How to write scientific articles

"But in science the credit goes to the man who convinced the world, not to the man to whom the first idea occurs"
(Francis Darwin, botanist, Ch. Darwin's son)

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Public

- Introduce yourself in <1': name, discipline, topic of research, article published?, expectations

Plan

- Motivations

- Article structure (sections)

- Writing style

- Article submission

Importance/Motivations

Styles of writing

- Literary: beautiful, pleasant to read, to imagine, to dream

- Politics: avoid to hurt people

- Journalistic: direct ideas, easy to understand

- Scientific: accurate, rational, proved, convincing, complete, compare with others

Definition of the word "research"

- "Creative work undertaken on a systematic basis in order to increase the stock of knowledge, [...] and the use of this stock of knowledge to devise new applications" (wikipedia Research)

- "The goal of the research process is to produce new knowledge or deepen understanding of a topic or issue" (wikipedia Research)

- "Careful study that is done to find and report new knowledge about something", "investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws in the light of new facts, or practical application of such new or revised theories or laws" (webster research)

- "L'une des plus belles missions de notre service public : préparer l'avenir par la connaissance" (end of ESRI minister's letter 07/2020)

Research and ideas

- Does my paper increase the stock of knowledge? Does it specify it clearly (abstract, introduction, conclusions)?

- "I wrote a Web site which uses mozilla API (firefox methods) to speech recognition" is not research, for ex. what can readers learn from your work?

- In CM you learn, in TP/lab you exercise, you get skilled

- COVID: we did not know in 2020 how the virus acts, how to make a vaccine – it was about knowledge, not about manufacturing

Importance/Motivations

- Researchers and laboratories are evaluated on their publications (quality and quantity)

  - see application-pr.pdf, page 3

  - e-mail "Prix de thèse du GDR RSD & ASF 2024": "Parmi les critères d'évaluation interviendra la qualité du dossier de publications incluant les brevets"

  - "La section [27] apprécie la qualité, et non la quantité, de la production scientifique" (conseils RIPEC sur https://cnu27.univ-lille.fr)

- Many people consider that a bad writing style mirrors a bad science

- Just like a text with grammar errors is suspicious, so is an article written badly

- => paramount importance for any researcher to use a high quality of writing

Bibliography

In English:

- The Elements of Style. Strunk and White (and Angell). 2014

- How to Increase the Chances Your Paper is Accepted at ACM SIGCOMM (CORE A* conference)

- Writing for Computer Science. J. Zobel, 2015

- Minimum competence in scientific English. S. Blattès, V. Jans, J. Upjohn, 2013

- How to Write a Thesis. U. Eco et al., 2015

- How to Write and Publish a Scientific Paper. B. Gastel, R. A. Day, 2016

In French:

- Rédiger pour être publié ! Conseils pratiques pour les scientifiques. É. Lichtfouse, 2011/2012

    - slides of his courses: Cours de rédaction scientifique, Rédiger pour les revues scientifiques à facteur d'impact, La rédaction à l'ère du numérique

- Guide de rédaction scientifique : L'hypothèse, clé de voûte de l'article scientifique. P. Poindron, D. Lindsay, 2011

- Écrire un article scientifique en anglais : Guide de rédaction dans la langue de Darwin. N. Forget-Dubois, 2016

- Guide pratique de rédaction scientifique : Comment écrire pour le lecteur scientifique international. J.-L. Lebrun, 2007

- L'article de recherche scientifique en anglais. D. Carnet, 2010

Use of AI for article writing

- For each idea in the following, think about how AI can help or not
- Some articles are fake
- Think at one of your articles: which sentences can be written by AI and which ones cannot
  - what to write: abstract, introduction, related work, idea, results
  - how to write: writing style
- Examples of AI tools useful for research: https://libguides.und.edu/ai-resources
  - research rabbit: give it a paper (pdf or DOI) and it looks in the bibl and generates related works

"Home"work

Suppose you have discovered a vaccine against a virus, and no other vaccine exists yet.
Write the title and the abstract (200–250 words) of the article where you present this vaccine.

Article structure (sections)

Types of articles

- Discovery of a phenomenon: evolution of the optimum path, effect of nanonode movement on communications, radioactive decay
- Solution to a problem (creation, new proposal): a new vaccine, a new packet routing protocol
- Survey (analysis of a topic, state of the art): taxonomy, low-weight comparison
- Rarely: tool (present a tool), problem (problem statement, position, white paper)

When to start writing, and what to start with?

Start a working document as soon as you have the idea to work on

- Write everywhere (in all the sections): presentation of the idea, related work, results, title, ...

- Use a top-down approach: first, write topics/ideas, some information, a few words, figures; detail them later, when you have time to think at them (or at the final writing), or get more insights on your work

- Continuous writing: write as soon as ideas come to your mind, writing makes us think and better understand our work, and guides us (idea validation)

Example:

- example-writing-timeshot.pdf – ideas in all the sections, some of them fully written

- example-writing.pdf, example-writing{2,3}.pdf – we do not yet know if our idea works and whether it is worth writing an article on it

- during-writing-linearfw/paper-commented.pdf – we have already most of the results + I keep other ideas in main.pdf

Once you have all the results, start the final paper:

1. Take from the working document what is valuable in the heart of the article (idea, results section) and related work, and complete it

2. Afterwards, write abstract, introduction, and conclusions

Reason: only after having finished describing your work you know precisely the results, details and advantages of your work, how your method compares to others', the domains of application, the contributions etc. of your article

Focus on one idea only in the article

- Focus in the article on one idea (instead of presenting several ideas)
    - do not run after two horses! You will need to motivate two different ideas, give results for two ideas etc.
    - the novelty is thus more visible and emphasized
    - too much information kills information

Where is the river stronger:
- one arm
- or two arms?

Focus on one idea only in the article – examples

- The effect of the virus on people, and a new vaccine against that virus are two different ideas
    - "In this paper, we will demonstrate that the human body needs to generate around 900 dedicated antibodies in less than 12 hours in order to defeat the virus. [...] Our vaccine bypasses other vaccines on several levels."

