How to review for MICCAI

15/16 March 2021

Thank you very much for reviewing for MICCAI!

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New in 2021

Reviews **will be made public**

> On the MICCAI website

> Only for accepted papers

> Including author responses/ rebuttal

> We will not disclose reviewer or meta-reviewer names

Authors were asked to fill out a **reproducibility checklist** during submission

Take into account -- and comment on -- reproducibility in your assessment

Today's tutorial

Stéphane Cotin - The role of the reviewer and reviewing ethics

Philippe Cattin - What makes a good (MICCAI) paper?

Nicolas Padoy - What makes a good review?

Marleen de Bruijne - Anonymity, general remarks, and MICCAI reviewing timeline

The role of the reviewer

- By reviewing you take part of a peer-review system
  - In this system you need to ensure rigorous standards which are key to the scientific process
  - You provide a professional courtesy to authors in your community
- As a reviewer you assess the quality* of the research
  - Provide feedback on the paper, suggest improvements and make a recommendation to the area chairs (ACs) about whether to accept or reject the article and why
  - The ultimate decision always rests with the Program Chairs but reviewers play a significant role in determining the outcome
- Reviewers evaluate papers based on multiple criteria
  - There is a common basis for these criteria shared with all scientific communications (e.g. ethics, quality, completeness and accuracy)
  - MICCAI brings additional requirements that you need to have in mind (e.g. clinical impact)

* by quality we mean scientific novelty, completeness, accuracy, reproducibility, ...

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Review ethics

- Avoid conflicts of interest and respect confidentiality
    - The MICCAI review process is confidential
    - Do not discuss the paper, or (meta-)reviews, with others
    - Certainly do not disclose names of authors / other reviewers / area chairs
    - Do not use the paper to develop your own ideas
- Take enough time
    - Reviewing is a time consuming task
    - In particular when the paper is not 100% in your area of expertise
    - But it is worth the effort: you are helping members of your community
- Be fair and transparent
    - Ask yourself how you would feel, as an author, if you received the review you are writing
    - Will you be fine once your review becomes public?
- Do not propose own publications to reference

What is a good Paper

- Is the topic of interest to the MICCAI community?
- Does it present innovative ideas?
- Is the evaluation sound? But remember: it is a <u>conference</u> paper.
- Is the paper reproducible?

Weighting between these 4 points is difficult.

Community

Reproducible

A+

Idea

Evaluation

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MIC Papers

- Topic of clinical significance
- Data collection, processing, methods clearly explained
- Authors report a sufficient number of performance measures
- Proper statistical analysis
- Significant contribution or just incremental
- Authors discuss limitations

CAI Papers

- Device or technology has potential clinical significance
- Demonstration of clinical feasibility even on a single subject/animal/phantom
- Novel MIC approach to solving a CAI need
- Proposal of a cost-effective approach
- Paper discusses the limitations of the proposed system

MIC vs CAI papers?

Should we evaluate MIC and CAI papers differently? No, but for CAI...

- do not expect a clinical evaluation on patients
- case numbers will be smaller
- comparing two CAI systems is more difficult than a direct comparison between two segmentation techniques
- ...

Review Form (1)

- Quick summary
    - Main contributions. What the authors have done, how and the results
    - For the AC. Also helps authors to verify that the reviewer has understood the approach & results
- Major strengths
    - What aspect is novel and why?
    - Novel formulation, demonstration of clinical feasibility, original way to use data, novel application, particularly strong evaluation, etc
- Major weaknesses
    - Reviewer's concerns about particular aspects of the paper
    - Provide **details**, eg. if a method is not novel, provide citations to prior work
- Clarity of presentation
    - It is important to know whether the paper is very clear and a pleasure to read, or whether it is hard to understand

Review Form (2)

