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Letter to Editor

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Simplifying the management of scientific reference and citation with a minimalist DOI-BibTex-LaTeX approach

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Abstract

Scientific citation is of undisputed importance in the field of scientific research. In the absence of a truly simple and functional tool for scientific reference and citation management, this article puts forward a minimalist DOI-BibTex-LaTeX approach, with which comes two advantages: 1), a scientific reference manager is as simple as one window of the File Explorer on Microsoft Windows®; 2), in the preparation of a scientific manuscript with LaTeX, there is no need to manually create a bibliography file, in-text citation will be as simple as a BibTex command \cite{DOI} without defeating the purpose of scientific citation.

While scientific citation analysis keeps drawing attention from the science community [1,2,3], much less (if not zero) is paid to simplifying the production of in-text citation itself in the preparation of a scientific manuscript. As geneticist Yaniv Erlich (for whom the pain of managing references is real) tweeted, "We are far closer to a level 5 autonomous vehicle and space tourism than a functional citation manager.", which was chosen as quote of the day by Nature on June 7, 2018.

Scientific citation with BibTex in LaTeX: current approach

A widely used typesetting program in scientific writing, LaTeX takes a plain text file (i.e., a .tex file) as input and converts it to a formatted document (e.g., a PDF format file) based on the commands included in the .tex file. BibTex is a reference management software (https://www.ctan.org/pkg/BibTex) that is typically used together with the LaTeX document preparation system. Rather than include reference details for the main manuscript document within the .tex file itself, with BibTex, one can store them in the BibTex database file (a .bib file) that is separate from the .tex file. In the .bib file, each reference is formatted with a certain structure and is given a "key", i.e., the citation key for in-text citation with the BibTex command \cite{citationkey}. With the .bib file as the BibTex database, there are three aspects in particular,

(1) Once stored in a bib file, a reference can be used and reused in the preparation of scientific manuscripts. One may choose to maintain one master bib file or a set of bib files for the preparation of different manuscript documents, too.

(2) Many scientific databases and reference management software allow direct automatic export of reference details as .bib files.

(3) Along with the digital object identifier (DOI®) system (http://www. doi.org/hb.html), one simple web interface (the DOI2BIB server at https://www.doi2bib.org) has been set up to provide an online service, where once a DOI is plugged into the DOI2BIB server, it retrieves one unique citation record (i.e., the BibTex entry) directly from publishers through public interfaces provided by The International DOI Foundation and Crossref, and returns it in plain text to be copied and pasted into the .bib file. As of June 29, 2018, this service is free of charge and free of ads.

In addition to the .bib file, LaTeX asks for a bibliography style file (a .sty file), too. Thus, to prepare a manuscript with BibTex and LaTeX, one must,

i. Prepare a .tex file.

ii. Prepare a .bib file.

iii. Specify the bibliography (the .bib file) location in the .tex file (optional).

iv. Provide the name of the bibliography file (the .bib file) in the .tex file.

v. Provide the name of the bibliography style (the .sty file) in the .tex file.

vi. Provide the name of the .tex file to the command LaTeX.

vii. Run LaTeX on local personal computer (PC).

viii. Run BibTex (\cite{citationkey}) on local PC.

Let citationkey = DOI: an alternative approach

When a reference is to be cited in LaTeX, one technically viable and simple approach (referred to as the DOI- BibTex-LaTeX approach below) is to let DOI be the citation key for the BibTex command \cite{}. With this comes a slightly different process of scientific manuscript preparation on local PC, as the .bib file can be automatically created by following the .tex-.doi-.bib axis, as below,

(i) From .tex to .doi: with the .tex file as an input, a python script (supplementary file split.py) is executed to extract a list of DOIs, and save them as a plain text file (the .doi file) on local PC.

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(ii) From .doi to .bib: with the .doi file as an input, a python script (supplementary file doi2bib.py) is executed to contact the DOI2BIB server to retrieve a list of references in plain texts, and save them as a .bib file on local PC.

For this approach to work, the DOI2BIB server must act, universally for the whole science-community, as a frequently checked-updated-and-maintained database that links correctly each and every DOI to one unique BibTex entry, making it unnecessary for individual researcher to build his/her own bibliography database(s). Furthermore, when the time is ripe for author(s) to submit the manuscript to the editorial server of a scientific journal, submission of the main LaTeX source file (i.e., the .tex file) (along with the figures included in the .tex file if applicable) alone will suffice, and a .bib file will be unnecessary, as it is technically quite straightforward for the editorial server to automatically create a .bib file by following the .tex-.doi-.bib axis (as described above by the two supplementary python scripts for scientific manuscript preparation on local PC), and continue to build a PDF according to the main .tex file, for the author(s) to check and finally approve the submission.

Summary

This DOI-BibTex-LaTeX approach establishes a minimalistic approach towards scientific reference and citation management in LaTeX, bringing two advantages for scientific manuscript preparation,

(i) One normal window of the File Explorer on Microsoft Windows® is able to act as a simple and viable scientific reference manager, with scientific articles (usually PDFs) downloaded from scientific journals and renamed locally as DOI-title.pdf, so that it is clear from the File Explorer which DOI to use by the BibTex command cite for which article without opening the PDF. For the management of scientific references on Linux machines, the situation is similar to that on Windows machines.

(ii) With respect to scientific citation on Linux machines, the situation is similar to that on Windows machines, too. There is no need for author(s) to manually create a bibliography file, in-text citation will be as simple as a BibTex command \cite{DOI}, so that author(s) can focus more on the .tex file in the preparation of a manuscript. Moreover, with the .tex-.doi-.bib axis on both local PC and editorial servers, the only manual input that is necessary from the author(s) is the BibTex command \cite{DOI} for in-text citation of previous scientific works.

Taken together, this article puts forward a simple and viable approach to simplify the management of scientific references and citations to a degree where a minimum amount of effort is necessary for in-text citation of previous scientific work during manuscript preparation without defeating the purpose of scientific citation, i.e., to allow readers of the article to refer to cited scientific work to assist themselves in judging the new work, source background information vital for future development, and acknowledge the contributions of sci-tech pioneers.

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