- Our vaccine was tested on 10000 young people; we tested also 100 elderly people
    - do you mention the elderly in the results? Are the results trustful? If yes, how much text for that: only a sentence, a paragraph, or a section? If yes, do you mention elderly in title too?
    - => remove the mention about elderly people, it just distracts the reader from the important idea

Do not present diverting/other topics (don't digress/deviate from the idea)

- "Know your message, and stay on it"

- Omit unrelated topics / needless text

- Your paper is about a flower, which image do you use?

Think about how you present the idea

- Show that a method/treatment has bad results on some data/patients – is it worth to write such a paper?
    - if it is me who proposed the method, then it is not worth
- Show that a method used by others with always good results gives bad results on some data (first time that bad results happen) – it is worth a lot!!
    - try also to analyse why it is bad on this data, and generalise to other data
- The idea, the work etc. are the same, but the view is different, and this changes everything!!

Plan and section proportions of a typical article

Abstract
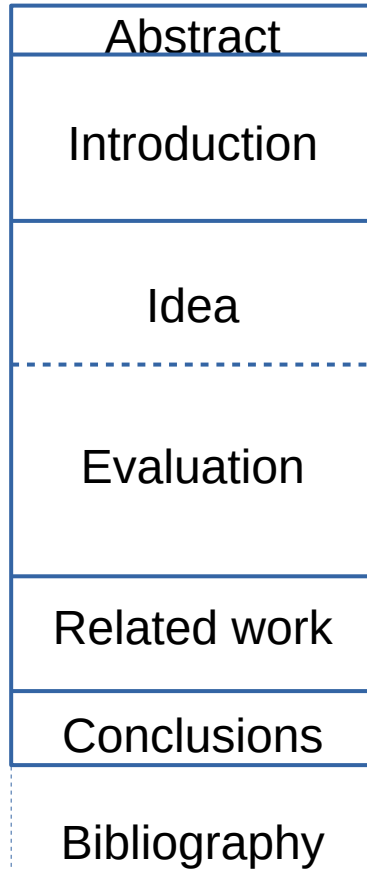
Introduction

A Background section
can be inserted

Idea

Do not skip any section
Do not add too many sections

Evaluation

Related work

Can be placed after
Introduction instead

Conclusions

Bibliography

Title

- Allows reader to decide whether he will read the paper or not

- Very important, you can spend 30 minutes to find the right title

- Not too generic/broad, not too specific/narrow either

  - "A better house isolation" – better from which pov (more or less expensive/robust/easy to install etc.), what material etc.?

  - "A taxonomy of the parameters used by decision methods for adaptive video transmission"

- Relevant, describes exactly the work

  - "TcpHas: TCP for HTTP Adaptive Streaming"

  - "Performance Evaluation of TcpHas: TCP for HTTP Adaptive Streaming"

  - "Design of a liquid drug based on wine" – the emphasis is on wine – better: for heart attack – do you want your article to be read by people who look for wine, or for heart attack?

- Ex.: write down the keywords of your work, and combine them to create the title

  - ex.: congestion control, transport protocol, deviation, routing-based, (electromagnetic) nanonetworks, decentralised => Congestion Control by Deviation Routing in Electromagnetic Nanonetworks

  - avoid words better, optimised (do not confound with optimal!), novel, because (almost) all the articles present better, optimised and novel methods

Abstract

- There are so many articles that readers usually read only title and abstract to decide whether it is worth reading or not => title and abstract are important

- Disproportional summary of the paper, informative

- Contains: context, importance of the subject, the problem, the solution proposed, the solution is good
  - context is good to have because the reader was thinking at completely other things before starting to read your paper

- What, how, proof

- See example-abstracts (10' of thinking per abstract)

Work in groups

Groups of 3–4 pers./group to proofread the abstracts

Introduction

- Its paramount importance is usually understated

- What does the reader need to know to **appreciate** my work? Why is my work **important**? Be convincing.

- "A great paper contains a puzzle and a solution"

- Here is a problem

- It's an interesting problem

- It's an unsolved problem

- Here is my idea

- My idea works

- Here's how my idea compares to other people's approaches

Introduction

- (Context)
  - introduce reader to the general field (e.g. 1 par.)
  - the specific sub-field (e.g. 1 par.)
  - start with general, societal problems, and go to specific, scientific ones
  - write sentences on which all people agree (phrases "béton")
  - context not presented => reader does not understand the article

- Here is a problem
  - describe the problem you are trying to solve
  - finding a problem is more important than finding a solution!!!

- It's an interesting problem
  - ... is everywhere, most people use it, has been unsolved for decades, [...] wrote about it that "..." etc.
  - "There are only a few studies on this subject" is not a sufficient reason for your paper; you must **differentiate** from them
  - implications, stakes missing => reader does not see the importance/usefulness of your solution

- It's an unsolved problem

Introduction

- Here is my idea
  - describe the method to solve it (overview)
- My idea works
- Here's how my idea compares to other people's approaches
  - describe any non obvious important feature, if any

- (Recall) contributions
  - clearly explain the advance compared to current knowledge
  - (scope of the article, which case it deals with and which case it does not: "The scope is computer networks; in contrast, telecom networks and sensor networks have different assumptions", "We consider only network criterion, not sender CPU load, [because...]")
  - (target audience: "especially useful to service providers")
- (Article organisation)
  - "Section X analyses ..., Next section presents, ..., Section Y concludes the article and highlight some perspectives."

Unexpected results

- Do not fear to analyse thoroughly an idea
- "The greatest scientific advances couldn't be, and weren't, predicted" (Sir Harold W. Kroto)
  - explain your results, especially if some results are unexpected or counter-intuitive
- "The path of discovery is not straight" (Ahmed Zewail)
- "[...] many authors suggest that a dense deployment should be avoided in sensor networks (see e.g. [2]). In this paper we argue the opposite. We show that..."

