with is great. Over-reliance on packages limits your growth as a programmer and can cause issues for reproducibility of your project.

Your code is carefully and clearly commented, giving an at-a-glace sense of what is happening within each section of your scripts. Your code is sensibly partitioned into distinct tasks such as data wrangling/model fitting/etc. In future, more complex projects you might consider writing separate scripts to hold all your functions and the main body of your code.

Your workflow runs without error, which is commendable. You successfully fit 5 models (quadratic, cubic logistic, Baryani and Gompertz) to your data, and compare them using AIC and BIC. However, although you did not log the population sizes for the logistic model (which is good!) you also did not ensure that residuals were transformed either all into log-space or into non-log-space before computing and comparing AIC/BIC values, and your comparisons are therefore potentially biased in favour of the log-space models.

Recall that you should write into your workflow commands that will delete all existing output files every time the workflow is run (they should be re-generated afresh).

Your workflow did not incorpirate progress updates on the terminal. Indeed the terminal was instead filled with warnings and output from the model fitting section of your workflow various commands throughout your workflow. While it is important not to unversally silence warnings, when many warnings or other outputs appear in quick succession it becomes essentially impossible to determine whether or not they are meaningful. It would be good practise to redirect repeated warnings and other non-critical outputs to log files, and simply flag on the terminal that warnings are being logged if they begin to appear. The user can then clearly track your progress updates on the terminal if you have included them.

Your project ran in a reasonable amount of time (180s), with most time spent in the model fitting and parameter estimation part of the workflow.

Overall a good project, well documented and capably coded. Commendations on an error-free workflow in particular.

Marks for the project and computational workflow: 72%

The Report

You demonstrate a reasonable understanding of the question at hand and the tools needed to achieve an answer, and produce a good report that comfortably meets and exceeds the project brief.

Title: Reasonably informative, though it's not mentioned relative to what other models logistic is "best".

Abstract: Decent job. Background and motivation present. Study objectives and methods are stated (although "can be easily applied" is a little informal), and results summarised. Take-home message is present but a little simplistic. (65%)

Intro: Pretty good. Background expanded upon in reasonable detail, both in general and for the specific mechanistic models under consideration. Could have made explicit comment about the mechanistic-phenomenological distinction. Research question clearly stated, though without an explicit hypothesis. (68%)

Methods: Good. Everything necessary is included in reasonable detail. Extra credit for fitting 4 models and using model comparison beyond just AIC. Computing tools section is present. (75%)

Results: Results are summarised but the text veers a little bit into describing the model fits on individual subsets of the data, presumably with the intention of describing different trends, but this is not 100% clear to begin with. AIC/BIC plot labels are too small to easily read. Overall the key results are successfully communicated. (65%)

Discussion & Conclusion: Easily digestible recapitulation of the results with some discussion of their implications, and then contextualisation with respect to the existing literature. Limitations and potential improvements are discussed (albeit somewhat briefly). Conclusion briefly sums all this up, though it ends on a somewhat noncommital note. (72%)

(Some specific feedback is in the attached pdf, and we can also discuss more aspects of your write-up in our 1:1 feedback meeting)

Marks for the Report: 70%

Signed: Samraat Pawar & Alexander Kier Christensen

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Notes on Assessment :

- This written feedback will be discussed in a 1:1 session scheduled after this assessment has been been given to you.
- The coursework marking criteria (included in this feedback at bottom) were used for both the computing and report components of the Miniproject Assessment. *In contrast*, Your final dissertation project marks are going to be based pretty much exclusively on the written report and viva (not code). Expect your final dissertation report to be marked more stringently, using the dissertation marking criteria (also included in this report).
- In the written feedback, the markers may have contrasted what you have done with what you should do in your actual dissertation. *This does not mean that you were penalized* — one of the main goals of the miniproject is to provide feedback useful for your main dissertation. However, there may be cases where what you have done is just really bad practise (for example missing line numbers or abstract), irrespective of whether it is a mini- or main- project report – you will be penalized in that case.
- The markers for this assessment are playing the role of somebody trying to understand and use your project organization and workflow from scratch. So it will seem like the feedback is particularly pedantic in places — please take it in the right spirit!