
Reinforcement Learning Algorithm Comparisons For The Game Of Reversi

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Abstract

1 The abstract paragraph should be indented 1/2 inch (3 picas) on both the left- and
2 right-hand margins. Use 10 point type, with a vertical spacing (leading) of 11 points.
3 The word **Abstract** must be centered, bold, and in point size 12. Two line spaces
4 precede the abstract. The abstract must be limited to one paragraph.

5 1 Submission of papers to NeurIPS 2023

6 Please read the instructions below carefully and follow them faithfully. **Important:** This year the
7 checklist will be submitted separately from the main paper in OpenReview, please review it well
8 ahead of the submission deadline: <https://neurips.cc/public/guides/PaperChecklist>.

9 1.1 Style

10 Papers to be submitted to NeurIPS 2023 must be prepared according to the instructions presented
11 here. Papers may only be up to **nine** pages long, including figures. Additional pages *containing only*
12 *acknowledgments and references* are allowed. Papers that exceed the page limit will not be reviewed,
13 or in any other way considered for presentation at the conference.

14 The margins in 2023 are the same as those in previous years.

15 Authors are required to use the NeurIPS L^AT_EX style files obtainable at the NeurIPS website as
16 indicated below. Please make sure you use the current files and not previous versions. Tweaking the
17 style files may be grounds for rejection.

18 1.2 Retrieval of style files

19 The style files for NeurIPS and other conference information are available on the website at

20 <http://www.neurips.cc/>

21 The file `neurips_2023.pdf` contains these instructions and illustrates the various formatting re-
22 quirements your NeurIPS paper must satisfy.

23 The only supported style file for NeurIPS 2023 is `neurips_2023.sty`, rewritten for L^AT_EX 2_ε.
24 **Previous style files for L^AT_EX 2.09, Microsoft Word, and RTF are no longer supported!**

25 The L^AT_EX style file contains three optional arguments: `final`, which creates a camera-ready copy,
26 `preprint`, which creates a preprint for submission to, e.g., arXiv, and `nonatbib`, which will not
27 load the `natbib` package for you in case of package clash.

28 **Preprint option** If you wish to post a preprint of your work online, e.g., on arXiv, using the
29 NeurIPS style, please use the `preprint` option. This will create a nonanonymized version of your

work with the text “Preprint. Work in progress.” in the footer. This version may be distributed as you see fit, as long as you do not say which conference it was submitted to. Please **do not** use the `final` option, which should **only** be used for papers accepted to NeurIPS.

At submission time, please omit the `final` and `preprint` options. This will anonymize your submission and add line numbers to aid review. Please do *not* refer to these line numbers in your paper as they will be removed during generation of camera-ready copies.

The file `neurips_2023.tex` may be used as a “shell” for writing your paper. All you have to do is replace the author, title, abstract, and text of the paper with your own.

The formatting instructions contained in these style files are summarized in Sections 2, 3, and 4 below.

2 General formatting instructions

The text must be confined within a rectangle 5.5 inches (33 picas) wide and 9 inches (54 picas) long. The left margin is 1.5 inch (9 picas). Use 10 point type with a vertical spacing (leading) of 11 points. Times New Roman is the preferred typeface throughout, and will be selected for you by default. Paragraphs are separated by $\frac{1}{2}$ line space (5.5 points), with no indentation.

The paper title should be 17 point, initial caps/lower case, bold, centered between two horizontal rules. The top rule should be 4 points thick and the bottom rule should be 1 point thick. Allow $\frac{1}{4}$ inch space above and below the title to rules. All pages should start at 1 inch (6 picas) from the top of the page.

For the final version, authors’ names are set in boldface, and each name is centered above the corresponding address. The lead author’s name is to be listed first (left-most), and the co-authors’ names (if different address) are set to follow. If there is only one co-author, list both author and co-author side by side.

Please pay special attention to the instructions in Section 4 regarding figures, tables, acknowledgments, and references.

3 Headings: first level

All headings should be lower case (except for first word and proper nouns), flush left, and bold.

First-level headings should be in 12-point type.

