

Qrlew: automatic differential privacy for SQL queries

Anonymous submission

Abstract

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Useful links

PPAI

Last year papers: <https://aaai-ppai23.github.io/#sp2> This year program: <https://ppai-workshop.github.io/>

Comparable open-source projects

- Paszke et al. 2017 - Automatic differentiation in PyTorch <https://openreview.net/pdf?id=BJJsrmfCZ>
- Frostig et al. 2018 - Compiling machine learning programs via high-level tracing <https://mlsys.org/Conferences/2019/doc/2018/146.pdf>

Comparable DP SQL papers

- Berghel et al. 2022 - Tumult Analytics: a robust, easy-to-use, scalable, and expressive framework for differential privacy (Berghel et al. 2022)
- Garrido et al. 2022 - Lessons Learned: Surveying the Practicality of Differential Privacy in the Industry (Garrido et al. 2022)
- Wilson et al. 2019 - Differentially Private SQL with Bounded User Contribution (Wilson et al. 2019)
- Johnson et al. 2018 - Towards Practical Differential Privacy for SQL Queries (Johnson, Near, and Song 2018)

Introduction

Motivation DP Solutions existantes Problème non résolu et nécessité de Qrlew

Preparing an Anonymous Submission

This document details the formatting requirements for anonymous submissions. The requirements are the same as for camera ready papers but with a few notable differences:

- Anonymous submissions must not include the author names and affiliations. Write “Anonymous Submission” as the “sole author” and leave the affiliations empty.

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- References must be anonymized whenever the reader can infer that they are to the authors’ previous work.
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- Only the PDF version is required at this stage. No source versions will be requested, nor any copyright transfer form.

You can achieve all of the above by enabling the submission option when loading the `aaai24` package:

```
\documentclass[letterpaper]{article}
\usepackage[submission]{aaai24}
```

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Camera-Ready Guidelines

Congratulations on having a paper selected for inclusion in an AAAI Press proceedings or technical report! This document details the requirements necessary to get your accepted paper published using PDFLATEX . If you are using Microsoft Word, instructions are provided in a different document. AAAI Press does not support any other formatting software.

The instructions herein are provided as a general guide for experienced LATEX users. If you do not know how to use LATEX , please obtain assistance locally. AAAI cannot provide you with support and the accompanying style files are **not** guaranteed to work. If the results you obtain are not in accordance with the specifications you received, you must correct your source file to achieve the correct result.

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We need source and PDF files that can be used in a variety of ways and can be output on a variety of devices. The design and appearance of the paper is strictly governed by the aaai style file (aaai24.sty). **You must not make any changes to the aaai style file, nor use any commands, packages, style files, or macros within your own paper that alter that design, including, but not limited to spacing, floats, margins, fonts, font size, and appearance.** AAAI imposes requirements on your source and PDF files that must be followed. Most of these requirements are based on our efforts to standardize conference manuscript properties and layout. All papers submitted to AAAI for publication will be recompiled for standardization purposes. Consequently, every paper submission must comply with the following requirements:

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- No type 3 fonts may be used (even in illustrations).
- You may not alter the spacing above and below captions, figures, headings, and subheadings.

- You may not alter the font sizes of text elements, footnotes, heading elements, captions, or title information (for references and mathematics, please see the limited exceptions provided herein).
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Your L^AT_EX source will be reviewed and recompiled on our system (if it does not compile, your paper will be returned to you. **Do not submit your source in multiple text files.** Your single L^AT_EX source file must include all your text, your bibliography (formatted using aaai24.bst), and any custom macros.

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Document Preamble

In the L^AT_EX source for your paper, you **must** place the following lines as shown in the example in this subsection. This command set-up is for three authors. Add or subtract author and address lines as necessary, and uncomment the portions that apply to you. In most instances, this is all you need to do to format your paper in the Times font. The helvet package will cause Helvetica to be used for sans serif. These files are part of the PSNFSS2e package, which is freely available from many Internet sites (and is often part of a standard installation).

