**Report#2**

The article titled “Latent Growth Curve Modeling for COVID-19 Cases in Presence of Time Variant Covariate” used a latent growth curve model to capture the nature of Covid-19 cases with time-varying covariates.

1. There are several factors responsible for the growth of Covid-19 cases, but the study considers only temperature as a covariate. This point should be justified that to what extent the used method can capture the real situation.

**Answer**:

Our main aim is to study whether the environmental temperature has any significant role in the growth of Covid-19 cases. We found that it plays a significant role in the growth of Covid-19 cases. However, the inclusion of other factors may improve the result and we are trying to include more relevant factors to improve our model in upcoming studies.

2. In the abstract the sentence should be modified by adding the country name/specific region/total number of the country like “In this article, the month-wise growth of cases per million infected in 10 country /specific region by COVID-19 has been……”

**Answer**:

The required changes are done as stated above by the reviewer.

3. In Table 4, the time-varying coefficients are negative in starting, become positive in mid months and again become negative corresponding to last months. How do you interpret these changes and what they mean for the real situation?

**Answer**:

The time-varying coefficients directly impact the response variable. In starting months, the coefficients are negative showing that environmental temperature has a negative correlation with growth in Covid-19 cases, becomes positive but very close to zero in middle months showing weak correlation and again, in the last months, there is a negative correlation between time-varying covariates and cases per million which is showing that environmental temperature has a negative correlation with the response variable in general.

4. In the second last paragraph before Section 3.1, I would like to know why the author considers the mean value to zero, the same variance at each occasion, and also it is assumed to be uncorrelated with other variables?

**Answer**:

These are the basic assumptions that are needed to establish a model and also needed for the validity and consistency of the estimates. The constant variance in error terms is considered to maintain the homoscedasticity in the model.

5. There are no-good records of Covid-19 cases in each country, especially in developing countries, so could the used methods be able to capture this phenomenon?

**Answer**:

The considered growth curve modeling discusses the interindividual and intraindividual changes for the countries’ data. If for a country, the data is not available over time then we can eliminate that country from our study and the model will work for other countries' data only.

6. In the second last paragraph a “ ; ” is used to separate the two different articles cited instead of “ , ” please correct it and also make the citation style the same in the whole paper.

**Answer**:

The changes are done as stated by the reviewer.

7. In the last line of page 2, what is SIR, the reader can’t pick the abbreviation easily, please define it.

**Answer**:

The full form of SIR is Susceptible-Infected-Recovered. The SIR abbreviation has been mentioned in the article.

8. What are M-SIER and ARIMA on page 3, GCMs on page 6 and S.D. on table 1, please define them. It’ll be easy for the reader to understand the abbreviation if they are defined when they appear for the first time.

**Answer**:

M-SIER stands for Modified Susceptible-Exposed-Infectious-Removed, ARIMA stands for Autoregressive Integrated Moving Average, GCMs stands for Growth Curve Models and SD stands for standard deviation. The abbreviations have been mentioned in the article in their respective places.

9. The abbreviation ANOVA looks strange!

**Answer**:

ANOVA stands for analysis of variance and we have stated the full form in the article.

10. The sentence “As Figure 1 shows a pattern that rate of change of Covid-19 cases is not uniform over considered months.” Should be corrected as “As Figure 1 shows such pattern where the rate of change of Covid-19 cases is not uniform over considered months.”

**Answer**:

The changes are done as stated above.

11. Please define MP. 12. in lines 12-13 on page 7 the author says that “each interindividual difference variable is associated with the corresponding intraindividual change variable”, please explain this point.

**Answer**:

Vector ’s are responsible for capturing the intraindividual trajectories of countries over the months, and latent variables 𝝉’s represent the slopes and intercepts based on which countries differ inter-individual. Since at the starting point, countries differ with respect to slope and intercept and move further with respect to time trajectory changes. So, both the vectors jointly define the trajectory of Covid-19 cases over the months started at any particular intercept.

13. Several models like linear, quadratic, exponential, latent and multi-phase are tried to find the most suitable one. Can these models be used for future prediction of outcome variables (Covid-19 cases)?

**Answer**:

Any structure modeling may be considered for prediction purposes. But when data has a sudden change in nature over time then it is not advisable to predict for a far time point. Even in the present study, the objective is to see the impact of environmental temperature in the growth of Covid-19 cases over time.

14. In the last paragraph of page 9, the author claimed that multi-phase GCM is most appropriate among the considered models. Please explain it.

**Answer**:

We considered various fitting criteria like AIC, BIC, TLI, RMSEA and Chi-square which are used to choose the most appropriate model among the considered models. In our study, we considered linear, quadratic, exponential, latent growth curves and many multi-phase models. On the basis of various fitting criteria, it is found that the multiphase models are performing better than others. And out of the considered multiphase GCM, $MP\_{[3,4,5]}$ is most appropriate and lastly used for estimation purposes.

15. To introduce the readers to a complete picture of this dynamic development, I suggest that the revised paper should cite the article in the introduction <https://doi.org/10.1016/j.aej.2020.08.028>

**Answer**:

We have included the mentioned article in the introduction section.

16. Finally, the manuscript needs to be shaped better in English. There are a lot of typos. This paper can be considered under minor changes and after the implementation of the above suggestion, it may be accepted for possible publication.

**Answer**:

We try our best to make all the possible corrections with respect to the grammar.