172

A Reproducibility Workflow for Scientific papers: A brief look into Movement Ecology.

Reproducibility is the earmark of science. However, studies in disciplines such as biology and geosciences have shown that published work is rarely reproducible. Ensuring reproducibility is not a mandatory part of the research process and thus there are no clear procedures in place to assess nor enforce the reproducibility of scientific articles. In this study we put forward a reproducibility workflow scoring sheet on a scale from 0 to 12, based on six criteria that lead to successful reproducible papers, focusing on data, code, software and results. The reproducibility workflow can be used by authors to evaluate the reproducibility of their studies before publication and reviewers to evaluate the reproducibility of scientific papers. We used our workflow to assess the state of reproducibility in our own field of Movement Ecology, we attempted to reproduce the results from 75 papers that used behavioral pattern identification methods, published in several journals from 2010-2020. According to the reproducibility workflow, sixteen studies only reflected at least some reproducibility (scores ≥ 4). In particular, we were only able to obtain the data for 16 out of 75 papers. Out of these, a minority of papers also provided code with the data (6 out of the 16 studies). Out of the 6 studies that made both data and code available, only four studies reflected a high level of reproducibility (scores ≥ 9) owing it to good code annotation and execution. Based on our findings, we proposed guidelines for authors, journals and academic institutions to enhance the state of scientific reproducibility. We believe that these guidelines are particularly relevant for the statistical community, that always strives for robust statistical and research practices.