Leave the setcounter for section number depth commented out and set at 0 unless you want to add section numbers to your paper. If you do add section numbers, you must uncomment this line and change the number to 1 (for section numbers), or 2 (for section and subsection numbers). The style file will not work properly with numbering of sub-subsections, so do not use a number higher than 2.

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the .gif (the resolution is too low), .ps, or .eps file format for your figures.

Figures, drawings, tables, and photographs should be placed throughout the paper on the page (or the subsequent page) where they are first discussed. Do not group them together at the end of the paper. If placed at the top of the paper, illustrations may run across both columns. Figures must not invade the top, bottom, or side margin areas. Figures must be inserted using the `\usepackage{graphicx}`. Number figures sequentially, for example, figure 1, and so on. Do not use minipage to group figures.

If you normally create your figures using pgfplots, please create the figures first, and then import them as pdfs with proper bounding boxes, as the bounding and trim boxes created by pgfplots are fragile and not valid.

When you include your figures, you must crop them **outside** of L^AT_EX. The command `\includegraphics*[clip=true, viewport 0 0 10 10]...` might result in a PDF that looks great, but the image is **not really cropped**. The full image can reappear (and obscure whatever it is overlapping) when page numbers are applied or color space is standardized. Figures `??`, and `??` display some unwanted results that often occur.

If your paper includes illustrations that are not compatible with PDFL^AT_EX (such as .eps or .ps documents), you will need to convert them. The epstopdf package will usually work for eps files. You will need to convert your ps files to PDF in either case.

Figure Captions. The illustration number and caption must appear *under* the illustration. Labels and other text with the actual illustration must be at least nine-point type. However, the font and size of figure captions must be 10 point roman. Do not make them smaller, bold, or italic. (Individual words may be italicized if the context requires differentiation.)

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Tables should be presented in 10 point roman type. If necessary, they may be altered to 9 point type. You may not use any commands that further reduce point size below nine points. Tables that do not fit in a single column must be placed across double columns. If your table won't fit within the margins even when spanning both columns, you must split it. Do not use minipage to group tables.

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Low-Resolution Bitmaps. You may not use low-resolution (such as 72 dpi) screen-dumps and GIF files—these files contain so few pixels that they are always blurry, and illegible when printed. If they are color, they will become an indecipherable mess when converted to black and white. This is always the case with gif files, which should never be used. The resolution of screen dumps can be increased by reducing the print size of the original file while

retaining the same number of pixels. You can also enlarge files by manipulating them in software such as PhotoShop. Your figures should be 300 dpi when incorporated into your document.

L^AT_EX Overflow. L^AT_EX users please beware: L^AT_EX will sometimes put portions of the figure or table or an equation in the margin. If this happens, you need to make the figure or table span both columns. If absolutely necessary, you may reduce the figure, or reformat the equation, or reconfigure the table. **Check your log file!** You must fix any overflow into the margin (that means no overfull boxes in L^AT_EX). **Nothing is permitted to intrude into the margin or gutter.**

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Resizing Graphics. Resize your graphics **before** you include them with LaTeX. You may **not** use trim or clip options as part of your `\includegraphics` command. Resize the media box of your PDF using a graphics program instead.

Fonts in Your Illustrations. You must embed all fonts in your graphics before including them in your LaTeX document.

Algorithms. Algorithms and/or programs are a special kind of figures. Like all illustrations, they should appear

Algorithm 1: Example algorithm

Input: Your algorithm's input

Parameter: Optional list of parameters

Output: Your algorithm's output

```

1: Let  $t = 0$ .
2: while condition do
3:   Do some action.
4:   if conditional then
5:     Perform task A.
6:   else
7:     Perform task B.
8:   end if
9: end while
10: return solution

```

Listing 1: Example listing `quicksort.hs`

```

1 quicksort :: Ord a => [a] -> [a]
2 quicksort [] = []
3 quicksort (p:xs) = (quicksort lesser) ++
                     [p] ++ (quicksort greater)
4   where
5     lesser = filter (< p) xs
6     greater = filter (>= p) xs

```

floated to the top (preferably) or bottom of the page. However, their caption should appear in the header, left-justified and enclosed between horizontal lines, as shown in Algorithm 1. The algorithm body should be terminated with another horizontal line. It is up to the authors to decide whether to show line numbers or not, how to format comments, etc.

