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学术论文写作

LaTeX使用注意事项

赵鹏

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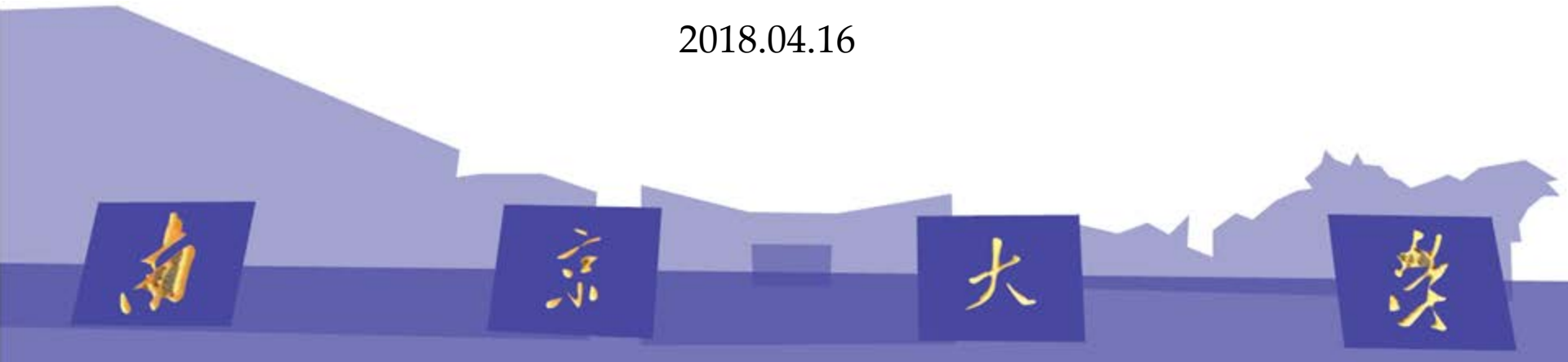
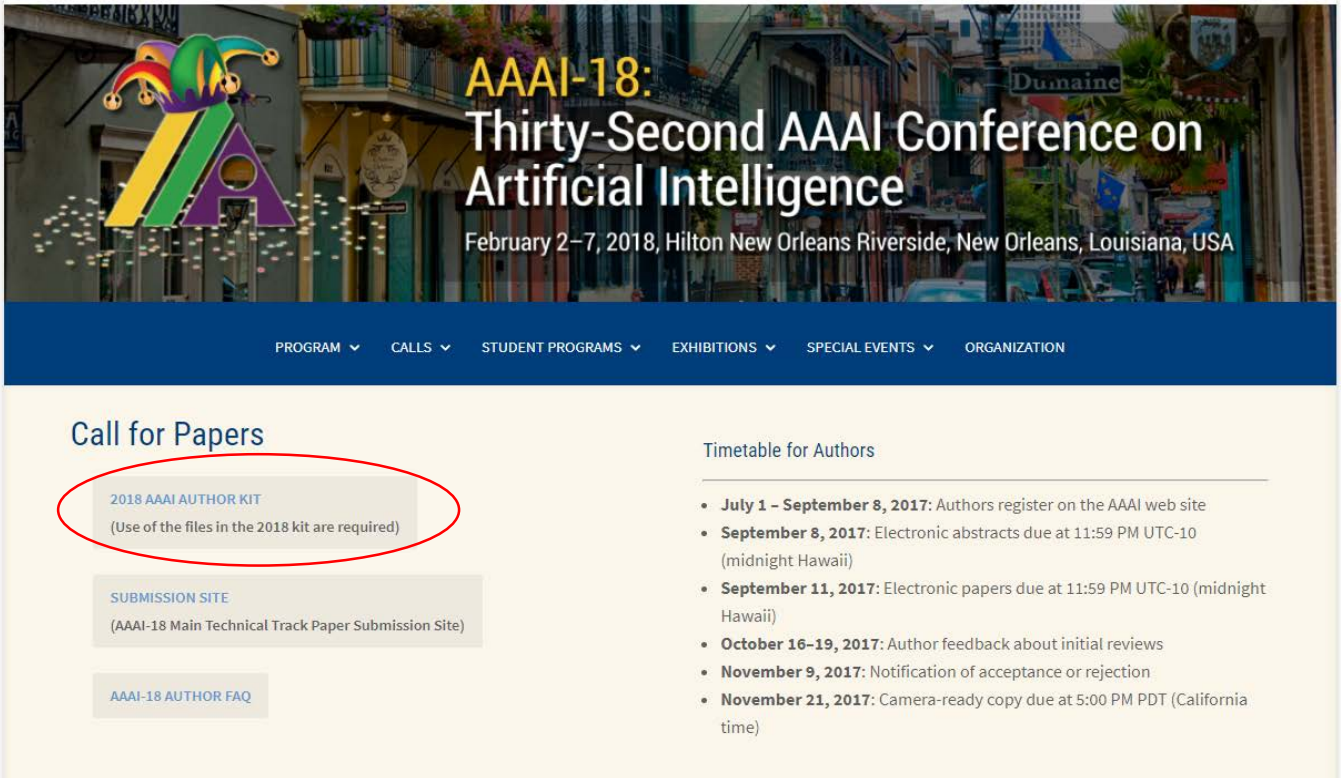
2018.04.16



