Grading Rubric and Formatting Instructions for Imperial Coursework on Machine Learning (ImpCML 2024)

Firstname Lastname [1]

Abstract

This document provides a basic paper template and submission guidelines. Abstracts must be a single paragraph, ideally between 4–6 sentences long. Gross violations will trigger corrections at the camera-ready phase. This document contains both formatting and grading criteria.

1. Grading Rubric

The marks for this assignment are broken down as follows:

- **Writing Quality (5 marks):** The outline of a prototypical submission is given in the submission instructions. This evaluates the clarity, structure, and overall presentation of the submission. Proper grammar, use of technical language, and effective communication are essential.
- **Report Strength (10 marks):** These marks evaluate the overall quality of the written report in terms of its coherence and how well it achieves the stated goal of the project: refuting the arguments of the mock paper.
- **Valid Experimental Design (10 marks):** Students will be assessed on their ability to design sound and robust experiments. This includes appropriate controls, thoughtful consideration of hypotheses/variables, and effectiveness in addressing the research question.
- **Results Communication (10 marks):** This refers to how effectively the results are presented, including clear visualizations, well-explained findings, and proper interpretation of data. *Please ensure axes are labeled, units are quantified, and text in table and figures are no smaller than main body text.*
- **Results Quality (5 marks):** This evaluates the reliability and significance of the results obtained, ensuring that they are accurate, meaningful, and aligned with the research objectives.
- **Theoretical Analysis (5 marks):** Marks will be given for how well students provide a theoretical foundation for their work, linking concepts, models, or theorems to the experimental results and demonstrating a strong understanding of the underlying theory.
- **Sustainability Analysis (5 marks):** This criterion assesses how the student considers the sustainability or long-term implications of their proposed solution or research, including environmental, ethical, or societal impacts.

Accomplishing all of the base criteria will award students 50/60 marks (a grade $\approx 83\%$). The remaining 10 marks are can be earned by performing any additional analyses. More than 60 marks is not possible, and so only two of your additional analyses will be considered:

- **Multiple Models (5 marks):** The mock paper that you are responding to explores, in a very rudimentary way, the use of GLMs. Whatever model your group chooses to use in its primary experiments, an additional 5 marks can be earned by implementing a different learning model (note: different hyper-parameters do not count as a different model) and offering comparative experiments and discussion.
- **Results $n \geq 30$ (5 marks):** Students can earn bonus marks for achieving high accuracy (above the goals stated in the mock paper) on Kryptonite-30 and 45 and discussing what (if any) additional steps the students took to achieve accuracy on the more challenging variants. Note: be wary of overfitting, you accuracy is measured on the held-out examples for which you do not have ground-truth labels.
- **Strong Theoretical Analysis (5 marks):** The strong claim in the workshop paper you are responding to is theoretically not valid. Additional marks can be earned with a well thought-out theoretical discussion of why the paper's foundations are faulty.

[1]Department of Computing, Imperial College London, London, United Kingdom. Correspondence to: Firstname Lastname <first.last@imperial.ac.uk>, Eee Pppp <ep@eden.co.uk>.

Coursework. For review by instructors of Mathematics for Machine Learning (70015) . Do not distribute.

Objective	Marks
Writing Quality	5
Report Strength	10
Valid Experimental Design	10
Results Communication	10
Results Quality	5
Sustainability Analysis	5
Theoretical Analysis	5
Additional Objectives	10
Total	**60**

Additional Objectives	Marks
Multiple Models	5
Results $n \geq 30$	5
Strong Theory Discussion	5
Strong Sustainability	5
Calibrated Uncertainty	5

- **Exceptional Sustainability Analysis (5 marks):** Additional objective credit will be given for going beyond the basic sustainability analysis by providing deeper insights into the long-term societal, ethical, and environmental implications of the work. This includes creative or novel approaches to addressing sustainability concerns.
- **Calibrated Uncertainty (5 marks):** Marks will be awarded for incorporating and quantifying predictive uncertainty in the results. This could include Bayesian inference, ensemble methods, or other methods that accurately reflect the uncertainty in the model or experimental outcomes. Note to students: predictive uncertainty is covered primarily in our 10th lecture, so this is an objective that will be best understood towards the end of the assignment.

