

Review of: "Object-Based Classification to Evaluate LULC Changes and Socio-Economic Mobility with Google Earth Engine: A Case Study of Rajarhat-New Town Agglomeration, Kolkata, India"

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Potential competing interests: No potential competing interests to declare.

Review Report (31 July 2024)

The manuscript explores the use of remote sensing, OO Classification approach, and ML algorithms in land use retrieval and prediction. The case study was conducted in a small town in India, which is a developing country in the world. The research has some scientific novelty; however, some technical details should have been described in a better and more in-depth manner.

Some major points to be addressed are as follows:

- (1) In the abstract, the author mentioned that a prediction of LULC for 2031 has been executed, but how is such a prediction being conducted? Technical details were not provided in the manuscript.
- (2) In the introduction, the authors mentioned the use of GIS and remote sensing tools to extract LULC informatics; it is necessary to include and discuss how ML and remote sensing approaches have been utilized in land use retrieval in developing countries. Some references are provided as follows:

<https://www.mdpi.com/2072-4292/13/16/3337>

<https://link.springer.com/article/10.1007/s43621-024-00263-w>

<https://www.sciencedirect.com/science/article/pii/S1110982315000034>
- (3) Figure 1: Please add labels to some major towns/cities/districts, especially those places that have appeared or been discussed in the later part of the manuscript.
- (4) Section 2.3: How do you ensure the accuracy of these 450 validation points? Data quality assurance for inter-comparison is a very important component in LULC analysis.
- (5) Section 2.4: "This technique has been used widely in several studies" – for what purposes and in what scenarios? It would be better to mention some details, especially those that are common with this current study. Also, the methodology of "predicting the LULC of the study area for 2031" is missing. Technical details have to be added.

- (6) Section 2.5: The difference of the regions—cultivable wastelands, green regions like shrub lands, and open fields under satellite retrieval—is not explicitly mentioned nor discussed in the manuscript.
- (7) Section 2.6: “each using SVM and RF classifiers alternatively” – how “alternatively”? Please explain in more detail.
- (8) Section 2.6: “The validation point data collection may be uploaded and imported as different formats employing GEE or a GIS application” – how? Please describe it clearly.
- (9) Equation (7): Are the grey levels in neighboring pixels necessarily linear? Can the statistical relationship be of another relation? The formula here might not be applicable in all cases.
- (10) For Results, the reasons for the induced changes in land use patterns have to be explained in more detail. Please try associating relevant changes with political and environmental considerations, and present the ideas and reasons in a more cohesive manner.
- (11) Section 3.1: “The output of 2001....was fully converted into the urbanized built-up area” – why? Isn’t ecological conservation taken into account in city or urban-rural development and planning? Please try searching for relevant historical and official documents and explain briefly.
- (12) Section 3.2: For the prediction, is it following the previous approach for conducting historical retrieval? The assumptions made for the future prediction are not mentioned.
- (13) Table 4: What do the data here implicate? Please explain from a statistical point of view.
- (14) Figure 8: The major reasons for such changes that took place between 1971 and 2011 have not been discussed in detail.
- (15) Section 5: Please include a brief summary of the quantitative results obtained in this study, and provide practical suggestions on how “policymakers should emphasize a coordinated effort”.

Minor points to be addressed

- (1) Introduction Line 1: “different divisions” - what are you referring to by “divisions”?
- (2) Introduction Lines 4-5: Why does zoning matter is associated with environmental and anthropogenic risks?
- (3) Introduction Paragraph 2: “more significant consequences for the eventual land-use changes” - please be more specific, and there is a bit of repetition here in the introduction paragraphs.
- (4) Introduction Paragraph 4: The authors mentioned that “many studies were conducted without considering the context of socioeconomic mobility” – why is that essential?
- (5) Section 2.4: What does it mean by “generated than the following steps”?

- (6) Figure 2: What are “impact on Socio-economy” and “Prospects” respectively?
- (7) Section 2.7 last line: Is the “socio-economic change” here referring to the phenomenon observed, or the quantities that are used to reflect the changes?
- (8) Section 4: “influenced farmers to purchase their land” – there are more than 10 citations in this single sentence, please remove some unnecessary citations from the list.
- (9) Section 4: “because of the land change program” – what’s the reason and rationale behind the scene?

Some grammatical mistakes were detected, for example:

- (1) Introduction Paragraph 1: essential characteristics
 - (2) Introduction Paragraph 2: In addition
 - (3) Introduction Paragraph 3: “done by Toh et al.” → “conducted by Toh et al.”
 - (4) Introduction Paragraph 3: (HMA) of China
 - (4) Introduction Paragraph 3: In contrast
 - (5) Introduction Paragraph 4: has developed the area as a planned...
 - (6) Section 2.1 Line 2: of the area is “from” 22.... And from 88... Rajarhat-Newtown has a total area of around 7212 hectares
 - (7) Section 2.1 Line 6: mean temperature “of” the study region...
 - (8) Table 1 caption: Details of the satellite-based datasets utilized in the current study
 - (9) Section 2.2 Line 2: collected to “be utilized” in this research of LULC analysis
 - (10) Section 2.2 Line 4: wavelengths utilized “in” the present research.
 - (11) Section 2.3 Line 3: There are also water bodies,..., and fallow lands that consist of...
 - (12) Section 2.3: A total of 450 validation sites was randomly generated and...
 - (13) Section 2.6 Paragraph 2 Line 2: “calculate NDVI, NDWI and BSI of various image datasets”
 - (14) Section 2.6 Paragraph 3 Line 1: “takes 8-bit grey-level images as input”
 - (15) Section 2.7: Field surveys were conducted “to collect primary data in this study”.
 - (16) Section 3.1: Several techniques were adopted to comprehend the pattern of LULC properly.
- Also, the sentence “These techniques have also been discussed before” should be removed.

(17) Section 3.2: performed by following the “aforementioned” methods in Figure 2.

(18) Section 3.3: accuracy, not Accuracy

Overall speaking, the manuscript is of sufficient scientific novelty and importance, however some technical details have to be provided, and the manuscript should be presented in a more cohesive manner.