3.1 Headings: second level

Second-level headings should be in 10-point type.

3.1.1 Headings: third level

Third-level headings should be in 10-point type.

Paragraphs There is also a `\paragraph` command available, which sets the heading in bold, flush left, and inline with the text, with the heading followed by 1 em of space.

4 Citations, figures, tables, references

These instructions apply to everyone.

4.1 Citations within the text

The `natbib` package will be loaded for you by default. Citations may be author/year or numeric, as long as you maintain internal consistency. As to the format of the references themselves, any style is acceptable as long as it is used consistently.



Figure 1: Sample figure caption.

70 The documentation for natbib may be found at

71 `http://mirrors.ctan.org/macros/latex/contrib/natbib/natnotes.pdf`

72 Of note is the command `\citet`, which produces citations appropriate for use in inline text. For
73 example,

74 `\citet{hasselmo}` investigated\dotso

75 produces

76 Hasselmo, et al. (1995) investigated...

77 If you wish to load the natbib package with options, you may add the following before loading the
78 neurips_2023 package:

79 `\PassOptionsToPackage{options}{natbib}`

80 If natbib clashes with another package you load, you can add the optional argument nonatbib
81 when loading the style file:

82 `\usepackage[nonatbib]{neurips_2023}`

83 As submission is double blind, refer to your own published work in the third person. That is, use “In
84 the previous work of Jones et al. [4],” not “In our previous work [4].” If you cite your other papers
85 that are not widely available (e.g., a journal paper under review), use anonymous author names in the
86 citation, e.g., an author of the form “A. Anonymous” and include a copy of the anonymized paper in
87 the supplementary material.

88 4.2 Footnotes

89 Footnotes should be used sparingly. If you do require a footnote, indicate footnotes with a number¹
90 in the text. Place the footnotes at the bottom of the page on which they appear. Precede the footnote
91 with a horizontal rule of 2 inches (12 picas).

92 Note that footnotes are properly typeset *after* punctuation marks.²

93 4.3 Figures

94 All artwork must be neat, clean, and legible. Lines should be dark enough for purposes of reproduction.
95 The figure number and caption always appear after the figure. Place one line space before the figure
96 caption and one line space after the figure. The figure caption should be lower case (except for first
97 word and proper nouns); figures are numbered consecutively.

98 You may use color figures. However, it is best for the figure captions and the paper body to be legible
99 if the paper is printed in either black/white or in color.

¹Sample of the first footnote.

²As in this example.

Table 1: Sample table title

Part		
Name	Description	Size (μm)
Dendrite	Input terminal	~ 100
Axon	Output terminal	~ 10
Soma	Cell body	up to 10^6

100 4.4 Tables

101 All tables must be centered, neat, clean and legible. The table number and title always appear before
102 the table. See Table 1.

103 Place one line space before the table title, one line space after the table title, and one line space after
104 the table. The table title must be lower case (except for first word and proper nouns); tables are
105 numbered consecutively.

106 Note that publication-quality tables *do not contain vertical rules*. We strongly suggest the use of the
107 booktabs package, which allows for typesetting high-quality, professional tables:

108 <https://www.ctan.org/pkg/booktabs>

109 This package was used to typeset Table 1.

110 4.5 Math

111 Note that display math in bare TeX commands will not create correct line numbers for sub-
112 mission. Please use LaTeX (or AMSTeX) commands for unnumbered display math. (You
113 really shouldn't be using \$\$ anyway; see [https://tex.stackexchange.com/questions/](https://tex.stackexchange.com/questions/503/why-is-preferable-to)
114 [503/why-is-preferable-to](https://tex.stackexchange.com/questions/503/why-is-preferable-to) and [https://tex.stackexchange.com/questions/40492/](https://tex.stackexchange.com/questions/40492/what-are-the-differences-between-align-equation-and-displaymath)
115 [what-are-the-differences-between-align-equation-and-displaymath](https://tex.stackexchange.com/questions/40492/what-are-the-differences-between-align-equation-and-displaymath) for more infor-
116 mation.)

