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Abstract

The purpose of this document is to provide both the basic paper template and submission guidelines. Abstracts should be a single paragraph, between 4–6 sentences long, ideally. Gross violations will trigger corrections at the camera-ready phase.

1. Motivation

Time series data in several domains is highly volatile and difficult to predict. One crucial reason is the presence of change point – a drastic change in the response due to several potential reasons including seasonality, marketing intervention, natural disaster or panic. Without incorporating change point into the model, the accuracy of the model can be severely affected. Another challenge is to automatically predict when the change point is going to happen. An agent that can automatically locate change point in real time and use the information to adjust the prediction can result in a fully automated monitoring system and real time prediction system. Most of the change point detection algorithm is frequentist model which is not fully data-driven. Here we will use Bayesian method with MCMC to detect change points and Gaussian Process to do extrapolation.

2. Format of the Paper

All submissions must follow the same format to ensure the printer can reproduce them without problems and to let readers more easily find the information that they desire.

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2.1. Length and Dimensions

Papers must not exceed eight (8) pages, including all figures, tables, and appendices, but excluding references and acknowledgements. When references and acknowledgements are included, the paper must not exceed ten (10) pages. Acknowledgements should be limited to grants and people who contributed to the paper. Any submission that exceeds this page limit or that diverges significantly from the format specified herein will be rejected without review.

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.

2.2. 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.

2.3. Author Information for Submission

To facilitate blind review, author information must not appear. If you are using \LaTeX and the `icml2016.sty` file, you may use `\icmlauthor{...}` to specify authors. The author information will simply not be printed until accepted is an argument to the style file. Submissions that include the author information will not be reviewed.

2.3.1. SELF-CITATIONS

If you are citing published papers for which you are an author, refer to yourself in the third person. In particular, do not use phrases that reveal your identity (e.g., “in previous work (?), we have shown ...”).

Do not anonymize citations in the reference section by removing or blacking out author names. The only exception are manuscripts that are not yet published (e.g. under submission). If you choose to refer to such unpublished manuscripts (?), anonymized copies have to be submitted as Supplementary Material via CMT. However, keep in mind that an ICML paper should be self contained and should contain sufficient detail for the reviewers to evaluate the work. In particular, reviewers are not required to look at the Supplementary Material when writing their review.

2.3.2. CAMERA-READY AUTHOR INFORMATION

If a paper is accepted, a final camera-ready copy must be prepared. For camera-ready papers, author information should start 0.3 inches below the bottom rule surrounding the title. The authors’ names should appear in 10 point bold type, electronic mail addresses in 10 point small capitals, and physical addresses in ordinary 10 point type. Each author’s name should be flush left, whereas the email address should be flush right on the same line. The author’s physical address should appear flush left on the ensuing line, on a single line if possible. If successive authors have the same affiliation, then give their physical address only once.

A sample file (in PDF) with author names is included in the ICML2016 style file package.

2.4. 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.

2.5. 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.

2.5.1. 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.

2.5.2. 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 footnotes¹ 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

2.6. Figures

You may want to include figures in the paper to help readers visualize your approach and your 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, 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 cen-

¹For the sake of readability, footnotes should be complete sentences.

²Multiple 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.

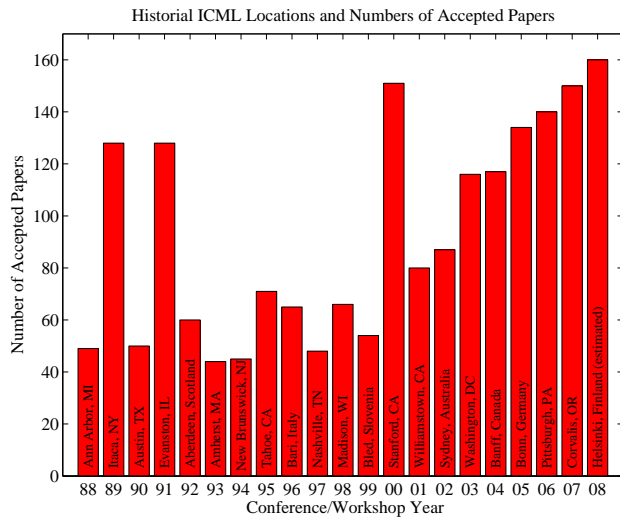


Figure 1. Historical locations and number of accepted papers for International Machine Learning Conferences (ICML 1993 – ICML 2008) and International Workshops on Machine Learning (ML 1988 – ML 1992). At the time this figure was produced, the number of accepted papers for ICML 2008 was unknown and instead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

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 $true$

tered 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), but always place two-column figures at the top or bottom of the page.

2.7. 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.

Tables contain textual material that can be typeset, as contrasted with figures, which contain graphical material that

must be drawn. 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, but place two-column tables at the top or bottom of the page.

2.8. 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 `icml2016.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 (?). Otherwise place the entire reference in parentheses with the authors and year separated by a comma (?). List multiple references separated by semicolons (???). 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 (?).

Authors should cite their own work in the third person in the initial version of their paper submitted for blind review. Please refer to Section 2.3 for detailed instructions on how to cite your own papers.

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 (?), conference publications (?), book chapters (?), books (?), edited volumes (?), technical reports (?), and dissertations (?).

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).