26th May 2022

To the Editor, Computers, Environment and Urban Systems

Dear Professor Alison Heppenstall,

Re: Revision of CEUS-D-21-00877 Wang et al. "Simulating large-scale urban land-use patterns and dynamics using the U-Net deep learning architecture."

We are very grateful for your interest in our work. We greatly appreciate the valuable comments and suggestions from the reviewers.

We are delighted that reviewers broadly appreciated the significance of our work on introducing deep learning to the simulation of urban land-use change. We note that Reviewer #1 said that "the subject addressed in this article is worthy of investigation," and Reviewer #2 thought "it is a promising new idea to apply U-Net to urban growth simulation and prediction". We also appreciate the Reviewers' more critical comments and suggestions, which helped us to greatly improve the novelty, reliability, and impact of our research.

Reviewer #1 suggested that we clarify the data used in the study and the description of the two trained models. This reviewer also suggested a consistent use of “urban land-use” throughout the manuscript and several specific modifications regarding the figure layouts, the use of adjectives, etc. In response, we added a table to describe the data used in this study, changed the various phrases *urban dynamic map*, *urban map*, *urban pixels*, and *urban images* to *urban land-use*, and added more descriptions to the figures.

Reviewer #2 advised us to discuss how deep learning helps the understanding of urban land-use change mechanisms and if deep learning had more robust performance than CA-based methods. In response, we added a discussion on techniques to transform deep learning structures into human-recognizable knowledge. Meanwhile, we emphasized that the primary goal of introducing deep learning to urban land-use simulation is to explore how deep learning could complement, rather than replace, CA-based land-use modeling. We also modified the discussion on comparing deep learning with CA to clarify that the U-Net had learned urban land-use patterns and achieved accuracies similar to CA-based models conducted in a similar urban growth context.

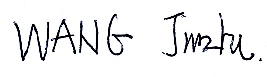
We have addressed each comment one by one as detailed in the attached "Response to Reviewers" document. All comments are reproduced and our responses are given directly afterward in a different color (blue). We have made our best effort to address each comment. We believe that these modifications will significantly increase the novelty, reliability, and impact of our research. We kindly ask that if, after considering our responses, the Reviewers and Editors still have further comments on our manuscript, we remain very open to further discussion and revision of the manuscript.

With warm regards.

Yours Sincerely,

Jinzhu WANG, on behalf of all authors

Sincerely, and with warm regards



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