学术论文写作基本流程

以AAAI-18为例

1. 找到当年会议网站发布的最新模板；



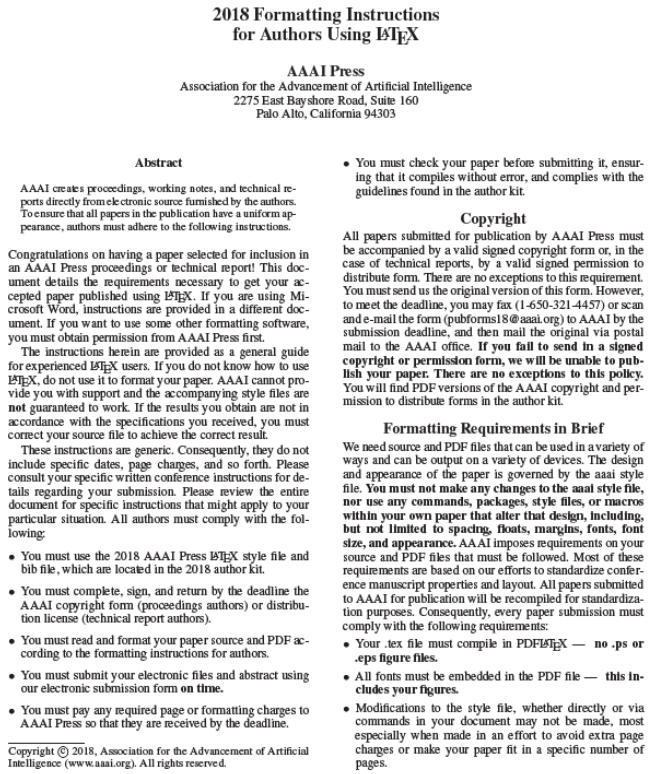
AuthorKit18.zip

学术论文写作基本流程

以AAAI-18为例

1. 找到当年会议网站发布的最新模板；
2. 仔细阅读Formatting说明。

名称	类型	大小
aaai.bst	BST 文件	22 KB
aaai18.sty	LaTeX Style	11 KB
formatting-instructions-latex-2018.pdf	Adobe Acrobat ...	470 KB
formatting-instructions-latex-2018.tex	TEX 文件	58 KB



2018 Formatting Instructions for Authors Using LaTeX

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Abstract

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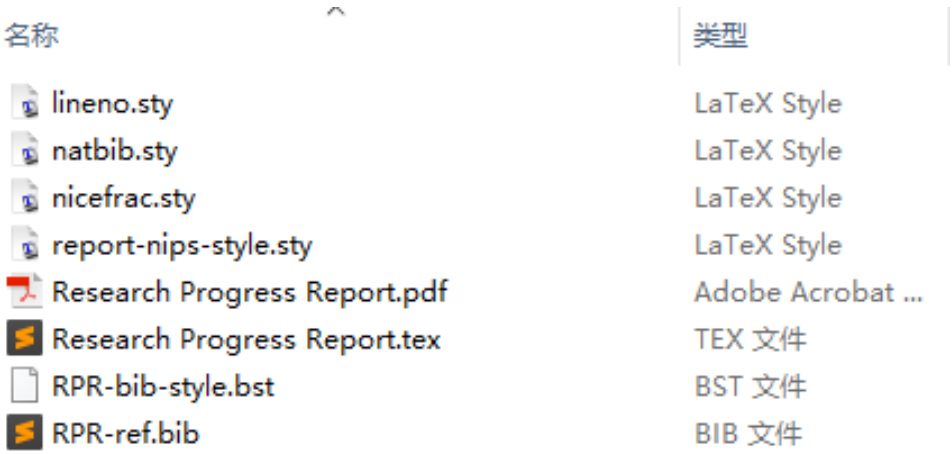
- All fonts must be embedded in the PDF file — **this includes your figures.**
- Modifications to the style file, whether directly or via commands in your document may not be made, most especially when made in an effort to avoid extra page charges or make your paper fit in a specific number of pages.

