



Pascal Horton <horton.pascal@gmail.com>

Decision for MWR-D-16-0093

Josh Hacker <em@editorialmanager.com>
Reply-To: Josh Hacker <hacker.mwr@ametsoc.org>
To: Pascal Horton <pascal.horton@terranum.ch>

Fri, Jun 17, 2016 at 7:29 AM

CC: schultz.mwr@ametsoc.org, hacker.mwr@ametsoc.org

Ref.: MWR-D-16-0093
Monthly Weather Review
Editor Decision

Dear Dr Horton,

After carefully considering the reviews of your manuscript, "Global Optimization of the Analogue Method by Means of Genetic Algorithms", an editorial decision of Major Revision has been reached. The reviews are included below.

Both reviewers suggest your work could be an interesting and useful contribution. Although the work needed to improve clarity and precision in the presentation is non-trivial, as elucidated by reviewer 2, it appears to me that the revisions are primarily editorial. I expect that addressing the reviewers' comments will result in a stronger contribution.

I invite you to submit a revised paper by Aug 16, 2016. If you anticipate problems meeting this deadline, please contact me as soon as possible at Hacker.MWR@ametsoc.org to discuss an extended due date.

Along with your revision, please upload a point-by-point response that satisfactorily addresses the concerns and suggestions of each reviewer and the Editor. To help the reviewers and Editor assess your revisions, our journal recommends that you cut-and-paste the reviewer and Editor comments into a new document. As you would conduct a dialog with someone else, insert your responses in a different font, different font style, or different color after each comment. If you have made a change to the manuscript, please indicate where in the manuscript the change has been made. (Indicating the line number where the change has been made would be one way, but is not the only way.) Although our journal does not require it, you may wish to include a tracked-changes version of your manuscript. You will be able to upload this as "additional material for reviewer reference." Should you disagree with any of the proposed revisions, you will have the opportunity to explain your rationale in your response. No separate cover letter to me is needed unless it contains essential information that does not appear in your reply.

Before submitting your revision, please carefully review the AMS Guidelines for Revisions found at <http://www.ametsoc.org/PUBSrevisions> to be sure you have complied with all instructions for quick processing of your revised manuscript.

Please note that figure source files formatted for publication must be uploaded for ALL revisions. Ensure that your figures adhere to the requirements for Journals authors: <http://www.ametsoc.org/PUBSfigures>

Please enter the figure number in the description field when uploading your figure files (or on the Attach Files page after upload). This is required even if the figure number is already in the file name.

When you are ready to submit your revision, go to <http://mwr.edmgr.com/> and log in as an Author. Click on the menu item labeled "Submissions Needing Revision" and follow the directions for submitting the file.

Thank you for submitting your manuscript to MWR. I look forward to receiving your revision.

With best regards,

Dr. Josh Hacker
Editor
Monthly Weather Review

REVIEWER COMMENTS

If reviewer comments have been added in the form of attachments they are found attached to this e-mail. They can also be accessed by logging into the Editorial Manager as an Author and clicking on "view attachments."

Reviewer #1:

This is an interesting paper that shows the genetic algorithms (GA) are a valuable way to select predictors for analog forecasts for weather. GA is the focus of this particular paper; apparently other papers by the authors discuss the analog weather forecast results in more detail.

There are a variety of evolutionary-like methods in the literature: genetic algorithms (GA), genetic programming (GP), gene-expression programming (GEP), etc. The approach used here is GA with fixed chromosome size. Although I am personally in the GEP camp, I find that their GA results are exciting and valuable.

Their results are intriguing - I might try it myself. The authors discuss a dizzying array of GA procedures - apparently all are needed to get the method to work successfully. The authors also do sensitivity studies to see which evolutionary procedures are most effective. The result is a nice set of recommendations that other researchers could use to good advantage. They also suggest new evolutionary methods, such as adding a gene for adaptive search radius to the chromosome, which allows the GA method to transition from exploration of a large global solution space initially to exploitation of the local solution space.

Suggestions:

line - comment

49 - Another analog-method researcher is Delle Monache. For example:

Vanvyve, E., Delle Monache, L., Rife, D., Monaghan, A., Pinto, J., 2015.

Wind resource estimates with an analog ensemble approach. *Renewable Energy*, 74, 761-773.

Alessandrini, S., Delle Monache, L., and Nissen, J., 2014. Probabilistic power prediction with an analog ensemble. Accepted to appear on *Renewable Energy*.

Delle Monache, L., Eckel, T., Rife, D., and Nagarajan, B., 2013. Probabilistic weather prediction with an analog ensemble. *Monthly Weather Review*, 141, 3498-3516

Delle Monache, L., Nipen, T., Liu, Y., Roux, G., Stull, R., 2011. Kalman filter and analog schemes to post-process numerical weather predictions. *Monthly Weather Review*, 139, 3554-3570

618 - change "chromosome" to "gene", because the adaptive-search-radius gene is just one position in a chromosome that includes many other genetic loci.