In L^AT_EX algorithms may be typeset using the `algorithm` and `algorithmic` packages, but you can also use one of the many other packages for the task.

Listings. Listings are much like algorithms and programs. They should also appear floated to the top (preferably) or bottom of the page. Listing captions should appear in the header, left-justified and enclosed between horizontal lines as shown in Listing 1. Terminate the body with another horizontal line and avoid any background color. Line numbers, if included, must appear within the text column.

References

The AAI style includes a set of definitions for use in formatting references with BibTeX. These definitions make the bibliography style fairly close to the ones specified in the Reference Examples appendix below. To use these definitions, you also need the BibTeX style file “`aaai24.bst`,” available in the AAI Author Kit on the AAI web site. Then, at the end of your paper but before `\enddocument`, you need to put the following lines:

```
\bibliography{bibfile1,bibfile2,...}
```

Please note that the `aaai24.sty` class already sets the `bibliographystyle` for you, so you do not have to place any `\bibliographystyle` command in the document yourselves. The `aaai24.sty` file is incompatible with the `hyperref` and

navigator packages. If you use either, your references will be garbled and your paper will be returned to you.

References may be the same size as surrounding text. However, in this section (only), you may reduce the size to `\small` if your paper exceeds the allowable number of pages. Making it any smaller than 9 point with 10 point linespacing, however, is not allowed. A more precise and exact method of reducing the size of your references minimally is by means of the following command:

```
\fontsize{9.8pt}{10.8pt} \selectfont
```

You must reduce the size equally for both font size and line spacing, and may not reduce the size beyond `{9.0pt}{10.0pt}`.

The list of files in the `\bibliography` command should be the names of your BibTeX source files (that is, the .bib files referenced in your paper).

The following commands are available for your use in citing references:

`\cite`: Cites the given reference(s) with a full citation. This appears as “(Author Year)” for one reference, or “(Author Year; Author Year)” for multiple references.

`\shortcite`: Cites the given reference(s) with just the year. This appears as “(Year)” for one reference, or “(Year; Year)” for multiple references.

`\citeauthor`: Cites the given reference(s) with just the author name(s) and no parentheses.

`\citeyear`: Cites the given reference(s) with just the date(s) and no parentheses.

You may also use any of the *natbib* citation commands.

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Please check all the pages of your PDF file. The most commonly forgotten element is the acknowledgements — especially the correct grant number. Authors also commonly forget to add the metadata to the source, use the wrong reference style file, or don’t follow the capitalization rules or comma placement for their author-title information properly. A final common problem is text (especially equations) that runs into the margin. You will need to fix these common errors before submitting your file.

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Additional Resources

L^AT_EX is a difficult program to master. If you’ve used that software, and this document didn’t help or some items were not explained clearly, we recommend you read Michael Shell’s excellent document (testflow doc.txt V1.0a 2002/08/13) about obtaining correct PS/PDF output on L^AT_EX systems. (It was written for another purpose, but it has general application as well). It is available at www.ctan.org in the tex-archive.

Reference Examples

For the most up to date version of the AAAI reference style, please consult the *AI Magazine* Author Guidelines at <https://aaai.org/ojs/index.php/aimagazine/about/submissions#authorGuidelines>

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changes to aaai24.sty and aaai24.bst have been made by Francisco Cruz and Marc Pujol-Gonzalez.

Thank you for reading these instructions carefully. We look forward to receiving your electronic files!

References

Berghel, S.; Bohannon, P.; Desfontaines, D.; Estes, C.; Haney, S.; Hartman, L.; Hay, M.; Machanavajjhala, A.; Magerlein, T.; Miklau, G.; et al. 2022. Tumult Analytics: a robust, easy-to-use, scalable, and expressive framework for differential privacy. *arXiv preprint arXiv:2212.04133*.

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