Formatting Instructions for TACL Submissions (Base files: tacl2021v1-template.tex & tacl2021v1.sty, dated Dec. 15, 2021)

(No author info supplied here, for consistency with TACL-submission anonymization requirements)

Abstract

The rapid evolution of Large Language Models (LLMs) in recent years has sparked extensive exploration into fine-tuning these sophisticated algorithms to suit specific tasks and domains. Among the diverse array of approaches to customizing LLMs, two notable innovations have emerged: In-Context Learning and Instruction Tuning. While both methodologies have showcased remarkable capabilities in enhancing model performance across various contexts, they fundamentally differ in their approaches, and little research has been done to directly compare these techniques on the same playing-field. This investigation seeks to bridge this gap by conducting a comparative analysis of instruction tuning and in-context learning for domain-specific tasks, determining the optimal approach to adopt in different scenarios.

1 Introduction

1.1 Motivation

This investigation provides a comparative evaluation of two recent innovations in the field of LLM improvement - In-Context Learning and Instruction Tuning. Instruction Tuning is a unique type of fine-tuning strategy that revolves around framing prompts as instructions, providing LLMs with specific information on how to proceed with the given task. In comparison, In-Context Learning is an exciting phenomena first discovered in the original GPT3 paper that aims to help models adapt to specific tasks by providing it with labelled examples preceding the task. Evidence from surrounding literature suggests that both approaches are versatile in improving model performance. However, the approaches are significantly different from one another (e.g., ICL does not feature any weight-based training). Thus, this investigation seeks to assess each technique against the other across a range of domain-specific tasks to establish the optimal approach for a given scenario.

1.2 Research Objectives

The study aims to meet the following objectives:

1. **Investigate Instruction-Tuning and In-Context Learning.** Explore the strategies behind in-context learning and instruction tuning as viable methods for model adaptation.

2. **Apply Instruction-Tuning and In-Context Learning to domain-specific tasks.** Perform these tuning techniques across domain-specific tasks with various models.

3. **Assess these techniques against each other**. Establish how in-context learning compares to instruction tuning when applied to domain-specific tasks and conclude with the optimal approach for an end-user.

1.3 Research Experiments

To achieve the above objectives, the following research experiments were carried out:

1. **Experiment 1 - Apply Instruction-Tuning**
   Apply instruction tuning to different models (GPT2, Mistral) according to various generalized NLP datasets (Alpaca/Natural Instructions).

2. **Experiment 2 - Apply In-Context Learning**
   Experiment with in-context learning with the same models, exploring aspects including the number of demonstrations and selection technique on performance.

3. **Experiment 3 - Assess In-Context Learning and Instruction-Tuning**
   Evaluate both techniques across various datasets according to specific criteria such as BLEU and BERTScore.

2 General instructions

Submissions that do not comply with this document's instructions risk rejection without review.

Submissions should consist of a Portable Document Format (PDF) file formatted for **A4 paper**.[1] All necessary fonts should be included in the file.

3 LaTeX files

LaTeX files compliant with these instructions are available at the Author Guidelines section of the TACL website, https://www.transacl.org.[2] Use of the TACL LaTeX files is highly recommended: *MIT Press requires authors to supply LaTeX source files as part of the publication process*; and use of the recommended LaTeX files makes conversion to the required camera-ready format simple.

3.1 Workarounds for problems with the hyperref package

The provided files use the hyperref package by default. The TACL files employs the hyperref package to make clickable links for URLs and other references, and to make titles of bibliographic items into clickable links to their DOIs in the generated pdf.[3]

However, it is known that citations or URLs that cross pages can trigger the compilation error "`\pdfendlink ended up in different nesting level than \pdfstartlink`". In such cases, you may temporarily disable the hyperref package and then compile to locate the offending portion of the tex file; edit to avoid a pagebreak within a link;[4] and then re-enable the hyperref package.

To disable it, add `nohyperref` in the square brackets to pass that option to the TACL package. For example, change `\usepackage[]{tacl2021v1}` to `\usepackage[nohyperref]{tacl2021v1}`.

Type of Text	Size	Style
paper title	15 pt	bold
the word "Abstract" as header	12 pt	bold
abstract text	10 pt	
section titles	12 pt	bold
document text	11 pt	
captions	10 pt	
footnotes	9 pt	

Table 1: Font requirements

4 Length limits

Submissions may consist of seven to ten (7-10) A4 format (not letter) pages of content.

