SCIENTIFIC ARTICLE WRITING GUIDELINE

Disclaimer: This is general guideline. It could be missing a few things or outlines more than what your research contains.

Submission: 10th January 2025.

Expected section: Introduction, Literature Review, Methodology and Results

- [Less than 300 words] The **Abstract** Section: This is a high-level summary written in 1 paragraph. You should cover the following in one or two sentence:
    - Background of your study
    - Research problem
    - Where and year the data was collected
    - Variable to studied
    - State the applied DS/ML models
    - Key results (e.g., most important parameters, best lag, best performing model, performance metrics scores/values, etc.)
    - Optimization approaches and results
    - Deployment and ease of use of the system by relevant stakeholders
    - Anticipated impact of your work on society
- [1.5 – 2.0 pages] The **Introduction** Section should
    - In 2-3 paragraphs, contextualize your problem from a broad to narrow/specific idea(s) of your research work. And state the global and local statistics. Cite your work properly!
    - Elaborate the research problem on the social/cultural/economic/etc perspectives and point to technology as a possible solution. The challenges could be inefficiencies, time constraints, inaccuracies, subjectivity, etc. Probably, you are not the 1st to identify the problem. It's good to discuss (cite your work properly!) how people are addressing with the same problem. And perhaps different and novel solutions should be investigated.
    - Walk us through how the research problem was solved using data science and machine learning techniques.
    - List at least 3 key contributions of your research work.
- [1.0 – 1.5 pages] The **Literature Review** Section should contain
    - Discuss at least 10 key DS/ML literature review articles, each in single paragraph.
    - From the articles, in less than 10 lines, your write up should give a brief background, data (variables, year, region, etc) studies, ML/DS solution, key results (e.g., most important parameters, best lag, best performing model, performance metrics scores, etc.), optimization, deployment, impact. Remember to cite your work properly!
    - Research gaps should be highlighted at the bottom of the literature review.

- [1.5 – 2.0 pages] The **Methodology** Section should contain
    - Data understanding: clearly stating the source of data, year collected, place/region where data was collected, data collection procedures, etc. Add citation where necessary!
    - Data cleaning/preprocessing: propose possible data cleaning remedies and clear reasons as to why (support by citing).
    - Exploratory data analytics
    - Feature Engineering/Selection [where applicable]
    - Machine learning modelling:
        - Data normalization/scaling.
        - Data splitting.
        - Describe/explain each (at least 3) algorithm/model in a paragraph. Model with their default parameters.
        - State why they were selected
        - How they were configured to ingest and adapt to your dataset.
    - Performance evaluation: propose appropriate metrics to evaluate the ML algorithms. Support by citing!
    - Optimize best performing model; hyperparameter tuning, etc.
    - Deployment: in detail describe deployment environments (e.g. web/mobile/desktop application) and the architecture.
    - Human and machine validation strategy (human outcome compared to machine outcomes).
- [2.5 – 3.5 pages] The **Results** Section.
    - Results should be an outline of the outcomes of your methodology.
    - The function of the Results section is to objectively present your key results (from your methodology), without interpretation, in an orderly and logical sequence using both text and illustrative materials (Tables and Figures).
    - The results section always begins with text, reporting the key results/trends/patterns and referring (using appropriate cross references) to your figures and tables below the text as you proceed.
    - Summaries of the statistical analyses may appear either in the text (usually parenthetically) or in the relevant Tables or Figures (in the legend or as footnotes to the Table or Figure).
    - The Results section should be organized around Tables and/or Figures that should be sequenced to present your key findings in a logical order.
    - The text of the Results section should be crafted to follow this sequence and highlight the evidence needed to answer the questions/hypotheses you investigated. o Important negative results should be reported, too. Authors usually write the text of the results section based upon the sequence of Tables and Figures.

- [1.5 – 2.0 pages] The **Discussion** Section.
    - The function of the Discussion is to interpret/explain your results (from the results section) in light of what was already known (in literature, that is why you need to support your finding by citing existing literature).
    - Back up interoperation with existing literature (by cite where appropriate) to support the observed trends.
- [Less than 200 words] The **Conclusion** Section:
    - This is a high-level summary of your work. Ideally one or two sentences:
        - Restate your research problem addressed in the introduction section.
        - Summarize your main arguments, important findings, and broader implications.
        - Restate key ideas to drive home the ultimate point of your research paper.
        - Provide a "take-home" message that you want the readers to remember about your study.
        - Recommend specific course(s) of action.
        - State the potential impact of your work.
- References
    - Have a list of the references.

Formatting:

- Latex (Overleaf) format: https://www.overleaf.com/latex/templates/elsevier-astronomyand-computing-journal-template/mrvsrqqqdkfr

Other resources:

- https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1005619
- https://www.elsevier.com/connect/11-steps-to-structuring-a-science-paper-editorswill-take-seriously

Sample articles to refer to:

- https://doi.org/10.3389/frai.2024.1403593
- https://doi.org/10.3390/insects14050479