Y4 Project meeting 7 record

Date and time: 11/11/2019 2:00 – 3:30 pm.

Attended by: Guy, Harry and Hin

Discussed:

1. General comments concerning proposals:
    a. Citation guidelines: if a piece of information is available in year 1-3 textbook, it can be treated as assumed knowledge and proper citation is not needed
2. About HBM structure:
    a. The actual full list of inputs into a stellar evolutionary model is way too long for the context of the project, a line has to be drawn between important parameters to be considered and parameters that are left as fixed.
    b. It is suggested to draw the line such that we only consider M, Age, [Fe/H], Y, alpha (mixing length) and potentially [Mg/Fe].
    c. Sensible priors for each of these stellar parameters:
        i. M: Flat with min and max values or a very broad normal distribution
        ii. Age and [Fe/H] and Y: a relatively narrow normal distribution characterize by a corresponding N(mu, sigma) with mu and sigma inferred from literature
        iii. Alpha (mixing length): assume flat with min and max at first, then use solar distribution after initial runs.
3. Roadmap and targets for the rest of autumn term and winter holiday:
    a. Obtain a stellar evolutionary grid model to be trained on – provided by Guy from Tannor's grid that is currently being built. Smaller versions of the grid are made available for students to play with.
    b. Build and train a NN on the grid – target set that in 2 weeks time, have a working NN that returns a loss (of some parameters) within 0.005 dex. (consider using median absolute error rather than mean absolute error when validating NN to achieve lower dex)
    c. Modelling tool - A backwards validation check: input eg. Solar observables to see if NN gives sensible solar properties, and intput off-grid points into the NN to check NN has learnt the function rather than the data – done in 3 weeks time.
    d. Construction of a working HBM (optimally for M67 of any other real cluster): if possible, finish before end of term/during winter break
4. About next evaluation "project work 1" and GitHub commits:
    a. Guy is not happy about the frequency and clarity of the existing commits
    b. Commits ought to have proper headings (and comments) to indicate the purpose of each commits
    c. Commits can be of much less "quantity of work" than what is currently being thought as, ie. Commit more frequently even if it means less work go into each commit, just treat GitHub as a logging file, so everytime one would write something in their lab books, they should commit.

5. It might be sensible to make plots displaying how different parameters to the NN affect the correlation between the inputs and outputs of the NN, and base our parameter choices on those plots. (eg. Displayed during meeting is the effect of l2 regularization and NN architecture on the “wigglyness” with the Input-Output relations.)
6. Guy will be not in campus next week (week 8), so no meeting next Monday. A Skype meeting can be schedule if needed.

To do:

Students:

1. Start making a NN that trains on stellar grid, and create a code that Guy can easily run on his powerful GPU through GitHub
2. Change GitHub commit habbits

Supervisor:

1. -

Next meeting: 25/11/2019 2:00 pm. Or skype meeting next week (week 8) if problems arise

Recorded by: Hin