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Natural Hazards and Earth System Sciences
Discussions

# *Interactive comment on* "Novel method for hurricane trajectory prediction based on data mining" *by* X. Dong and D. C. Pi

**Anonymous Referee #3**

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The paper deals with a major issue in the study of hurricane trajectory prediction according to the hurricane's motion characteristics. Trajectories on a historical hurricane trajectory database are mined by using association analysis technology and their association rules are generated as motion patterns. The current hurricane trajectories are matched with the motion patterns for prediction. Even though the paper addresses a main issue in the research field related to hurricane motion prediction, there are significant weaknesses in the content of the manuscript and the manuscript is quite poor regarding the methodology description. From the written document, it is difficult to assess the transferability of the method and its real value to the field. The paper must undergo major revisions for publication in NHESS

Here are general and more focused comments:



General comments.

- The paper in its present form seems more like a tutorial than a scientific paper. Three pages of the manuscript are used for the algorithm applied in the analysis, which I suggest this can be added as an annex. Instead of this copy and paste of the algorithm, the authors should describe the methodology in a descriptive way with the assumptions used.

- The authors have tried to report and refer to the literature in a thorough manner but the referenced work of data mining for Hurricane prediction is somehow poor. To mention a few related work: Su, 2010, Chatzidimitriou & Sutton, 2005; Yang et al., 2011; Jiang, 2010. The authors should improve their reference list and include more related work and its applicability.

- Regarding also references, the paper is lacking of an analysis of the important results and issues raised by other studies, in particular in context of the submitted paper. Discussion of the results obtained in the submitted manuscript should be made by comparing qualitatively and if possible quantitatively with the results obtained in referenced studies. Actually at the moment, the presented model makes it difficult to foresee its real potential and usage advantages.

- The manuscript should be restructured in a scientific manner. At the moment it looks like a computing exercise.

- Some figures in the document are just "print-screen" shots and some graphs are lacking the axis titles. The quality is very poor and the figures look like they were taken from a "user-manual". I suggest that the authors make an effort to improve the figures and graphics.

- The authors should revise carefully the numbering of the equations and mention them correctly inside the text.

- In addition, the editing and the English should be revised very carefully. The English

is very poor in some sections.

Detailed comments:

- The authors failed to show what is the added value of the methodology when compared to other studies. But most important, how this methodology improves the prediction of the hurricane trajectories. What are the advantages and disadvantages of using the proposed methodology? The authors should make this clear in a concise way.

- References are missing in the Introduction part. There is a lot of information inside the introduction but not one single reference. The authors should refer to published work in this section.

- I suggest deleting lines 18 to 21 and making a better structuring of the whole manuscript.

- The Introduction section should also contain some related work. I suggest merging these two sections into one and making a better description of the methodology used.

- The methodology should not be described as “Definitions” as they are really not definitions as such. The authors should find a better way to rename this section and to describe it thoroughly.

- Line 26 page 5: What is k-1? I cannot see a k-1 reference earlier.

- Line 30 page 5: How is this threshold defined? How did the authors assume this value? The authors should make clear throughout the whole manuscript the assumptions they used in the methodology.

- The used methodology is confusing and difficult to follow. I suggest that the manuscript follows the graphic and detailed workflow-framework in Figure 3. This will help in order for the reader to understand the entire process

- Line 12 page 6: Where does this rule’s confidence comes from?? It is unclear for me why is this rule accepted and performed. The authors should discuss this in detail.



- Section 4: Should be rewritten completely in a descriptive manner and the algorithm should be added as an annex. The section looks very sloppy.

- Section 5 Experiment and Analysis: This section should be rewritten and divided in two: the section experiment by itself and the analysis in another section. Both sections should be able to be stand alone and be understandable for the reader.

- Section 5.2.1: I suggest that the correct rates results should be shown as a “success graphs”. This will enhance the section and the analysis.

- Section 5.2.1: I suggest the authors carry a sensitivity analysis regarding this section. Although not necessary, I think this could be beneficial to the manuscript.

- Section 5.2.2: In which basis 57.5% of the whole prediction is a satisfactory one. The authors should clarify this and give the reasons for this statement.

- The authors should include a section called “Discussion”: The discussion section should be critical to the work and the difficulties found on it. The section should also include how the work can improve the quality of the present predictions methods and its transferability. Also include how to assess the propagation of uncertainties during the analysis.

- The conclusions are poor and do not reflect the results. This arise the question about the credibility of the method.

Figures and Tables

- I suggest that table 2 and table 3 should be only one table. Of course, a clear distinction should be made between the raw data and the experiment data. Having the same description of columns, I think having 2 tables is a waste of space. The authors should decide is this is relevant or not.

- Figure 1 is very poor. It should include the “definitions” to make it easier for the reader to grasp the concept of the discretized movement.

- Figure 4, 5, 7 have no titles in the axis of the graphs and they should be added. Also the “print-screen” shots should be modified to look presentable.

- Figure 8 and 9: A better description (thorough explanation) inside the body of the manuscript (text) and in the legend of the figures should be done.

- I suggest that the authors add extra figures showing the results obtained in a spatial manner. This should be done in a similar manner as Figure 2 in order to visually enhance the obtained results.

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 4681, 2013.