

Comments

1. p.5, regarding yearly observations Y_{ij} : were these obtained directly as pre-processed data, or did you have access to the full set of events? It appears to be the latter, as you also do make use of $n_{\text{obs},i}$ (the number of events competed in year i) later on p.10. In that case, what would be your reasoning for only using yearly observations to fit your underlying trajectory $X_i(s)$, while discarding other (non-peak) events within each year? Conceptually, nothing stops you from fitting $X_i(s)$ to all pairs (s_{ik}, e_{ik}) for all events e_{ik} associated with athlete i following your procedure on p.8. What might be the pros and cons for these different approaches?
2. p.6, definition of Δ_i is unclear: the "follow-up" is not defined; the 1 and 0 possibilities are not mutually exclusive as defined. How do you know whether the peak occurs before 2023 or not? E.g., if the "best year so far" was 2023, then it seems you treat that as $\Delta_i = 0$? But if the "best year so far" was 2022, followed by a slight dip (or same performance) in 2023, which case is that and why?
3. p.9, Fig 3 is not clear to me. I have difficulty seeing where are the $n = 30$ individual trajectories in each subplot. Moreover, why are the red lines so wiggly (non-smooth) if they represent averages? The amount of wiggleness suggests over-fitting. Please clarify.
4. p.11, Eqn 2: This suggests you use a common $\beta(s)$, but in practice I think you allow a different one by event family (as later on p.20). Please ensure this is clearly described somewhere.
5. p.13, how exactly would you carry out CV here? What are the available inputs for athletes in the test set for each split? It seems clear we could have the scalar covariates $(L_i, n_{\text{obs},i})$, but what about $X_i(s)$ or Y_{ij} for the FCMs? If you use $X_i(s)$ or Y_{ij} as inputs, doesn't that essentially encode when the peak occurs? Some details are needed to verify that the way CV is done makes sense here.
6. p.18, Fig 4: if I'm reading this right, scalar Cox uniformly has the lowest MAE/RMSE in the bottom panels. This doesn't match the text descriptions which suggest FCMs are better on p.16. Can you explain what's going on here?
7. p.20-21, the phase-specific functional effects are a nice insight; however, I could not find the detail of how early, mid, and late phases were defined.