2. Electronic Submission

Submission to ImpCML 2024 will be entirely electronic, via a web site (not email). Information about the submission process is in the document. Up-to-date deadline information will be on scientia:

http://www.scientia.com/

The guidelines below will be enforced for initial submissions and camera-ready copies. Here is a brief summary:

- Submissions must be in PDF.
- Submitted papers can be between three and six pages long, not including references, plus unlimited space for references and appendices. Using this template will allow you to conform to the submission standards, specifically:
- Your paper should be in **10 point Times font**.
- Make sure your PDF file only uses Type-1 fonts.
- Place figure captions *under* the figure (and omit titles from inside the graphic file itself). Place table captions *over* the table.
- Do not alter the style template; in particular, do not compress the paper format by reducing the vertical spaces.
- Keep your abstract brief and self-contained, one paragraph and roughly 4–6 sentences. Gross violations will require correction at the camera-ready phase. The title should have content words capitalized.

2.1. Submitting Papers

Paper Deadline: The deadline for paper submission that is advertised on the Scientia is strict.

Authors must provide their manuscripts in **PDF** format. Furthermore, please make sure that files contain only embedded Type-1 fonts (e.g., using the program `pdffonts` in linux or using File/DocumentProperties/Fonts in Acrobat). Other fonts (like Type-3) might come from graphics files imported into the document.

Authors using **Word** must convert their document to PDF. Most of the latest versions of Word have the facility to do this automatically. Submissions will not be accepted in Word format or any format other than PDF. Really. We're not joking. Don't send Word.

Those who use LaTeX should avoid including Type-3 fonts. Those using `latex` and `dvips` may need the following two commands:

```
dvips -Ppdf -tletter -G0 -o paper.ps paper.dvi
ps2pdf paper.ps
```

It is a zero following the "-G", which tells dvips to use the config.pdf file. Newer TeX distributions don't always need this option.

Using `pdflatex` rather than `latex`, often gives better results. This program avoids the Type-3 font problem, and supports more advanced features in the `microtype` package.

Graphics files should be a reasonable size, and included from an appropriate format. Use vector formats (.eps/.pdf) for plots, lossless bitmap formats (.png) for raster graphics with sharp lines, and jpeg for photo-like images.

3. Format of the Paper

All submissions must follow the specified format.

3.1. Dimensions

The text of the paper should be formatted in two columns, with an overall width of 6.75 inches, height of 9.0 inches, and 0.25 inches between the columns. The left margin should be 0.75 inches and the top margin 1.0 inch (2.54 cm). The right and bottom margins will depend on whether you print on US letter or A4 paper, but all final versions must be produced for US letter size.

The paper body should be set in 10 point type with a vertical spacing of 11 points. Please use Times typeface throughout the text.

3.2. Title

The paper title should be set in 14 point bold type and centered between two horizontal rules that are 1 point thick, with 1.0 inch between the top rule and the top edge of the page. Capitalize the first letter of content words and put the rest of the title in lower case.

3.3. Abstract

The paper abstract should begin in the left column, 0.4 inches below the final address. The heading 'Abstract' should be centered, bold, and in 11 point type. The abstract body should use 10 point type, with a vertical spacing of 11 points, and should be indented 0.25 inches more than normal on left-hand and right-hand margins. Insert 0.4 inches of blank space after the body. Keep your abstract brief and self-contained, limiting it to one paragraph and roughly 4–6 sentences. Gross violations will require correction at the camera-ready phase.

3.4. Partitioning the Text

You should organize your paper into sections and paragraphs to help readers place a structure on the material and understand its contributions.

3.4.1. Sections and Subsections

Section headings should be numbered, flush left, and set in 11 pt bold type with the content words capitalized. Leave 0.25 inches of space before the heading and 0.15 inches after the heading.

Similarly, subsection headings should be numbered, flush left, and set in 10 pt bold type with the content words capitalized. Leave 0.2 inches of space before the heading and 0.13 inches afterward.

Finally, subsubsection headings should be numbered, flush left, and set in 10 pt small caps with the content words capitalized. Leave 0.18 inches of space before the heading and 0.1 inches after the heading.

