

How to Write an Abstract

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Abstract

Because on-line search databases typically contain only abstracts, it is vital to write a complete but concise description of your work to entice potential readers into obtaining a copy of the full paper. This article describes how to write a good computer architecture abstract for both conference and journal papers. Writers should follow a checklist consisting of: motivation, problem statement, approach, results, and conclusions. Following this checklist should increase the chance of people taking the time to obtain and read your complete paper.

Introduction

Now that the use of on-line publication databases is prevalent, writing a really good abstract has become even more important than it was a decade ago. Abstracts have always served the function of "selling" your work. But now, instead of merely convincing the reader to keep reading the rest of the attached paper, an abstract must convince the reader to leave the comfort of an office and go hunt down a copy of the article from a library (or worse, obtain one after a long wait through inter-library loan). In a business context, an "executive summary" is often the *only* piece of a report read by the people who matter; and it should be similar in content if not tone to a journal paper abstract.

Checklist: Parts of an Abstract

Despite the fact that an abstract is quite brief, it must do almost as much work as the multi-page paper that follows it. In a computer architecture paper, this means that it should in most cases include the following sections. Each section is typically a single sentence, although there is room for creativity. In particular, the parts may be merged or spread among a set of sentences. Use the following as a checklist for your next abstract:

- **Motivation:**
Why do we care about the problem and the results? If the problem isn't obviously "interesting" it might be better to put motivation first; but if your work is incremental progress on a problem that is widely recognized as important, then it is probably better to put the problem statement first to indicate which piece of the larger problem you are breaking off to work on. This section should include the importance of your work, the difficulty of the area, and the impact it might have if successful.
- **Problem statement:**
What *problem* are you trying to solve? What is the *scope* of your work (a

generalized approach, or for a specific situation)? Be careful not to use too much jargon. In some cases it is appropriate to put the problem statement before the motivation, but usually this only works if most readers already understand why the problem is important.

- **Approach:**

How did you go about solving or making progress on the problem? Did you use simulation, analytic models, prototype construction, or analysis of field data for an actual product? What was the extent of your work (did you look at one application program or a hundred programs in twenty different programming languages?) What important variables did you control, ignore, or measure?

- **Results:**

What's the answer? Specifically, most good computer architecture papers conclude that something is so many percent faster, cheaper, smaller, or otherwise better than something else. Put the result there, in numbers. Avoid vague, hand-waving results such as "very", "small", or "significant." If you must be vague, you are only given license to do so when you can talk about orders-of-magnitude improvement. There is a tension here in that you should not provide numbers that can be easily misinterpreted, but on the other hand you don't have room for all the caveats.

- **Conclusions:**

What are the implications of your answer? Is it going to change the world (unlikely), be a significant "win", be a nice hack, or simply serve as a road sign indicating that this path is a waste of time (all of the previous results are useful). Are your results general, potentially generalizable, or specific to a particular case?

Other Considerations

An abstract must be a fully self-contained, capsule description of the paper. It can't assume (or attempt to provoke) the reader into flipping through looking for an explanation of what is meant by some vague statement. It must make sense all by itself. Some points to consider include:

- Meet the word count limitation. If your abstract runs too long, either it will be rejected or someone will take a chainsaw to it to get it down to size. Your purposes will be better served by doing the difficult task of cutting yourself, rather than leaving it to someone else who might be more interested in meeting size restrictions than in representing your efforts in the best possible manner. An abstract word limit of 150 to 200 words is common.
- Any major restrictions or limitations on the results should be stated, if only by using "weasel-words" such as "might", "could", "may", and "seem".
- Think of a half-dozen search phrases and keywords that people looking for your work might use. Be sure that those exact phrases appear in your abstract, so that they will turn up at the top of a search result listing.
- Usually the context of a paper is set by the publication it appears in (for example, *IEEE Computer* magazine's articles are generally about computer technology).

- But, if your paper appears in a somewhat un-traditional venue, be sure to include in the problem statement the domain or topic area that it is really applicable to.
- Some publications request "keywords". These have two purposes. They are used to facilitate keyword index searches, which are greatly reduced in importance now that on-line abstract text searching is commonly used. However, they are also used to assign papers to review committees or editors, which can be extremely important to your fate. So make sure that the keywords you pick make assigning your paper to a review category obvious (for example, if there is a list of conference topics, use your chosen topic area as one of the keyword tuples).

Conclusion

Writing an efficient abstract is hard work, but will repay you with increased impact on the world by enticing people to read your publications. Make sure that all the components of a good abstract are included in the next one you write.

Further Reading

Michaelson, Herbert, *How to Write & Publish Engineering Papers and Reports*, Oryx Press, 1990. Chapter 6 discusses abstracts.

Cremmins, Edward, *The Art of Abstracting 2nd Edition*, Info Resources Press, April 1996. This is an entire book about abstracting, written primarily for professional abstractors.