- Reproducibility
  - Authors are encouraged to use open data or to make their data and code available
  - Not always possible: clear description of algo/params/dataset/evaluation is then highly valuable
  - Take the authors' answers to the reproducibility checklist into account
- Constructive comments
  - Help the authors to revise a weak paper or expand into a strong journal version
  - Back up comments by **detailed arguments**
- Your recommendation
  - Considering all points above, should this paper be presented at the conference?
    Is it an interesting contribution? Does it advance the field significantly? Is the paper of sufficiently high clinical impact to outweigh a lower degree of methodological innovation? Is novelty sufficiently high to outweigh a weaker evaluation?
  - **A paper would make a good contribution if you think others would want to read it**

Review Form (3)

- Justification of your recommendation
  - What were the major factors in making your assessment? How did you weigh the strengths and weaknesses?
  - Reasons for your overall recommendation to accept or reject need to be clear to the area chairs *and* authors
- Paper ranking in your review stack
  - Used to calibrate the overall rating. Try to avoid ties.
- Your expertise
  - If your expertise is limited to a particular aspect, bring it to the attention of the AC
- Confidential comment
  - Inform the Area Chairs about any potential concerns or issues

What makes a good review?

- Content that helps authors improve their work and Area Chairs make a decision on the inclusion of the paper in the program
- A review should judge the paper objectively
  - Be aware of bias (eg. if you know this field particularly well)
  - Read the literature if needed (learn from the paper)
  - Keep an open mind as many kinds of paper exist (basic proof of concept; experimental results…)
  - Assess paper as is (minor errors can be fixed, but major changes are not possible, no 2nd review)
- A review should be specific
  - Ban judgements without arguments. Critiques should be backed up with details
  - Strong supporting arguments are also needed for a paper for which you recommend acceptance
- A review should be polite and professional
  - Ban rude and sarcastic comments
  - Avoid using "you": can be perceived as confrontational. Use "the authors", "the paper" instead

Why make a good review?

- For the area chairs: to make a good/informed decision
- For the authors: to obtain fair evaluation + constructive feedback
- For the MICCAI community: to listen to and learn from an interesting program
- For your own reputation

- After a poor review
  - AC/PC will remember it (similarly if the review is late!)
  - Authors may feel unfairly treated or unwelcome
  - Attendees may waste their time

- If you expect a good review for your own paper, write good reviews too!

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Example of a Good Review (part 1)

- Summary: "Authors propose X, a new semantic and fully-convolutional segmentation architecture. X essentially is a U-Net with bi-directional recurrent skip connections. Compared to other recurrent U-Net architectures with gated RNN blocks, X uses existing layers and concat blocks and does not require any extra parameters. Authors validate the method on two segmentation tasks and one super-resolution task, outperforming baseline methods from literature and simpler architectures."

- Strength: "- Simplicity: X's main strength is that no extra parameters are required, since the recurrence is realized directly on the layers - Extendability: The method can be applied to already existing U-Net segmentation problems with minor changes to the model architecture. Even though this is not investigated in this work, an extension to 3D segmentation should be straightforward, as no extra parameters are required. The high number of network parameters in 3D makes the incorporation of additional gated RNN architectures (GRU LSTM) particulary "costly", while X would keep the model complexity constant."

- Weaknesses: "- Limited novelty: the proposed network appears like a special case of the previously proposed R-U-Net (Wang et al.), with l=0, without gates, and with a concat merging of the hidden layers/states. - Limited discussion of recurrence: in principle, authors realize a vanilla RNN directly on the hidden representations in the U-Net. Hence, training requires an unrolling of the X and backpropagation-through-time (BPTT) on the recurrence time steps, which may cause vanishing gradients (as in vanilla RNNs). Authors use very few timesteps (in this work, t=1/2/3). Larger temporal context, in combination with gating of units (as in GRU/LSTM) could further improve results, but to what degree this could be necessary/helpful, is not discussed here. - Limited comparison to state-of-the-art: Authors compare to R2-U-Net, but not to Wang et al. (R-U-Net) - No statistical evaluation of results: paired tests would give statistical weight to the argument of "superiority" of the proposed method."