The page limit *includes* any appendices. However, references do not count toward the page limit.

Exception: Revisions of (b) or (c) submissions may have been allowed additional pages of content by the prior Action Editor, as specified in their decision letter.

5 Fonts and text size

Adobe's Times Roman font should be used. In LaTeX2e this is accomplished by putting `\usepackage{times,latexsym}` in the preamble.[5]

Font size requirements are listed in Table **??**. In addition to those requirements, the content of figures, tables, equations, etc. must be of reasonable size and readability.

6 Page Layout

The margin dimensions for a page in A4 format (21 cm × 29.7 cm) are given in Table **??**. Start the content of all pages directly under the top margin. (The confidentiality header (§**??**) for submissions is an exception.)

Submissions must be in two-column format. Allowed exceptions to the two-column format are

[1] Prior to the September 2018 submission round, a different paper size was used.

[2] Last accessed Dec. 15, 2021.

[3] Indeed, for some versions of acl_natbib.sty, DOIs and URLs are not printed out or included in the bibliography in any form if the hyperref package is not used.

[4] If the problematic link is part of a reference in the bibliography and you do not wish to directly edit the corresponding .bbl file, a heavy-handed approach is to add the line `\interlinepenalty=10000` just after the line `\sloppy\clubpenalty4000\widowpenalty4000` in the "`\def\thebibliography`" portion of the file tacl2021v1.sty. This penalty means that LaTex will not allow individual bibliography items to cross a page break.

[5] Should Times Roman be unavailable to you, use Computer Modern Roman (LaTeX2e's default). Note that the latter is about 10% less dense than Adobe's Times Roman font.

Left and right margins: 2.5 cm
Top margin: 2.5 cm
Bottom margin: 2.5 cm
Column width: 7.7 cm
Column height: 24.7 cm
Gap between columns: 0.6 cm

Table 2: Margin requirements

the title, which must be centered at the top of the first page; the confidentiality header (see §**??**) on submissions; and any full-width figures or tables.

Should the pages be numbered? Yes, for submissions (to facilitate review); but no, for camera-readies (page numbers will be added at publication time).

Submissions should be single-spaced.

Indent by about 0.4cm when starting a new paragraph that is not the first in a section or subsection.

6.1 The confidentiality header and line-number ruler

Each page of the submission should have the header "Confidential TACL submission. DO NOT DISTRIBUTE." centered across both columns in the top margin.

Submissions must include line numbers in the left and right margins, as demonstrated in the TACL submission-formatting instructions pdf file, because the line numbering allows reviewers to be very specific in their comments.[6] Note that the numbers on the ruler need not line up exactly with the text lines of the paper. (Indeed, the line numbers generated by the recommended LaTeX files typically do not correspond exactly to the text lines.)

The presence or absence of the ruler or header should not change the appearance of any other content on the page.

7 The First Page

Center the title, which should be placed 2.5cm from the top of the page, across both columns of the first page. Long titles should be typed on two lines without a blank line intervening. Do not include the paper ID number assigned during the submission process.

[6] Authors using Word to prepare their submissions can create the marginal line numbers by inserting text boxes containing the line numbers.

Although submissions should not include any author information, maintain space for names and affiliations/addresses so that they will fit in the final (camera-ready) version.

Start the abstract at the beginning of the first column, about 8 cm from the top of the page, with the centered header "Abstract" as specified in Table **??**. The width of the abstract text should be narrower than the width of the columns for the text in the body of the paper by about 0.6cm on each side.

8 Section headings

Use numbered section headings (Arabic numerals) in order to facilitate cross references. Number subsections with the section number and the subsection number separated by a dot.

9 Figures and Tables

Place figures and tables in the paper near where they are first discussed. Note that MIT Press disallows figures and tables on the first page.

Provide a caption for every illustration. Number each one sequentially in the form: "Figure 1: Caption of the Figure." or "Table 1: Caption of the Table."

Authors should ensure that tables and figures do not rely solely on color to convey critical distinctions and are, in general, accessible to the colorblind.