Please use no more than three levels of headings.

3.4.2. Paragraphs and Footnotes

Within each section or subsection, you should further partition the paper into paragraphs. Do not indent the first line of a given paragraph, but insert a blank line between succeeding ones.

You can use footnotes[1] to provide readers with additional information about a topic without interrupting the flow of the paper. Indicate footnotes with a number in the text where the point is most relevant. Place the footnote in 9 point type at the bottom of the column in which it appears. Precede the first footnote in a column with a horizontal rule of 0.8 inches.[2]

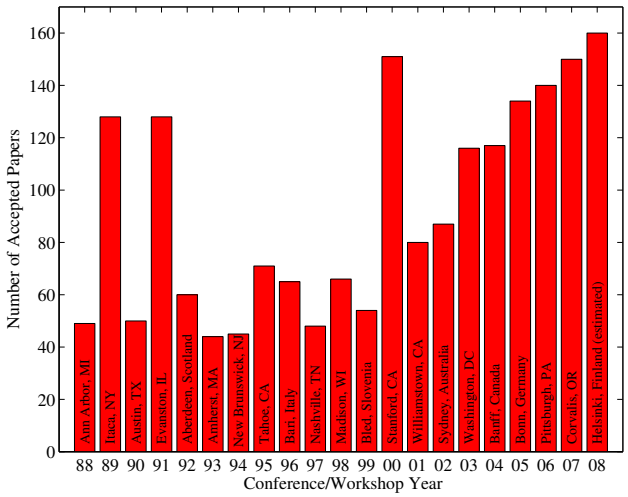

Figure 1. Historical locations and number of accepted papers for International Machine Learning Conferences (ICML 1993 – ICML 2008) and International Workshops on Machine Learning (ML 1988 – ML 1992). At the time this figure was produced, the number of accepted papers for ICML 2008 was unknown and instead estimated.

3.5. Figures

You may want to include figures in the paper to illustrate your approach and results. Such artwork should be centered, legible, and separated from the text. Lines should be dark and at least 0.5 points thick for purposes of reproduction,

[1] Footnotes should be complete sentences.

[2] Multiple footnotes can appear in each column, in the same order as they appear in the text, but spread them across columns and pages if possible.

Algorithm 1 Bubble Sort

Input: data x_i, size m
repeat
  Initialize $noChange = true$.
  for $i = 1$ **to** $m - 1$ **do**
    if $x_i > x_{i+1}$ **then**
      Swap x_i and x_{i+1}
      $noChange = false$
    end if
  end for
until $noChange$ is $true$

and text should not appear on a gray background.

Label all distinct components of each figure. If the figure takes the form of a graph, then give a name for each axis and include a legend that briefly describes each curve. Do not include a title inside the figure; instead, the caption should serve this function.

Number figures sequentially, placing the figure number and caption *after* the graphics, with at least 0.1 inches of space before the caption and 0.1 inches after it, as in Figure 1. The figure caption should be set in 9 point type and centered unless it runs two or more lines, in which case it should be flush left. You may float figures to the top or bottom of a column, and you may set wide figures across both columns (use the environment `figure*` in LaTeX). Always place two-column figures at the top or bottom of the page.

3.6. Algorithms

If you are using LaTeX, please use the "algorithm" and "algorithmic" environments to format pseudocode. These require the corresponding stylefiles, algorithm.sty and algorithmic.sty, which are supplied with this package. Algorithm 1 shows an example.

3.7. Tables

You may also want to include tables that summarize material. Like figures, these should be centered, legible, and numbered consecutively. However, place the title *above* the table with at least 0.1 inches of space before the title and the same after it, as in Table 1. The table title should be set in 9 point type and centered unless it runs two or more lines, in which case it should be flush left.

Tables contain textual material, whereas figures contain graphical material. Specify the contents of each row and column in the table's topmost row. Again, you may float tables to a column's top or bottom, and set wide tables across both columns. Place two-column tables at the top or bottom of the page.

Table 1. Classification accuracies for naive Bayes and flexible Bayes on various data sets.