Introduction – originality of the idea

Think about the originality of your idea, and mention it:

- None: an adaptation of an existing idea from one field to another

- Innovation: an incremental amelioration of an existing method

- Perfection/improvement: decisive improvement in the field

- Discovery in continuity: significant news for the field

- Discovery by discontinuity ("découverte de rupture"): discontinuity in the field, fundamental shift, e.g. Einstein's relativity theory

- "Alan Kay once said that the future does not need to be incremental. Sometimes we need to think about where we want to be in ten years, then build that future." (cited by J. Corbet)

Introduction – discussion

- Discuss Introduction of the NCA paper !!

Background

- Optional section, appears when a sub-field (several notions) must be known to understand the article, e.g. nanonetworks

- Read your presentation of your idea and write down the notions needed to understand it; then explain these notions in Background section

Idea

- If the idea has several steps or parts, start with the big picture, e.g. a scheme with the various parts of the system, less is more

- Be complete, i.e. do not omit important details

- Specify the assumptions used by your idea (i.e. in which case it works)

- Feel free to use pictures/schemes which describe the idea, "a picture is worth a thousand words" ("une image vaut mille mots")

- Always use high-quality images, if possible (pdf vs png/gif)
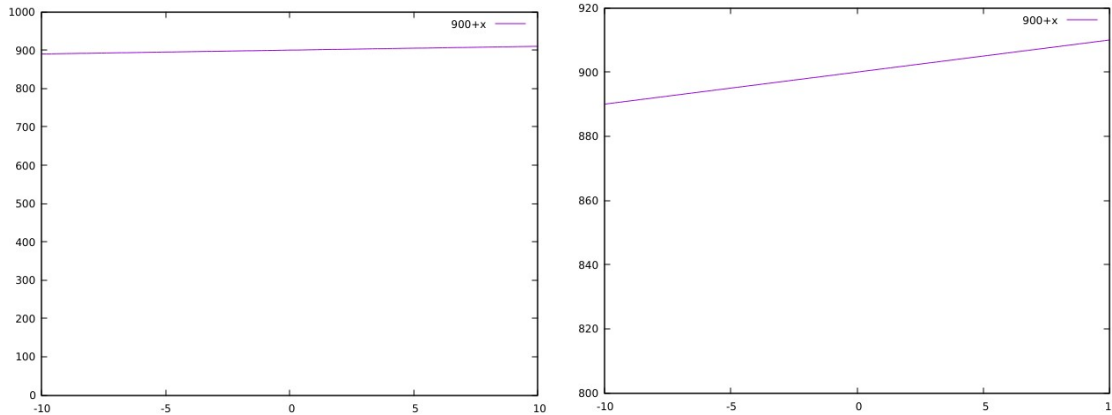
Evaluation, analysis

- Sort out the good results to present in the paper

- Disciplines technologiques : simulation, expérimentation, modélisation, ...

- Disciplines de la santé/médicales : étude crossover, essai randomisé contrôlé, ...

- Elle peut être extrêmement importante car elle peut avoir un impact immense, par ex. de plusieurs dizaines de mild d'€, voir https://www.youtube.com/watch?v=2pPCt0XqZLs (médicament)

Evaluation, pay attention to / specify ordinate axis

How to Lie with Statistics. Darrell Huff, 1993
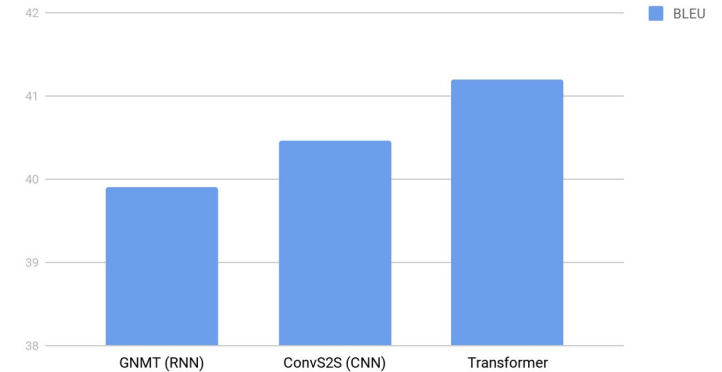
Sell increase of two products:

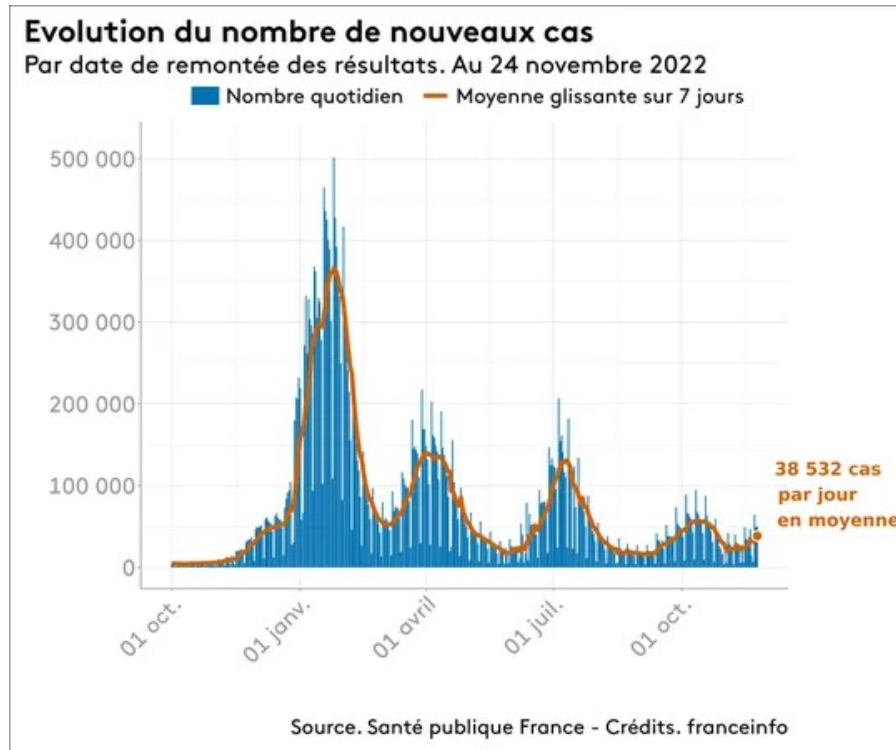English French Translation Quality

f(x) = 900+x

Ethics, specify evaluation parameters (accuracy of analysis)

- You are prime minister, you need to buy 1 million doses of a covid vaccine, you found four papers describing each a covid vaccine, which one do you choose to buy?

