How to read a scientific article

Fun with Algorithm in English

Annelyse Thévenin

Genome Informatics, Faculty of Technology and
Institute for Bioinformatics, Center for Biotechnology (CeBiTec), Bielefeld
University, Germany

Winter 2013-2014

What is an scientific article

Goal: Report new results

There exist different types of article:

- Journal or conference proceedings
- Free or payed access
- Limited or unlimited number of pages
- Different review mechanisms
- Difficulty to publish depends on the quality of the article but also on the requirements of the publisher
- Different readers
- Theoretic results, practical results, discussion, review, letter
- Time between work and publication

How to read an article

How to find an interesting article

- Recommendation by a colleague or a teacher
- Citation in another article
- Presented during a conference
- Web search to create or update your knowledge about a research field
- Articles which cite your work
- Journal club
- Articles with lots of citations
- New journal

Academic articles cannot be read effectively in the same way as a short story, a novel or a newspaper report.

An article is very dense, each sentence is important.

An article must be read several times, in different ways. And **you** have to find your ways to read it.

Structure of an article

Gaming is a hard job, but someone has to do it!

GIOVANNI VIGLIETTA
Department of Computer Science
University of Pisa
viglietta@gmail.com

September 21, 2012

Abstract

We establish some general schemes relating the computational complexity of a video game to the presence of certain common elements or mechanics, such as destroyable paths, collectible items, doors opened by keys or activated by buttons or pressure plates, etc. Then we apply such "metatheorems" to several video games published between 1980 and 1998, including Pac-Man, Tron, Lode Runner, Boulder Dash, Deflektor, Mindbender, Pipe Mania, Skweek, Prince of Persia, Lemmings, Doom, Puzzle Bobble 3, and Starcraft. We obtain both new results, and improvements or alternative proofs of previously known results.

1 Introduction

This work was inspired mainly by the recent papers on the computational complexity of video games by Forišek [4] and Cormode [2], along with the excellent surveys on related topics by Kendall et al. [7] and Demaine et al. [3], and may be regarded as their continuation on the same line of research. A conference version of this paper has appeared at FUN 2012 [12].

- **Material and methods**: description of algorithm/experiment (enough info to re-implement algorithm/recreate experiment.)
- **Results/Discussion**: evaluation
- **Discussion/Conclusion**: conclusion and open work

Different way to read

Because we can read an article for different reasons, we don't read an article in the same way all the times, it also depends on the time we have for the reading.

What do you want to get out of it?

- **Read the whole article**
- Focus on the introduction
- Focus on the methods
- Focus on the conclusion
- Focus on the figures

One way to read

Don't read everything the first time.

1. Take the time to really understand the **title**, then the **abstract** (and keywords).

2. Read the **introduction**, then the **conclusion**: understand the aim and the interest before the technique.

3. **Understand enough of the background**. Review what you already know about the topic.

4. **Read again** the introduction and conclusion.

Don't read everything the first time.

5. **Skim the method and result sections**: only the first sentence of each paragraph or only the figures and tables for example. Not the proof during the first run.

6. **Repeat reading** of the methods and results sections more and more deeply.

7. Read the **whole article**.

> Take notes during the reading!

What is important? Not understood? Wrong? Nice? Inspiring?

You must be able to tell with your own words the idea of each paragraph, and to see the structure of the article.

Questions before to start to read:

- Date?
- Journal article? In proceedings? Which journal/conference?
- Popularity (cited, see `http://citeseerx.ist.psu.edu/index`)
- Which field?
- Historical context?

Tips

Reading is an active task

Imagine the next step/the end, take notes, do the link with what you already know, try to understand the figures and tables before you read the caption.

- Don't ignore the part that you don't understand
- There are mistakes (small or big...)
- Do not believe everything they say
- An article tells a story, you must be able to recount it
- Read cited papers
- Manage your time

There exists software to organize the bibliography (jabRef, Zotero, EndNote, ...).

For a review

- Is the topic interesting?
- Is it a new topic?
- What is it the historical context? What is the impact today?
- What is the main point of this article?
- How is the quality of the writing? Is it clear? Are there mistakes?
- Is there sufficient background information?
- Are the evaluations and proofs sufficient (quantity and quality)?
- Did they forget state of the art? Explanation? Discussion?
- Do we have enough information to repeat their work?
- Which future work is suggested? Maybe it is already done...
- How to improve the presented work?

Homework

1. Choose and present an article (20 min)
2. Write a summary and a review of this article (8 pages)
3. Improve your text after our correction

But also: Read at least the abstract of all presented articles and review the text of one other student.

You have to write a **summary** of the article (use your own words), a **review** (positive and negative critique) then your impression about the exercise (which methods did you apply to read).

Each section must be structured.