117 4.6 Final instructions

118 Do not change any aspects of the formatting parameters in the style files. In particular, do not modify
119 the width or length of the rectangle the text should fit into, and do not change font sizes (except
120 perhaps in the **References** section; see below). Please note that pages should be numbered.

121 5 Preparing PDF files

122 Please prepare submission files with paper size "US Letter," and not, for example, "A4."

123 Fonts were the main cause of problems in the past years. Your PDF file must only contain Type 1 or
124 Embedded TrueType fonts. Here are a few instructions to achieve this.

- 125 • You should directly generate PDF files using `pdflatex`.
- 126 • You can check which fonts a PDF files uses. In Acrobat Reader, select the menu
127 Files>Document Properties>Fonts and select Show All Fonts. You can also use the program
128 `pdf fonts` which comes with `xpdf` and is available out-of-the-box on most Linux machines.
- 129 • `xfig` "patterned" shapes are implemented with bitmap fonts. Use "solid" shapes instead.
- 130 • The `\bbold` package almost always uses bitmap fonts. You should use the equivalent AMS
131 Fonts:

132 `\usepackage{amsfonts}`

133 followed by, e.g., `\mathbb{R}`, `\mathbb{N}`, or `\mathbb{C}` for \mathbb{R} , \mathbb{N} or \mathbb{C} . You can also
134 use the following workaround for reals, natural and complex:

```

135 \newcommand{\RR}{\mathbb{R}} %real numbers
136 \newcommand{\Nat}{\mathbb{N}} %natural numbers
137 \newcommand{\CC}{\mathbb{C}} %complex numbers

```

138 Note that `amsfonts` is automatically loaded by the `amssymb` package.

139 If your file contains type 3 fonts or non embedded TrueType fonts, we will ask you to fix it.

140 5.1 Margins in L^AT_EX

141 Most of the margin problems come from figures positioned by hand using `\special` or other
 142 commands. We suggest using the command `\includegraphics` from the `graphicx` package.
 143 Always specify the figure width as a multiple of the line width as in the example below:

```

144 \usepackage[pdftex]{graphicx} ...
145 \includegraphics[width=0.8\linewidth]{myfile.pdf}

```

146 See Section 4.4 in the graphics bundle documentation ([http://mirrors.ctan.org/macros/](http://mirrors.ctan.org/macros/latex/required/graphics/grfguide.pdf)
 147 [latex/required/graphics/grfguide.pdf](http://mirrors.ctan.org/macros/latex/required/graphics/grfguide.pdf))

148 A number of width problems arise when L^AT_EX cannot properly hyphenate a line. Please give LaTeX
 149 hyphenation hints using the `\-` command when necessary.

150 6 Supplementary Material

151 Authors may wish to optionally include extra information (complete proofs, additional experiments
 152 and plots) in the appendix. All such materials should be part of the supplemental material (submitted
 153 separately) and should NOT be included in the main submission.

154 References

155 References follow the acknowledgments in the camera-ready paper. Use unnumbered first-level
 156 heading for the references. Any choice of citation style is acceptable as long as you are consistent. It
 157 is permissible to reduce the font size to `small` (9 point) when listing the references. Note that the
 158 Reference section does not count towards the page limit.

- 159 [1] Alexander, J.A. & Mozer, M.C. (1995) Template-based algorithms for connectionist rule extraction. In
 160 G. Tesauro, D.S. Touretzky and T.K. Leen (eds.), *Advances in Neural Information Processing Systems 7*, pp.
 161 609–616. Cambridge, MA: MIT Press.
- 162 [2] Bower, J.M. & Beeman, D. (1995) *The Book of GENESIS: Exploring Realistic Neural Models with the*
 163 *GENeral NEural Simulation System*. New York: TELOS/Springer-Verlag.
- 164 [3] Hasselmo, M.E., Schnell, E. & Barkai, E. (1995) Dynamics of learning and recall at excitatory recurrent
 165 synapses and cholinergic modulation in rat hippocampal region CA3. *Journal of Neuroscience* **15**(7):5249-5262.