
Generalized Linear Bandits revisited

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Abstract

Previous work on generalized linear bandit (GLB) suggested that algorithms based on optimism can achieve a \sqrt{T} -regret analogous to the linear bandit setting. We argue however, that these results are rather asymptotic results, as they include generally huge constants that might even be a priori unknown. Our novel lower bound for GLB proves that these constants are not mere artifacts of the analysis, but that the regret might be as large as $\Omega(\frac{1}{2} + \frac{d-1}{2d+6})$. We prove that this lower bound has a matching upper bound up to log factors on a finite time setting with unit ball arms.

1 GENERAL FORMATTING INSTRUCTIONS

Both submitted and camera-ready versions of the paper are 8 pages, plus any additional pages needed for references.

Papers are in 2 columns with the overall line width of 6.75 inches (41 picas). Each column is 3.25 inches wide (19.5 picas). The space between the columns is .25 inches wide (1.5 picas). The left margin is 1 inch (6 picas). Use 10 point type with a vertical spacing of 11 points.

Paper title is 16 point, caps/lc, bold, centered between 2 horizontal rules. Top rule is 4 points thick and bottom rule is 1 point thick. Allow 1/4 inch space above and below title to rules.

Author descriptions are center-justified, initial caps. The lead author is to be listed first (left-most), and the Co-authors are set to follow. If up to three authors, use a single row of author descriptions, each

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one center-justified, and all set side by side; with more authors or unusually long names or institutions, use more rows. (But, do not include author names in the initial double-blind submission! Instead leave a row of “Anonymous Author” descriptions as above.)

Use one-half line space between paragraphs, with no indent.

2 FIRST LEVEL HEADINGS

First level headings are all caps, flush left, bold, and in point size 12. Use one line space before the first level heading and one-half line space after the first level heading.

2.1 Second Level Heading

Second level headings are initial caps, flush left, bold, and in point size 10. Use one line space before the second level heading and one-half line space after the second level heading.

2.1.1 Third Level Heading

Third level headings are flush left, initial caps, bold, and in point size 10. Use one line space before the third level heading and one-half line space after the third level heading.

Fourth Level Heading Fourth level headings must be flush left, initial caps, bold, and Roman type. Use one line space before the fourth level heading, and place the section text immediately after the heading with no line break, but an 11 point horizontal space.

2.2 CITATIONS, FIGURES, REFERENCES

2.2.1 Citations in Text

Citations within the text should include the author’s last name and year, e.g., (Cheesman, 1985). References should follow any style that you are used to using, as long as their style is consistent throughout the paper. Be sure that the sentence reads correctly if the citation is deleted: e.g., instead of “As described

by (Cheesman, 1985), we first frobulate the widgets,” write “As described by Cheesman (1985), we first frobulate the widgets.” Be sure to avoid accidentally disclosing author identities through citations.

2.2.2 Footnotes

Indicate footnotes with a number¹ in the text. Use 8 point type for footnotes. Place the footnotes at the bottom of the column in which their markers appear, continuing to the next column if required. Precede the footnote section of a column with a 0.5 point horizontal rule 1 inch (6 picas) long.²

2.2.3 Figures

All artwork must be centered, neat, clean, and legible. All lines should be very dark for purposes of reproduction, and art work should not be hand-drawn. Figures may appear at the top of a column, at the top of a page spanning multiple columns, inline within a column, or with text wrapped around them, but the figure number and caption always appear immediately below the figure. Leave 2 line spaces between the figure and the caption. The figure caption is initial caps and each figure should be numbered consecutively.

Make sure that the figure caption does not get separated from the figure. Leave extra white space at the bottom of the page rather than splitting the figure and figure caption.

This figure intentionally left non-blank

Figure 1: Sample Figure Caption

2.2.4 Tables

All tables must be centered, neat, clean, and legible. Do not use hand-drawn tables. Table number and title always appear above the table. See Table ??.

Use one line space before the table title, one line space after the table title, and one line space after the table. The table title must be initial caps and each table numbered consecutively.

3 SUPPLEMENTARY MATERIAL

If you need to include additional appendices during submission, you can include them in the supplement-

¹Sample of the first footnote.

²Sample of the second footnote.

Table 1: Sample Table Title

PART	DESCRIPTION
Dendrite	Input terminal
Axon	Output terminal
Soma	Cell body (contains cell nucleus)

tary material file.

4 INSTRUCTIONS FOR CAMERA-READY PAPERS

For the camera-ready paper, if you are using L^AT_EX, please make sure that you follow these instructions. (If you are not using L^AT_EX, please make sure to achieve the same effect using your chosen typesetting package.)

1. Download `fancyhdr.sty` – the `aistats2017.sty` file will make use of it.
2. Begin your document with

```
\documentclass[twoside]{article}
\usepackage[accepted]{aistats2017}
```

The `twoside` option for the class `article` allows the package `fancyhdr.sty` to include headings for even and odd numbered pages. The option `accepted` for the package `aistats2017.sty` will write a copyright notice at the end of the first column of the first page. This option will also print headings for the paper. For the *even* pages, the title of the paper will be used as heading and for *odd* pages the author names will be used as heading. If the title of the paper is too long or the number of authors is too large, the style will print a warning message as heading. If this happens additional commands can be used to place as headings shorter versions of the title and the author names. This is explained in the next point.

3. If you get warning messages as described above, then immediately after `\begin{document}`, write

```
\runningtitle{Provide here an alternative
shorter version of the title of your
paper}
\runningauthor{Provide here the surnames
of the authors of your paper, all
separated by commas}
```

Note that the text that appears as argument in `\runningtitle` will be printed as a heading in the *even* pages. The text that appears as argument in `\runningauthor` will be printed as a heading in the *odd* pages. If even the author surnames do not fit, it is acceptable to give a subset of author names followed by “et al.”

4. Use the file `sample_paper.tex` as an example.
5. Both submitted and camera-ready versions of the paper are 8 pages, plus any additional pages needed for references.

6. If you need to include additional appendices, you can include them in the supplementary material file.
7. Please, don’t change the layout given by the above instructions and by the style file.

Acknowledgements

Use unnumbered third level headings for the acknowledgements. All acknowledgements go at the end of the paper. Be sure to omit any identifying information in the initial double-blind submission!

References

References follow the acknowledgements. Use an unnumbered third level heading for the references section. Any choice of citation style is acceptable as long as you are consistent. Please use the same font size for references as for the body of the paper—remember that references do not count against your page length total.

J. Alspector, B. Gupta, and R. B. Allen (1989). Performance of a stochastic learning microchip. In D. S. Touretzky (ed.), *Advances in Neural Information Processing Systems 1*, 748-760. San Mateo, Calif.: Morgan Kaufmann.

F. Rosenblatt (1962). *Principles of Neurodynamics*. Washington, D.C.: Spartan Books.

G. Tesauro (1989). Neurogammon wins computer Olympiad. *Neural Computation* 1(3):321-323.