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Example of a Good Review (part 2)

- Comments:

"Lack of clarity: - Better explanation of the training stage: it would help to have a clear separation of the training and test stage. The training stage should explain unrolling of the network architecture through time (ideally accompanied by a figure), and how training is performed. - #params: Authors claim that no extra parameters are required compared to a vanilla U-Net, however, the concatenation of decode features from the previous iteration with the current iteration's encode features (i.e. the reverse direction) causes larger feature maps, which require deeper convolutional filters (i.e. more channels in each filter) and hence more parameters. This increase may be negligible in a network with 15.0M parameters, but a brief clarification would be helpful (maybe I am still misunderstanding sth). [...]

For future work, I would recommend:
- Extension to 3D: the simplicity and compactness makes this approach particularly attractive for 3D segmentation.
- Explore performance on many more problems: X could be universally applicable, but here it is used on only a few tasks. I would strongly recommend to apply X to the medical image segmentation decathlon (http://medicaldecathlon.com/). I would not expect X to end up leading the board, but it would be interesting to see whether X can actually scale to a wide variety of tasks, and especially in higher dimension (i.e. perform at least as good as an equivalent 3D U-Net on all tasks). If so, this could become an attractive alternative architecture next to U-Net in future. [...] "

- Recommendation: "accept"

Example of an Unhelpful Review (#1)

- Summary: "This work proposed a [...] with [...] for extracting both the structural and functional connectivities from fmri data, it is very interesting work since a few works has been working on both the structural and functional connectivities patterns on this field. However, I would like to see the discussion of this work on how to expand to dynamic brain network on both the structural and functional patterns."
- Strength: "as above"
- Weaknesses: "as above"

- Recommendation: "accept"

- AC cannot use the review and make any decision without reading the paper

Example of an Unhelpful Review (#2)

- Summary: "This paper proposes a [...] to combine generic keypoint and CNN information into a single, highly efficient memory-based model for indexing and classifying generic 3D medical image data."
- Strength: "none"
- Weaknesses: "- no novelty according to a conference as MICCAI - no well written, so many English errors - only 1 expert on each dataset"

- Recommendation: "reject"

- Judgements are not supported by any arguments

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Anonymity and formatting

- MICCAI review process is **double blind**
- Miccai papers are max 8 pages+2 pages bibliography, LNCS style
- We removed papers with major issues [we may have missed some]
- Authors are allowed to upload their submitted papers on preprint servers (eg ArXiv)
- As a reviewer
  - **Remember, anonymization and formatting guidelines are a means to a fair review process, not an aim by themselves**
  - Notify your AC of major issues with the paper
  - Smaller issues (eg authors identity can be guessed from citations) are not a reason for rejection
  - Do not search for the paper on the internet
  - If you find out who the authors are, try not to let that influence you

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General remarks

- See [The MICCAI Review Process](#) and [Reviewer Guidelines](#)
- Make sure you receive emails from CMT (some institutes flag some of the emails as spam)
- All reviewer instructions are also posted on the website [miccai2021.org](#)

The MICCAI 2021 review timeline

- **March 19 - 25** Reviewers bid on papers
- **March 29** Papers assigned - check for issues and **confirm/decline acceptance within 2 days**
  - You were identified as one of the best reviewers for this paper. You probably bid for it too. Please use decline option sparingly, e.g. if
    - You guess the author identities and are/feel conflicted
    - The paper is too far outside your expertise
  - If you need to decline, do it within 48 hours. After that, *no response* will be registered as *confirmed*.

The MICCAI 2021 review timeline

- **March 19 - 25** Reviewers bid on papers
- **March 29** Papers assigned - check for issues and confirm/**decline acceptance within 2 days**
- **Mar 29 - April 20** Review period
  - Each paper handled by 1 Area Chair 3 reviewers
  - Contact your Area Chair (via CMT) in case of issues
- **After review:**
  - The Area Chair may contact you for clarification of your review
  - You can see other reviews and rebuttal
  - No formal discussion period
- **September**
  - For accepted papers, review, meta-review and author response **will be made public**

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Thank you for your important contribution to MICCAI 2021!