DATA SET	NAIVE	FLEXIBLE	BETTER?
BREAST	95.9± 0.2	96.7± 0.2	√
CLEVELAND	83.3± 0.6	80.0± 0.6	×
GLASS2	61.9± 1.4	83.8± 0.7	√
CREDIT	74.8± 0.5	78.3± 0.6	
HORSE	73.3± 0.9	69.7± 1.0	×
META	67.1± 0.6	76.5± 0.5	√
PIMA	75.1± 0.6	73.9± 0.5	
VEHICLE	44.9± 0.6	61.5± 0.4	√

3.8. Citations and References

Please use APA reference format regardless of your formatter or word processor. If you rely on the LaTeX bibliographic facility, use `natbib.sty` and `icml2021.bst` included in the style-file package to obtain this format.

Citations within the text should include the authors' last names and year. If the authors' names are included in the sentence, place only the year in parentheses, for example when referencing Arthur Samuel's pioneering work (1959). Otherwise place the entire reference in parentheses with the authors and year separated by a comma (Samuel, 1959). List multiple references separated by semicolons (Kearns, 1989; Samuel, 1959; Mitchell, 1980). Use the 'et al.' construct only for citations with three or more authors or after listing all authors to a publication in an earlier reference (Michalski et al., 1983).Authors should cite their own work in the third person in the initial version of their paper submitted for blind review.

Use an unnumbered first-level section heading for the references, and use a hanging indent style, with the first line of the reference flush against the left margin and subsequent lines indented by 10 points. The references at the end of this document give examples for journal articles (Samuel, 1959), conference publications (Langley, 2000), book chapters (Newell & Rosenbloom, 1981), books (Duda et al., 2000), edited volumes (Michalski et al., 1983), technical reports (Mitchell, 1980), and dissertations (Kearns, 1989).

Alphabetize references by the surnames of the first authors, with single author entries preceding multiple author entries. Order references for the same authors by year of publication, with the earliest first. Make sure that each reference includes all relevant information (e.g., page numbers).

Please put some effort into making references complete, presentable, and consistent. If using bibtex, please protect capital letters of names and abbreviations in titles, for example, use {B}ayesian or {L}ipschitz in your .bib file.

4. Software and Data

Importantly, all submissions must be accompanied by a GitLab hash containing the source code to reproduce all experiments in the paper. These will be manually checked by reviewers. If the grader cannot run the provided code or not all experiments are reproduced this will reduce marks from the experimental design and experimental communication sections. Additionally, if the code is missing entirely or deviates substantially from what is reported this can result in a 0 for valid experimental design. Finally, if reported results are found to be entirely fabricated the group will receive a 0 on the entire coursework and College academic honesty policies will be followed.

References

Duda, R. O., Hart, P. E., and Stork, D. G. *Pattern Classification*. John Wiley and Sons, 2nd edition, 2000.

Kearns, M. J. *Computational Complexity of Machine Learning*. PhD thesis, Department of Computer Science, Harvard University, 1989.

Langley, P. Crafting papers on machine learning. In Langley, P. (ed.), *Proceedings of the 17th International Conference on Machine Learning (ICML 2000)*, pp. 1207–1216, Stanford, CA, 2000. Morgan Kaufmann.

Michalski, R. S., Carbonell, J. G., and Mitchell, T. M. (eds.). *Machine Learning: An Artificial Intelligence Approach, Vol. I*. Tioga, Palo Alto, CA, 1983.

Mitchell, T. M. The need for biases in learning generalizations. Technical report, Computer Science Department, Rutgers University, New Brunswick, MA, 1980.

Newell, A. and Rosenbloom, P. S. Mechanisms of skill acquisition and the law of practice. In Anderson, J. R. (ed.), *Cognitive Skills and Their Acquisition*, chapter 1, pp. 1–51. Lawrence Erlbaum Associates, Inc., Hillsdale, NJ, 1981.

Samuel, A. L. Some studies in machine learning using the game of checkers. *IBM Journal of Research and Development*, 3(3):211–229, 1959.

A. Do have an appendix here

Feel free to put content after the references. Feel free to add appendices to your submissions, but be aware the markers are ***not*** required to consider appendicies as part of the marks for your work.