

## *Why, How and What to Write in a Paper Summary/Review*

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October 2018

At some point in your graduate career, you will have to read some papers to both familiarize yourself with the state-of-the-art in a specific field and likely to propose a topic in which to carry out pertinent research. Reading research papers keeps thoughts coming and so, it is a good habit for scientists, engineers and professionals to have. This is especially true when one is trying to carry out meaningful, productive, and fruitful graduate studies. Also, it is an invariably good idea that one pens down a summary of the works she has read along the way.

This note helps outline the process and argue for the usefulness of creating written summaries for existing scientific reports and papers that have already appeared in the open literature. The exercise in question is particularly useful in the early stages of a PhD degree. One could also argue that summaries do help people in their pursuit of MS and BS research theses.

### WHY:

Attempting to write down in parse-able text what one has read and produce a quality summary is never a trivial task. Along the process, one learns how to best outline and do justice to works of others. Moreover, a summary can help as a quick means of reference for the reviewed article and may assist as a refresher of key points the reader has obtained from the drill at a later time.

### HOW:

The following steps could be helpful:

1. Read a few times abstract, introduction and conclusion(s) to understand what is the context, the problem and the main findings of the study.
2. Seek out the problem statement, if there is such a portion of text anywhere in the paper. Ascertain its core-value/stated-research-hypotheses.
3. Read through the proposed solution/approach and assess the novelty of the proposal offered.
4. Ascertain how extensive the evaluation of the work at hand is and what are the visible benefits derived along this process.
5. Go through the related work to find out what is the *new material* added to the article in comparison to what has happened in the area before.

## WHAT:

A summary should be *no more than 1-1.5 A4* typeset pages. One could always try to provide an outline of the reviewed work in a 4-5 lines long text. Although this Spartan effort is a winner in the area of *not* being verbose, it may ultimately present a challenge for the individual to recall what the work was about! So, the author should strive to strike a balance: length vs. quality of message. Empirically one can say that the aforementioned length (1-1.5 A4 pages) is a workable threshold for a viable outline.

In a comprehensive summary, one should at least address the following points:

1. What is the main question(s) asked in this paper? (a.k.a. research hypothesis/-es)?
2. In a short paragraph, state what are the additional issues that the paper seeks to address (besides the main research hypothesis/-es)?
3. What are the key characteristics/elements of the proposed solution?
4. How the main hypothesis is supported through evaluation/experimentation and what are the key findings along this way?
5. In your opinion, state *2-3 strong points* going for the paper.
6. State *2-3 weak points* you may perceive for the work at hand (if of course such points exist).
7. In your opinion, is there anything at all that could have been pursued better/differently? Does reading of the paper lead into more open questions? What are they? If you are to pursue work on this very topic, what would be the first issues/aspects you would go after?
8. In your assessment, refrain from colloquialism or statements that are either hard to decipher later on or make not much sense e.g., this is a truly wonderful paper, this is a tremendous algorithmic effort, this is one of the worst reads I have had in three weeks etc. A good summary requires tempered language and academically-inclined assessment on real points.
9. Provide, if you have, a *take-away statement* from the paper under examination. This is a statement one may see years down the road and would help her/him recollect what the manuscript has been about.

## WHILE CARRYING OUT A REVIEW:

While in graduate school, you may also be asked to perform a technical review of a manuscript that has been submitted for publication to either a conference or a journal. There are many ways to go about it and clearly, some of the aforementioned steps could be performed in order to produce a substantive/helpful review. The key questions one is called to answer upon performing such a review are:

1. What is the working hypothesis(-es) and what is the degree of originality and/or novelty you believe the work has?

2. Does the presented work advance the state-of-the-art in the area? Does it account for ideally all pertinent work published before?
3. Are the suggested methods/proposals correct and do indeed help solve the problem at hand? Are there situations where the proposed solution will perform the best/worst and what are they?
4. Is the followed methodology for demonstrating the utility of the suggested techniques/approaches a rigorous one? The results obtained are of noteworthy value?
5. Is the work at hand relevant to the submitted venue? If not, suggest respective forums that authors might be able to present their work.
6. Are there any apparent omissions in terms of prior efforts/references in the area? If so, do provide the relevant works.
7. What is your rating of the manuscript and why? Especially if the feedback is negative, clear directions/comments should be provided for authors to improve their work.
8. You will have to state how confident you are about your own evaluation. This is an important contextual piece of information deemed very helpful to the organizers of an event/conference.
9. If applicable, suggest ways/directions that the authors could take in order to better their work.
10. State your opinion about the readability of the paper under review. You may run into an important piece of work but if its presentation is deficient, it would be best that the authors be alerted about the fact.
11. Reveal any *Conflict of Interest (COI)* you may have with the contributors of an article under consideration.