- The article: efficiency 95%
  - reality: tested on 10 persons only

- The article: eff 90%, tested on 100 persons
  - reality: 90% of them are children

- The article: eff 80%, tested on 100 persons, all of them are young (20-40 years old)
  - reality: 60% of them had covid 1 month ago

- The article: eff 75%, tested on ... persons, none of them had covid in the last 6 months, 20-40 years old etc.

- "Jeudi, la commission de vaccination allemande l'a déconseillé [le vaccin AstraZenecca] pour les plus de 65 ans, arguant que « les données disponibles actuellement sont insuffisantes pour évaluer l'efficacité du vaccin » dans cette tranche d'âge"

Politics poll vote, methodology:

- Sample universe: adult population rezident in Romania

- Sampling volume: 1082 respondents, voters aged 18 and over

- Maximum error across the entire sample: +/-3% at a 95% confidence level

- Data collection method: face-to-face, at respondents' homes

- Data is weighed by age

- Period of poll: 15–27 January 2024

Evaluation, justify your choices

Evolution du nombre de nouveaux cas
Par date de remontée des résultats. Au 24 novembre 2022

Nombre quotidien — Moyenne glissante sur 7 jours

38 532 cas par jour en moyenne

Source. Santé publique France - Crédits. franceinfo

Questions:
- Why do they show an average too?
- Why is the average done on 7 days?

Write the rationale in the paper!
Justify your choices (of protocol / software / tool / parameters etc. used in the evaluation)

Answers:
- average too in order to see more clearly the evolution, because the daily numbers change sharply
- 7 days because during week-ends laboratories are closed and people test less etc., the cycle is 1 week

https://www.francetvinfo.fr/sante/maladie/coronavirus/covid-19-l-epidemie-repart-en-france-avec-une-reprise-de-la-circulation-du-virus_5501637.html

Evaluation, describe results, not figures

- Do not only describe the figure, but, more importantly, the (reason of) results!

- This figure shows that... vs This is because...

Fig. 3 presents a comparative analysis of the variation in cluster head retention time versus communication radius for different clustering algorithms, while maintaining a maximum node movement speed of 60 km/h. It is evident that all three algorithms exhibit an increase in CH retention time with an increase in node communication radius, under the same speed and node distribution. The CH retention time serves as a performance metric that reflects the algorithm's stability at the CH. Notably, our proposed mechanism consistently demonstrates the highest CH retention time among the three algorithms, thereby improving the clustering stability.
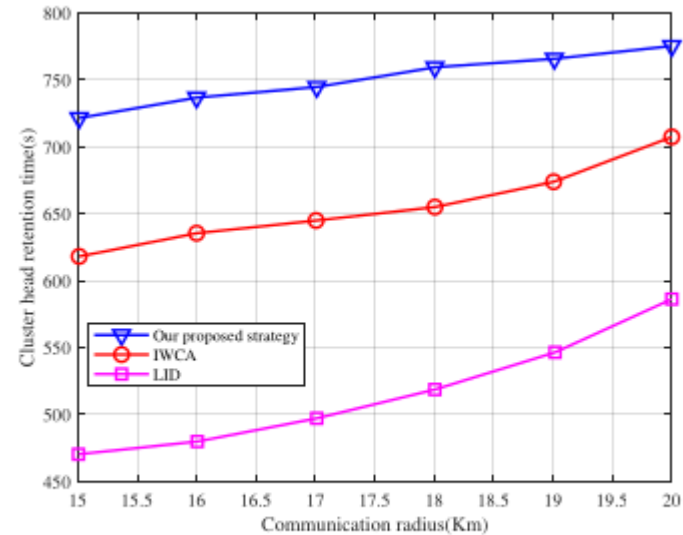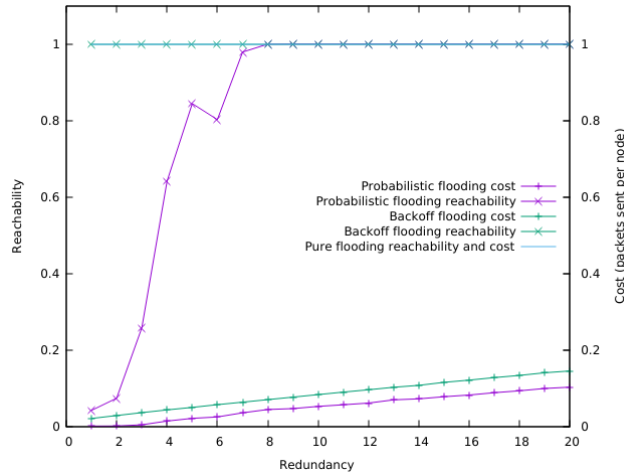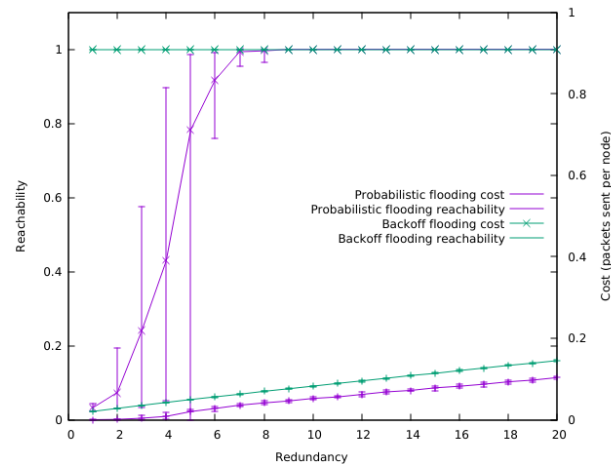

Fig. 3: Cluster head retention time.