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Writing Conference Abstracts

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When to submit an abstract

You should submit an abstract to a conference when you have (1) data and (2) an analysis of your data. You should not submit an abstract in the early stages of your data collection, and you should never submit an abstract if

you have not started your study! However, you do not need to have your study fully completed by the time you submit the abstract; a solid preliminary analysis can benefit from conference presentation. Your analysis should be as polished as you can make it, but probably the feedback you receive at the conference will lead to some revision. Typically, the conference paper is the first step to publication. It is not expected that you will have written anything up related to your study by the time you submit the abstract, although the more you have written the easier it will be to write the abstract. In some cases, you may want to submit an abstract for work you have already written up and submitted for publication. As long as the paper has not been published by the time you submit the abstract, it's acceptable to do so, and it will provide some publicity for your forthcoming publication (which you should mention in your presentation so those who are interested will know where to look for it).

Where to submit an abstract

Contrary to what many students think, it's perfectly acceptable to present the same research at more than one conference. Different audiences will give you different kinds of feedback. It's recommended, however, that you frame each paper a bit differently to match the focus of each conference and change the title to reflect this reframing.

How to select a topic

Typically conference talks are only 15 to 20 minutes in length. You cannot present your entire dissertation or even an entire research article. You should select a small sample of data that makes a single point; for discourse data choose either one long stretch of data or several smaller excerpts that offer interestingly different perspectives on your argument.

Title

Select a clear, informative title that contains all the key elements of your presentation (e.g., a key concept, the language or group under study, a general sense of your argument). Very short and very long titles are not recommended. Using a title and a subtitle separated by a colon is often a good way to maximize informativeness in a short space. It's easiest to choose a title after writing the abstract.

General format and style

Your abstract should single-spaced in an easy-to-read 12pt font (like

Times). Try to come as close as possible to the word limit without going over. In writing the abstract, do not use the future tense, even to say "In my presentation, I will...." It sounds unnatural to use the present tense in this context, but if you use the future some abstract reviewers may think you haven't completed the research.

Be extremely precise and detailed about your argument and analysis. Never simply say "Results of the study will be discussed" or the equivalent; state what the results are and why they matter.

How to structure the abstract

Abstracts are quite formulaic in structure, although there is a lot of variation. Here's one tried-and-true structure. Each of the sections may include one or more paragraphs.

Section 1

The main focus of the first paragraph or two should be a general statement about some issue in the field that your study contributes to. At this point you typically don't mention your study yet but stake out the part of the field that you're speaking to, and raise the issue that you'll be addressing (this sets the stage for you to present your research as the solution to a problem, or as a challenge to a claim made by another scholar). Don't just present a topic; frame the issue as a puzzle or problem or gap or weakness in the literature. This shows why your work is important. Also don't just say you're applying someone else's ideas; make clear what this application adds to knowledge. Alternatively, you can open with one sentence stating what the paper is about and then contextualize it with a general statement about how it connects to an issue in the field, but the first way is a bit more elegant.

Section 2

This should be the heart of the abstract. State here that your study offers a solution to the problem described in section 1 and how. Briefly give details about the study--where it was conducted and with whom (number and background of participants, sources of data), how long the study lasted and/or how much data was collected (e.g., hours of recordings). Then summarize your research findings. You should typically include a brief example to illustrate your argument (this usually isn't possible if you are allotted less than 500 words for the abstract). Be sure to specify precisely how the example demonstrates your point. You should in any event include a detailed description of the results: specify your findings in detail (perhaps introduce key terms you use in the analysis).

NOTE: If your data are in a language other than English, use only the Roman alphabet or the International Phonetic Alphabet to represent them; do not use other writing systems. Be sure to provide translations (and morpheme-by-morpheme glosses, if relevant to the analysis).

Section 3

You now need to return the big picture: How do these findings address the issue raised in Section 1? What does this imply for the field? This discussion need not be lengthy, but it should convincingly convey that your research has significant implications.

References

You should cite a few references in the text (no more than 5 or so in a 500-word abstract) to show you know the field. Don't waste space with a long list; select the key references only. (Deciding who's key may partly depend on who's hosting the conference, the theme, the theoretical position of the conference, etc.) It's often best to cite at least one "classic" (i.e., canonical but not antique) reference and one "cutting-edge" recent reference. You should also cite anyone who centrally represents the issue you're discussing. If you cite yourself, do so in the third person so your anonymity is preserved. You should NOT include a bibliography; save the space for describing your study.

What happens next?

The abstract review process varies greatly by conference; some solicit outside reviews from special committees, smaller conferences use local graduate students and faculty. Often the abstract review committee is anonymous. A few conferences will send comments from reviewers about your abstract; this is very valuable information and you should request it if available.

You should receive notification of the acceptance or rejection of your abstract in a timely fashion; if the conference organizers do not announce a notification date, you should contact them to find out when to expect a reply. If you don't receive notification by the specified date, follow up right away! Your abstract may have fallen through the cracks, and it may not be too late for it to be reviewed.

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