Reproducible Publications at AGILE Conferences – Proposed Guidelines for Authors and Reviewers

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Abstract

This contribution reports on the outcomes of a specialist meeting on reproducible publication guidelines for the AGILE conference series. Reproducibility of research is fundamental for assuring significance and credibility of science and receives increasing attention in computational research fields including geoinformatics. The development of publication guidelines needs to address a series of questions like how reviewers can be rewarded for their efforts to assess the reproducibility or what a reasonable balance is between being specific in the guidelines (e.g. recommending tools) vs. generic (usable for all disciplines represented at AGILE now and in the future). The development of the guidelines is a collaborative effort and this contribution is meant to disseminate results to the AGILE community.

Keywords: reproducible research, publication guidelines, AGILE initiative.

1 Introduction

Reproducibility of research is a fundamental pillar of science, in which scientists recreate findings of other researchers and, thereby assure the significance and credibility of research results. Reproducibility is gaining increasing importance in relation to computational research – which also applies in the context of GIScience. The basic requirement to assure research reproducibility is the unrestricted and open availability of the computational environment in which the research was originally created, including input data and analysis code (Nüst et al. 2018). This poster presents the outcomes of an AGILE initiative on reproducible publications. These outcomes are guidelines for both authors as well as reviewers to encourage reproducible publications for the AGILE conference series (http://agile-online.org/). The following sections summarize the motivation for reproducible AGILE publications, the collaborative work on preparing the guidelines, and expected benefits of the outcomes.

2 Reproducibility@AGILE

Workshops stimulating the discussion on reproducible research and providing practical training on how to reproduce a publication are held at AGILE conferences 2017 to 2019 (http://o2r.info/reproducible-agile/). As an outcome of the first workshop, a group of researchers assessed the level of reproducibility of papers nominated for the best full paper and best short paper between 2010 and 2017 (Nüst et al. 2018). Nüst et al. (2018) evaluated the potential to reproduce the papers according to criteria based on input data, methods and results. Results indicate that although some papers strove for reproducibility, no paper fulfilled all criteria completely.

Subsequently the level of reproducibility was significantly low, especially considering that a high proportion of AGILE papers uses computational methods, produces software/data, and/or uses input datasets. Therefore, it is worthwhile to deepen the discussion about the value of openness (cf. ideals of Open Science) in the GIScience domain as reproducible research requires wide acceptance in a community and the efforts needed to achieve reproducibility. Other work recently discussed how reproducible research practices can be integrated into researchers' daily scientific work and habits (Granell et al., 2018). One important observation is that reproducible research is not just a checklist, but an ever evolving process. Checklists are useful, but researchers need to acquire, engage and continuously reflect on their practices. A support action for reproducibility is community-level incentives, in contrast to top-down or individual actions. They can accelerate the adoption and consolidation of reproducible research habits and practices. The AGILE conferences can be the motivating "hook" to engage authors in these reproducible practices. AGILE as a small to medium size community may successfully achieve a common consensus in the adoption and consolidation of "healthy" research habits.

3 Approach To Reproducible Publication Guidelines

As part of the AGILE initiative on reproducible publication guidelines (https://agile-online.org/agile-actions/current-initiatives/reproducible-publications-at-agile-conferences), a specialist meeting with experts on reproducible research and publications, domain experts and representatives of the AGILE association takes place in April 2019. This work will report on the results of the meeting. All material used and created at the meeting is shared openly in an OSF project (Nüst et al., 2019).

The objective of the initiative's meeting is to derive guidelines for reproducible publications and to seek community agreement for, and adoption of the guidelines. The guidelines will entail recommendations for data and code repositories as well as for tools for transparent workflows. In addition, rules for citing software and data need to be defined. One can expect a number of challenges for reproducible publications, not all of which can be resolved by guidelines, but all must be taken into account for successful adoption:

- How can reviewers be rewarded for their efforts to assess the reproducibility of a submission?
- How to manage data and software review as part of review platforms, e.g. matching specific skills (e.g. programming languages)?
- What are differences and commonalities between submission types (poster, short paper, full paper) and what are their expected levels of reproducibility?
- What is a reasonable balance between being specific (e.g. recommending tools) vs. generic (usable for all disciplines represented at AGILE, and sustainably applicable for the foreseeable future)?
- Which parts can be externalised to other existing resources, and what must be included in the AGILE-specific guidelines?

4 Expected Impact of Reproducible Publication Guidelines

The AGILE conference series are supported by a well-established community and cover the whole breadth of geoinformatics/GIScience; the authors therefore consider that AGILE (the organisation) is in a unique position to promote reproducibility through its member labs and the encouragement of the best practices put forward through submission guidelines. Reproducible publications have the potential to increase transparency of the research presented at AGILE conferences and to increase the relevance of conference contributions.

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