10 Citations and references

10.1 In-text citations

Use correctly parenthesized author-date citations (not numbers) in the text. To understand correct parenthesization, obey the principle that *a sentence containing parenthetical items should remain grammatical when the parenthesized material is omitted.* Consult Table **??** for usage examples.

10.2 Self-citations

Citing one's own relevant prior work should be done, but use the third person instead of the first person, to preserve anonymity:

Correct: Zhang (2000) showed ...
Correct: It has been shown (Zhang, 2000)...
Incorrect: We (Zhang, 2000) showed ...
Incorrect: We (Anonymous, 2000) showed ...

Incorrect	Correct
"(Cardie, 1992) employed learning." The problem: "employed learning." is not a sentence.	"Cardie (1992) employed learning." Create by `\citet{...}` or `\newcite{...}`.
"The method of (Cardie, 1992) works." The problem: "The method of was used." is not a sentence.	"The method of Cardie (1992) works." Create as above.
"Use the method of (Cardie, 1992)." The problem: "Use the method of." is not a sentence.	"Use the method of Cardie (1992)." Create as above.
Related work exists Lee (1997). The problem: "Related work exists Lee." is not a sentence (unless one is scolding a Lee).	Related work exists (Lee, 1997). Create by `\citep{...}` or `\cite{...}`.

Table 3: Examples of incorrect and correct citation format. Also depicted are citation commands supported by the tacl2018.sty file, which is based on the natbib package and supports all natbib citation commands. The tacl2018.sty file also supports commands defined in previous ACL style files for compatibility.

10.3 References

Gather the full set of references together under the boldface heading "References". Arrange the references alphabetically by first author's last/family name, rather than by order of occurrence in the text.

References to peer-reviewed publications should be given in addition to or instead of preprint versions. When giving a reference to a preprint, including arXiv preprints, include the number.

List all authors of a given reference, even if there are dozens; do not truncate the author list with an "et al." Use full first/given names for authors, not initials. Include periods after middle initials.

Titles should have correct capitalization. For example, change "lstm" or "Lstm" to "LSTM".[7] Capitalize the first letter of the first word after a colon or similar punctuation mark. For book titles, capitalize the first letter of all main words. See the reference entry for **?** for an example.

We strongly encourage the following, but do not absolutely mandate them:

- Include DOIs.[8]
- Include the version number when citing arXiv preprints, even if only one version exists at the time of writing. For example,[9] note the "v1" in the following.

  > Joshua Goodman. 2001. A bit of progress in language modeling. *CoRR*, cs.CL/0108005v1.

  An alternative format is:

  > Rebecca Hwa. 1999. Supervised grammar induction using training data with limited constituent information. cs.CL/9905001. Version 1.

11 Appendices

Appendices, if any, directly follow the text and the references. Recall from Section **??** that *appendices count towards the page limit.*

12 Contributors to this document

This document was adapted by Lillian Lee and Kristina Toutanova from the instructions and files for ACL 2018, by Shay Cohen, Kevin Gimpel, and

[7] If using BibTex, apply curly braces within the title field to preserve intended capitalization.

[8] The supplied LaTeX files will automatically add hyperlinks to the DOI when BibTeX or BibLateX are invoked if the hyperref package is used and the doi field is employed in the corresponding bib entries. The DOI itself will not be separately printed out in that case.

[9] Bibtex entries for **?** and **?** corresponding to the depicted output can be found in the supplied sample file `tacl.bib`. We also cite the peer-reviewed versions (**??**), as required.

Wei Lu. This document was updated by Cindy Robinson to include additional information on formatting final versions. Those files were drawn from earlier *ACL proceedings, including those for ACL 2017 by Dan Gildea and Min-Yen Kan, NAACL 2017 by Margaret Mitchell, ACL 2012 by Maggie Li and Michael White, those from ACL 2010 by Jing-Shing Chang and Philipp Koehn, those for ACL 2008 by Johanna D. Moore, Simone Teufel, James Allan, and Sadaoki Furui, those for ACL 2005 by Hwee Tou Ng and Kemal Oflazer, those for ACL 2002 by Eugene Charniak and Dekang Lin, and earlier ACL and EACL formats, which were written by several people, including John Chen, Henry S. Thompson and Donald Walker. Additional elements were taken from the formatting instructions of the *International Joint Conference on Artificial Intelligence* and the *Conference on Computer Vision and Pattern Recognition*.