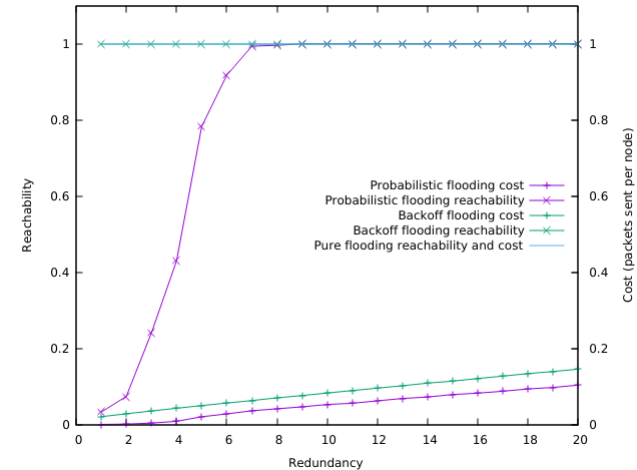# Evaluation, describe results

- https://youtu.be/2pPCt0XqZLs?t=3484 jusqu'à 1:03:50 : âge des patients, durée des tests etc.
- If you cannot explain some results, either spend more time to understand and present them, or remove them

5 simulations/point

Deviation from average

15 simulations/point

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How to write scientific articles

Ethics, reproducibility (if applicable)

- "Dans les nouveaux critères d'évaluation fournis par l'HCERES figure le critère : "La production scientifique de l'unité respecte les principes de la science ouverte en partageant le plus largement et le plus rapidement possible les publications, méthodes, données, codes et autres éléments constitutifs de la démarche scientifique. "(Domaine 2. Référence 3. Critère 3)" (12/2021)

- PhD will make an oath (« prêter serment ») on scientific integrity of their work (ED SPIM, 11/2022)

- Reproducibility = scientific rigour

- If possible, specify how to fully reproduce the results presented in the article

    – e.g. provide the program to reproduce tables and figures of the paper, example 1, example 2

- "Nobel laureate Linda Buck retracted two papers from prominent journals because she was "unable to reproduce [the] key findings" of experiments" (E. Lichtfouse)

- 2006 Science paper, 2001 Nature paper pulled in 2008

- Water memory: https://www.youtube.com/watch?v=oLteK_JoW5Q and https://www.youtube.com/watch?v=OhdQjf1QJ3U

- Be honest when writing papers...

Related work

Who are your competitors (have the same goal as you)?

- You want to create a company to transfer documents, your competitors are: public postal office, private ones, e-mail

- You want to create a drug for some disease, your competitors are not how that drug is used for other diseases, but how that disease can be cured, no matter if using drugs, sport, psychology, etc.

- See paper example-routing-flow-guided.pdf, the paper is about routing, what does its related work deal with?

How does my idea compare with others'?

- Do not simply cite other articles, but compare with them by specifying why and in which respect your method is better than theirs etc., so that readers see the progress compared to current knowledge

Related work

- Search methodology:
  - search for surveys, look at related bibliography entries during article reading
  - search on Internet for articles using keywords related to the idea
  - no real methodology, but see e.g. my MTAP article
- Try to use high quality articles in the bibliography, and, except particular cases, recent ones

Conclusions

- While abstract is mainly informative (this paper is on this topic), conclusions are mainly about understanding/knowledge (this paper learns us that...)

- ~30% summary of the article, what the article is about, give (all) important information, e.g. "A common problem in distributed systems is data consistency. This paper presents a method to check the consistency of a system..."

- ~50% the main findings / achievements of the article, what message do you want to convey to readers?, lessons or ideas learned, "It turns out that", "This article showed that", "We noticed/observed that", "The main results of the paper are as follows:", "Our simulations revealed that..."

  - this consolidates paper's findings in reader's mind, yet many articles miss to present it

  - the introduction presents the topic, whereas the conclusions present the result

- ~20% perspectives (future work(s))

- See depcos paper

- See "PinePhone: trying out a Linux-based smartphone", after reading the title and the introduction, what is the question readers ask? Do the conclusions answer it? Does the title "introduce" (give a hint about) the conclusions?

Bibliography

- Write completely bibliography entries: specify pages, year, the whole name of the journal, place of the conference etc.

- Write them correctly: IoT vs iot, author names etc.

End of the paper

- Having reached the end of the paper, have you convinced the reader?, i.e. have your arguments to defend your idea been sufficient (sufficiently strong)?

Memento / check list

- Carefully choose the title
- Write a perfect abstract
- Introduction: are contributions clearly stated? The importance of the topic and of your solution?
- Is the idea, method sound (strong, major)?
- Evaluation: do you show results not explained?
- Conclusions: what does the reader need to memorise (main findings of the article)?

Writing style

"Make the paragraph the unit of composition"

- "Any subject requires division into topics, each of which should be dealt with in a paragraph"

- "A paragraph is a self-contained unit of discourse in writing dealing with a particular point or idea" (wikipedia)

- => an article is not a sequence of words, it is a sequence of topics=paragraphs!

- "Moderation [i.e. neither too big, nor too small, as a general rule] and a sense of order should be the main considerations in paragraphing"

- The first sentence introduces the topic, the next sentences support it, and the last sentence summarises the points of the topic

Beginning of paragraph (and sentence, section)

- "Begin each paragraph either with a sentence that suggests the topic [(what this paragraph deals with)] or with a sentence that helps the transition"

- "If a paragraph forms part of a larger composition, its relation to what precedes, or its function as a part of the whole, may need to be expressed"

Expressing relationship

Consequently, therefore, hence, thus, so, as such

First

Second(ly), afterwards

Third(ly), finally?

