Peer Review 02

Reviewer: Kai Liu

Reviewee: Charles Tanguy

Date: Oct 19th, 2016

I mainly reviewed the cpp version of SGD implementation. You implemented lazy update for zero-valued xs, which can be much faster than regular update. This is awesome. However, there are several issues:

- line 58: in denominator, it should be `M.sum() + 2.0` instead of `M.sum() * 2.0`;
- line 76, `g0squared` should be initialized as 0;
- line 99: `global_iterator` initialization should be outside the first `for` loop. Otherwise, you will get into trouble when `npass` > 1;
- line 102: `obs` should be initialized as 0. Though it is just a warning when compiling the code, R will be crashed when calling the function;
- line 108: a) log likelihood of a single data point should be multiplied by `discount`. b) the equation for log likelihood of a single data point is not correct. It should be `n_LL_avg = n_LL_avg * (1.0 - discount) + discount * (M[obs] * log(1.0 + e_psi) - Y[obs] * psi)`.

Two suggestions:

- in line 156 of your code, an `epsilon` is added in denominator. I guess this is not necessary (though not a big issue) since all cumulative log likelihoods (`Gsquare`) are initialized as 1e-03 (line 87). Therefore, `Gsquare` will not be equal to 0 anyway...
- It would be better if a comments section could be included in the function. Generally, a comments section should be below the function definition line. It can help users understand meaning and format of each argument.

Overall, you did a great job! The code is readable, and can be understand easily. After correcting all above issues, it only takes around 30s to finish the whole dataset on my laptop.