624 - please define (remind the readers) the meanings of Pmut, Gm and omega.

Minor changes & typos

57 - change "when" to "if"

466 - change "variants" to "variant"

523 - remove the word "a"

525 - change to "... allows one to highlight ..."

Reviewer #2: MAJOR COMMENTS

This manuscript proposed an interesting idea: using genetic algorithms to optimize predictors of an analog-based method. However, the manuscript has several significant deficiencies and therefore I am recommending major revisions.

In the literature, several algorithms based on the analog concept can be found. These algorithms differ at times significantly in their philosophy and implementation. The authors refer to their method as "The Analogue Method" but fail to recognize that the algorithm they used is just one of the several proposed analog-based approach. In the title, abstract, and throughout the manuscript, they should refer to the analyzed method as "an analog method" (or "analogue" if they prefer).

The authors often mention results that they are familiar with in absolute terms, neglecting several other contributions on analog methods (see specific comments below).

Introduction: the authors completely missed a body of work on analog method, some of which has been published on MWR. See Delle Monache et al. 2013 MWR (141, 3498-3516) and Hamill et al. 2015 MWR (143, 3300-3309). The authors need to refer to these contributions and references therein and explain how the method they propose differs from it.

What are the computational requirements to run GA for analog-predictor optimization? This is an important factor to evaluate the merit of the proposed approach.

The description of GA is way too long and needs to be significantly shortened.

The baseline sequential method is not described.

The authors need to explain much more in details the application considered, in addition to "precipitation forecasting over a subcatchment (Binn-Simplon region) in the Swiss Alps".

467-470: the goal described here is questionable; the authors must provide evidence of the benefit of the proposed analog-predictor optimization, and show if it is statistically significant or not.

467-470: the authors must clearly describe which predictors they are considering and which ones are selected by the GA procedures.

The authors should provide a physical explanation, when possible, of why specific predictors are selected.

482-483: I disagree with the authors. "The magnitude of the improvement" is indeed very important to determine if this is a valid contribution deserving publication on MWR.

The data set used for training and testing of the algorithm must be described in details.

"Submitted" papers cannot be cited.

Throughout the manuscript, there are several awkward or unclear sentences that need to be revised by a technical writer. The following is a list (not comprehensive) of these sentences that must be revised:

- 46
- 51
- 93
- 96
- 111-112 (English too colloquial, not appropriate for a scientific document)
- 118-119
- 127
- 133
- 150-151
- 180-181
- 183-184
- 192
- 315
- 417-418
- 427-428
- 442
- 460-461
- 475
- 479
- 511-512
- 521-522
- 546-547
- 620
- 639

- The Authors are not familiar with the AMS style. They should follow the guidelines in the AMS Authors' Guide. E.g.:

* Throughout the manuscript: change "Sect." to "section"

* Spell out numbers lower than 10 (e.g., line 121)

* Use "e.g., " or "i.e., " throughout the manuscript

Line 50: the authors seem to contrast the proposed method to NWP models; however, there are analog-based methods (e.g., Delle Monache et al. 2011, 2013 MWR; Hamill and Whitaker 2006; Hamill et al. 2015) that rely on NWP data (i.e., they can be considered "hybrid" methods, combining NWP and statistical methods). Clarify this to the reader.

58-59: The statement is not true. E.g., See Junk et al. Meteorologische Zeitschrift (24, 361-379), who have proposed fully automated analog-predictor optimization procedures.

68-69: No true. See above.

138: This statement is incorrect.

ADDITIONAL EDITS

86: simplex à simple.

105-106: described sections do not reflect sections in the manuscript.

Section 2: the analog method is poorly described.

113: "that are most similar"...to what?

116: "typically"...for what?

121: The word "parameterization" is not used with the same meaning as typically used in NWP, which is what most of MWR readers are familiar with. The authors likely meant "procedures".

125: "target date": define.

125: what is the lead time of the forecast, i.e., how many hours out in the future these forecasts go?

126: "S1": define.

185-186: temperature is a continuous variable.

189: you need to define also lambda.

-193-196: this sentence seems out of context.

- 198: divergences à differences.

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217: what is meant with "applied to floating-point coding"?

256: "...zero probability of being selected". Why?

- 430: "temporal window" is never defined.

- 433: Provide an estimate of how expensive they are. Is the proposed system feasible for real-time operations?

- 463: "sometimes": too vague.

- Figs. 2, 3: describe them and comment on the presented results.

- 495: where?

- 509: very vague. Avoid this kind of statements.

- 517: "last box in the figure". Say which one.

- 552-553: is not clear which are the predictors that are discussed here.

- 561: how long?

- 566: why "new"?

- 589: "longer optimization". The authors need to be more specific!

- Fig. 1: add "." at end of caption.

- Fig. 2: what do the circles represent? Explain in caption.

- Fig 4 (and similar figures): to improve the readability, the information listed in table 1 could be added directly to the figure or the figure caption.

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