On the contrary, although, though, nevertheless

For the same reason
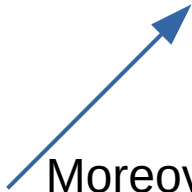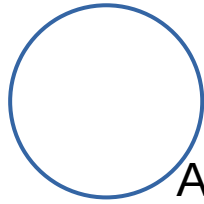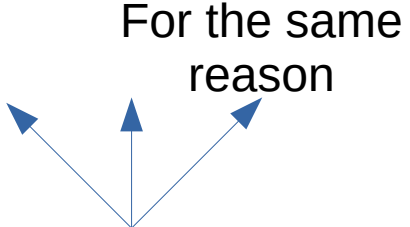
Moreover, in addition, finally?

This is caused by, the cause is
To do that/so, to implement/check/prove it
Likewise, similarly

Again

Missing relationship

- Without relationship, the reader does not understand well, or imagines other links

- "Wireless radios today are generally half-duplex. On a single channel, they can either transmit or receive, but not both simultaneously."

  - does the 2nd sentence specify another property of radios, or a consequence of the 1st sentence ("So, ..."), or an example ("For example, ...", or an additional explanation of the 1st sentence ("Thus, ...", ": ", "i.e. ")?

- Somewhere in a paragraph: "The average number of neighbours is 300":

  - is it a recall, something having been written before: then add "as previously stated"?

  - elsewhere, the reader assumes it is a new information: then where does it come from: "It can be easily computed that number of neighbours is..." and give the formula; or "as given by the program, which computes the number of neighbours and shows it to the screen"?

- A node covers a communication range. Neighbours of this node are within this communication range. Normally, the node sends its data packets to its whole communication range and its neighbours receive them through the wireless medium. The ring chooses neighbours between two concentric communication ranges following three phases.

  - is 2nd sentence a consequence of the previous sentence ("Hence, ..."), or a new idea, or a general fact ("It is known that...")?

  - 3rd sentence: does "Normally" mean that this is general fact, or not? If yes, and if the other sentences are facts too, why do not they use "Normally" too?

  - is 4th sentence contrary to previous sentence?

End of paragraph (and section)

- "As a rule, [...] end the paragraph in conformity with the beginning [e.g. with a conclusion]. Ending with a digression, or with an unimportant detail, is particularly to be avoided"

- Examples:
  - "Therefore, we need an additional method to get the network density. [...method explanation, DEDeN functioning...] Thus, we use DEDeN density estimator in our evaluation."
  - see example-par-start-end.pdf file

- The same advises apply to sections, which can end by "To conclude, ...", "To sum up, ..." etc.

- Modify one of the abstracts to add a introductory and a concluding sentence in each topic of the abstract

Make progress

- "(The beginning of) each paragraph is a signal that a new step in the development [progress] of the subject has been reached"

Progress is not visible, everything is flat

Progress is clear
water is going down
everything else is hidden

Make progress, do not go back and forth with topics

- Each topic has its place, where it belongs; write it there!

- Example:

  - **The** number of awake potential forwarders is between 7×10/100 = 0.7 to 1.4 in average. **Thus**, there is a high risk of a packet being lost **due** to all possible forwarding nodes being asleep when it is transmitted.

  - The... Thus... due...

  - ---> if x => y => z, then present x, y and z, and not x, z, y

  - ---> **The** number of awake potential forwarders is between 7×10/100 = 0.7 to 1.4 in average, **hence** all possible forwarding nodes might be asleep when it is transmitted. **Therefore**, there is a high risk of a packet being lost.

- This problem appears often at inter-paragraph level: a paragraph presents several topics, and one of them is discussed in the next paragraph mixed with other topics, and yet another topic is presented in another paragraph

- ---> organise the article to have one topic per paragraph

Use the active voice

Stronger and shorter:

- When a route towards node B is discovered by node A

- There were a great number of dead leaves lying on the ground

- It was not long before she was very sorry that she had said what she had

- When node A discovers a route towards node B

- Dead leaves covered the ground

- She soon repented her words

Use the active voice

It is usually more direct and vigorous than the passive:

- I shall always remember my first visit to Boston

- My first visit to Boston will always be remembered by me – less direct, less bold, less concise

- My first visit to Boston will always be remembered – more concise, but indefinite: is the writer, another person, or the world at large that will always remember this visit?

However, do not completely discard passive voice:

- The dramatists of the Restoration are little esteemed today – preferred in a paragraph on the dramatists of the Restoration

- Modern readers have little esteem for the dramatists of the Restoration – preferred in a paragraph on the tastes of modern readers

Put statements in positive form, and avoid uncertainty/doubt

- "He was not very often on time" vs "He usually came late" – if he was not on time, how was he?!

- "Our proposed method does not assume that ..." – but what does it assume?

- Zbar is "not limited to images" – so in which other cases it also works?

- Consciously or not, the reader is dissatisfied with being told what it is not; he wishes to know what it is

- Use *not* as a means of denial or in antithesis, never as a means of evasion: "Method ... assumes that ..., whereas our method does not"

- If your sentence admits a doubt, your writing will lack authority:
  - "applicants can make a good impression by being neat and punctual" vs "applicants will make a good impression if they are neat and punctual"

- Use *would*, *should*, *could*, *may*, *might*, and *can* [and *perhaps*] only for situations involving uncertainty

Omit needless words

- "A sentence should contain no unnecessary words, a paragraph no unnecessary sentences, for the same reason a drawing should have no unnecessary lines and a machine no unnecessary parts"

- "Whenever I am asked to correct the English language of a manuscript written by a French native, the result is at least 20% shorter" (E. Rubiola)

- The question as to whether vs whether (the question whether)

- There is no doubt that vs no doubt

- He is the man who vs he

- The reason why is that vs because

- The aim/goal of this article is to vs this article aims to

- "Representing the information can be done by" vs "The information can be represented by"

- avoiding collisions can be got by vs collisions can be avoided by

- avoid *the fact that*:
  - in spite of the fact that vs although
  - call your attention to the fact that vs remind/notify you
  - the fact that he did not succeed vs his failure

Describe clearly your idea, use the right word

- What are the right words in the following sentences? Discuss some of the synonyms
  - "the assumptions used in the other method are *inappropriate* in our case" – cannot be used, irrelevant, unsuitable, inapplicable, unacceptable
  - "our method *surpasses* X's method" – exceeds, beats, outperforms, outweigh, is better than, go beyond, improves upon
  - "the *wished* parameters are specified by the user" – desired, applicable, convenient, correct, good, pertinent, relevant, true, adapted, right
- In a browser: ctrl-l s surpass; also click on proposed words

Explain ideas clearly

- "ID assignments can also be done manually, at the manufacturing level, randomly, ideally, or a mix of them" – is manufacturing level the same as manually or not? How to fix it?

- "When a machine is switched on, the scanning procedure is invoked by the MAC layer to detect networks" – what is the idea?
  - the procedure invoked is the scanning one
  - the procedure is indeed invoked (and not other action)
  - it is the MAC layer, and not another layer, which invokes
  - the procedure aims to detect networks
  - a scan is performed

- Depending on the idea to carry, the sentence may be rearranged to make it clear

Be pedagogical (clear explanations)

- Science should not be presented as difficult and complex, but simple

- Do not use complex words to be seen as "serious"

- "The incomprehensible should cause suspicion rather than admiration" (N. Wirth)

- Enlarge audience: Researchers in the field, students in the field or not, journalists, social and political actors; do not write only for experts!

A. Einstein (cited by E. Lichtfouse):

- "If you can't explain something simply, you don't understand it well"

- "Most of the fundamental ideas of science are essentially simple, and may, as a rule, be expressed in a language comprehensible to everyone"

- "Everything should be as simple as it can be, yet no simpler"

Latin-spoken people errors

- Little focused, numerous detours /give an example: xxx, yyy, xxx/ vs concise, focused, monoverb sentences
- Long sentences are usually difficult to understand, use short sentences
- Quantity (numerous results) vs quality (1–3 results/idea)
- Impersonal writing (We see that..., we use two pulses...) vs personal (I, We, This study/figure etc.)
  - Who is "We"? Reader, author, developer of the system, user of the system, a part of the system (method, node etc.)?
  - "We can detect the signal peaks associated with the different responders reliably" -> "Signal peaks [...] can be detected reliably"
  - "if we know some collision-free samples alongside with the sample shaping"

Emphasising

- When you want to emphasize some point, better write the sentence so that the idea is emphasized, instead of writing a normal text and use italic
  - example: The simultaneity can be: *flow-level*, ... vs The simultaneity can appear at four levels: flow-level, ... In this sentence there is no need of italic, because the text/words themselves emphasize the four types.

- Avoid parentheses, which are considered as *additional* text to understand the previous idea, as if it was not well explained => better modify the sentence so that parenthesis are unnecessary
  - good example: "where E is the packet emission (sending) time, c the speed of light (i.e. 3 × 10 9 m/s), and ρ the density (number of neighbours)"
  - bad example:

Be professional, serious

- What do you think about: "The Alzheimer's disease is the worst disease people have, so we tackle this disease. Our method is the best, since it uses ..., which are the main causes of the disease"?
  - there are also COVID, cancer (33% of deaths??), car accidents implying young people (contrary to Alzheimer's) etc.

- When reading a paper, sometimes the reader has a sense of doubt
  - => the review, even if short, gives a bad mark to your paper, and you wonder why

- Avoid making the reader disagree with you
  - In a COVID paper: "As it is known, no vaccine has been created for COVID, which is a worse disease than H-42, and this paper proposes one vaccine" – is it important to compare with H-42?

- Look at your work from an upper level point of view, like readers (who have knowledge different than yours) do

Be professional, have an upper/global view of the problem

The emergence of the COVID-19 pandemic began urgent efforts worldwide to develop effective vaccines.
In this study, we present the development of a novel vaccine candidate targeting the SARS-CoV-2 virus. Utilizing cutting-edge nanovesicles and miRNA technology, not explored before, the vaccine induces a robust immune response against key viral antigens.
Preclinical studies demonstrate 98% efficacy in animal models, and promising safety results, with strong immunogenicity and tolerability. This vaccine holds great promise in the current effects to globally control COVID-19. Further clinical trials are proposed to assess its long-term efficacy and safety in diverse populations.

At the end of 2019, a new coronavirus called SARSCOV2 and causing COVID19 was identified in Wuhan province, China. Highly contagious, this virus spread rapidly and led to a global pandemic situation.
According to the WHO, X people worldwide have been infected with COVID19, X have died and X now have a permanent disability linked to the disease.
Effective preventive measures are therefore essential to counter the spread of the epidemic and reduce the disease's impact on the population.
Vaccination, which has been in use since x, has demonstrated its effectiveness in reducing mortality from many diseases.
In this study, we propose a method of vaccination xxx effective against SARSCOV2.
Materials and methods: We conducted a case-control study. Included xx patients aged from x to x.
Results: Population with vaccine / pop without : sequelaes / disease /deaths /
Discussion: To our knowledge, this is the first study that explores a vaccine (type) about SARSVO2. In the vaccinated patient population, we showed a % reduction in motality. Vaccinated patients rarely contracted the disease, and only % of them had sequelae.
Conclusion: public health benefits ++

are proposed: in the current article or as future works?

Examples with various problems

- See example-errors-paragraph

- See example-errors-carole.pdf

- See example-errors-abstract.pdf

Article submission

Secret, patent, or publication?

- (Industrial) secret: just never publish the idea and keep it secret, e.g. Coca-Cola
- Patent ("brevet"): if we are the first, exclusive licence for 20 years (afterwards it will be made public and free), but it will published in 1.5 years, e.g. GIF image format
  - goal: allow the inventor to get money for his idea, as an incentive to all to create new things
  - it is very costly
  - very rarely used by public researchers, but used by researchers from companies
- Publication: we want to make it public (and free to use)
  - published on Internet – researchers have doubts on it, because not reviewed ("tout et n'importe quoi")
  - reviewed publishing: in journals and conferences
  - in maths: arXiv and afterwards journal
  - google scholar searches scientific articles (even unpublished ones)

Journals and conferences

- In contrast to journals, conferences allow authors to:
    - present the article in front of other researchers (15') and answer their questions (5')
    - meet other researchers, discuss and establish contacts with them – relations are very important for visibility: common projects and work/publications, invitations for juries etc.
    - => a researcher could go abroad 1–4 times per year
    - conferences give yearly the *Best paper award* to 1–3 papers
    - you cannot revise your paper, it is a one shot "ball"
    - in computer science (and a few other disciplines) conferences are esteemed, some of them (with a small selection rate, 10–15%) more than journals

- Make a list of the journals and the conferences (with their annual deadline) in your topic, with their rank, so that you find easily where to submit your article (especially for your supervisors...)

Journals and conferences – reputation

For journals:

- Impact factor = average number of citations of each article in the journal for the last two years

- Journals with biggest IFs: Nature (40) and Sciences (30)

- SJR considers WHO cites too, and uses SCOPUS index
    - ISI index contains 11000 journals

- Problems:
    - IF greatly varies with the discipline; a solution: use quartiles: scimagojr is used in France
    - articles in the same journal have highly varied (contrasted) number of citations

For conferences in computer science:

- Ranking systems: Australia (CORE), Spain+Italy, Poland, Brazil

- France uses CORE: A*, A, B, C, unconsidered (+ unreferenced)

- Selection (acceptance) rate = number of articles accepted divided by number of submissions
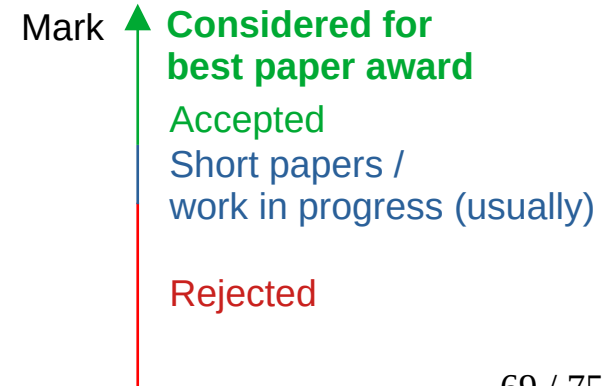   - e.g. a good conference has ≤30%

All the metrics are criticised

Decision process for journals

- The journal editor-in-chief receives the submission and delegates it to an editor
- The editor finds a few reviewers for it, see e-mail example TMC-2022-01-0091-Invitation-to-Review.pdf, asking them to write the review in 2–8 weeks
- The reviewers write a review and make a recommendation: accept, revise&resubmit, reject
- The editor / editor-in-chief, based on their reviews and recommendations, makes the decision
  - if resubmit, the editor contacts again the reviewers (or new reviewers) and so on

Decision process for conferences

- The conference chair(s) invite researchers (reconducted from previous years usually) to be in the TPC long time before submission period
  - best to have people from various countries and well known

- Sometimes, he shows them all the abstracts and let them choose the papers to review, otherwise papers are affected randomly

- Each review yields a mark from 2 to –2: accept, weak accept, neutral, weak reject, reject

- After reviewing, the system (edas, easychair etc.) shows the average of the overall scores of each paper, see example-chair-...pdf

- Based on them, the chair takes the decisions

Mark ↑ **Considered for best paper award**
Accepted
Short papers /
work in progress (usually)

Rejected

Reviews

- All articles are reviewed by researchers (*peer reviewing*) to decide whether to accept it or not

- Simple (authors do not know their reviewers) or double blind (+ reviewers do not know the authors)
  - (if a reviewer wants to, it is usually relatively easy to discover the authors)

- Evaluated on several criteria

- Reviewers write comments on the article and make the recommendation

Examples:

- Simple reviews: see ICM, UIC, and example-review (what sections has the reviewer read? The paper's idea is worthless)

- Serious reviews: see MTAP* files

- Having contrary reviews is normal, even for your feedbacks, Dijon 2023:
  - "Beaucoup d'exemples concrets", "il y a une interaction entre les étudiants et l'animateur" and "l'animateur a eu une approche pratique avec exercices et mises en situation"
  - "Pas assez d'interactions et de cas pratiques" and "pas assez intéractif notamment avec les autres doctorants"

If rejected article

- Do not be upset!!

- Improve your paper as much as you can based on reviewers' comments, and resubmit to another journal

- "In 90% of cases, the problem is not novelty, but novelty explanation!" (E. Lichtfouse)

If rejected article – example

Getting the TriScale work published
has been... complicated.

Rejected at

NSDI'20
SIGCOMM'20
SIGMETRICS'21
CCR'21

while receiving comments like

- Solid work with great tooling.
- Our community clearly has a problem with reproducibility and this paper presents very promissing solutions.
- Every PhD student should read this paper.

Criticism towards research

- Scientific articles are not applicable to reality, because their assumptions are unrealistic (e.g. model or formulas used are too simplistic) or unspecified
- Many of them have false/fake results (it might be hard to check by reviewer)
- A large part of articles are rarely cited (e.g. <5 times), are they useful?

Conclusions

- Idea, discovery, effective work is certainly very important, but:

- Authors must pay attention to writing style

- Bad style, bad science: many articles are rejected because of writing flaws, especially by high quality journals

- Le petit Nicolas en thèse

Reviewing this course

- What slides or parts of the course you found most important?

- What slides or parts can be removed or you did not understand?