LaTeX学术写作

文件组成

- 内容
  - tex文件
  - bib文件
- 格式文件
  - sty文件（style）
  - bst文件（bibstyle）



LaTeX学术写作

原则：规范，清晰，简洁

LaTeX学术写作

规范

机器学习中有很多约定俗成的符号语言

m	训练样本个数
d	数据维度
$D, \mathcal{D}$	数据样本集合，概率分布
$(\mathbf{x}_i, y_i)$	数据点对（向量，标量）
…	…

LaTeX学术写作

清晰

表达方面：文字简练、公式明确

表现方面：图片矢量、表格排版

等等

LaTeX表格规范

原则：self-contained；清晰；美观。

负样本

colic	0.814	0.035	0.766-L	0.029	0.832-W	0.026	**0.839-W**	0.035	0.827-W	0.025	0.824	0.025
colic.ORIG	0.618	0.027	0.550-L	0.054	0.619	0.042	**0.633-W**	0.033	0.617	0.036	0.627	0.037
credit-a	0.861	0.014	0.783-L	0.03	**0.864-W**	0.013	0.862	0.014	0.853	0.042	0.854	0.033
fourclass	**0.724**	0.014	0.723	0.015	0.723	0.014	0.723	0.014	0.723	0.014	0.723	0.014
german	0.711	0.03	0.673-L	0.015	0.738-W	0.016	**0.743-W**	0.015	0.740-W	0.015	0.740-W	0.013
haberman	0.734	0.03	0.568-L	0.076	0.738	0.02	**0.734**	0.018	0.731	0.025	0.731	0.025
heart	0.799	0.029	0.809	0.032	0.791	0.03	**0.801**	0.027	0.794	0.026	0.797	0.026
house	0.942	0.015	0.845-L	0.026	**0.968-W**	0.011	0.965-W	0.01	**0.968-W**	0.012	**0.968-W**	0.011
isolet	0.995	0.003	0.935-L	0.026	0.997-W	0.002	**0.998-W**	0.003	0.997	0.005	0.997	0.005
parkinsons	0.846	0.038	0.718-L	0.041	**0.865-W**	0.03	0.858-W	0.027	0.860-W	0.026	0.856	0.040
planning	0.683	0.031	0.463-L	0.052	**0.706-W**	0.034	**0.706-W**	0.034	**0.706-W**	0.034	**0.706-W**	0.034
promoters	0.723	0.071	0.595-L	0.068	0.721	0.069	**0.736**	0.067	0.726	0.070	0.727	0.061
sonar	0.725	0.039	0.613-L	0.055	0.736	0.036	**0.741-W**	0.035	0.731	0.042	0.737	0.035
vehicle	0.959	0.012	0.738-L	0.033	0.959	0.013	**0.961**	0.011	0.958	0.012	0.958	0.012
vote	0.934	0.022	0.847-L	0.023	**0.970-W**	0.014	0.968-W	0.013	**0.970-W**	0.013	**0.970-W**	0.013
wdbc	0.963	0.012	0.887-L	0.022	0.968-W	0.011	**0.969-W**	0.011	0.952-L	0.015	0.962	0.013
win/tie/lose			18/2/0		0/8/12		0/6/14		1/12/7		0/15/5	

LaTeX表格规范

原则：self-contained；清晰；美观。

（相对）正样本

Table 2: Experimental results on LDL datasets. Each row corresponds to a data set. On each dataset, 10 test runs were conducted and the average performance as well as standard deviation are presented, - indicates numerical limits or errors. Besides, • (○) indicates that LALOT is significantly better (worse) than the compared method (paired t-tests at 95% significance level).

(a) Performance Measure: Chebyshev ↓

Dataset	IIS-LLD	PT-Bayes	PT-SVM	AA-BP	AA-KNN	LALOT
Image	.6749 ± .0065	.6682 ± .0103	.7305 ± .0465 •	.5863 ± .0370 ○	**.5130 ± .0074** ○	.6850 ± .0073
JAFFE-5	.1396 ± .0046	.4251 ± .0270 •	.1430 ± .0053 •	.1490 ± .0073 •	.1444 ± .0059 •	**.1394 ± .0044**
JAFFE-6	.1207 ± .0060	.3674 ± .0296 •	.1220 ± .0057 •	.1265 ± .0085 •	.1321 ± .0042 •	**.1206 ± .0049**
Emotions	.4429 ± .0138	.6659 ± .0312 •	.5526 ± .0565 •	.4087 ± .0140 ○	**.3989 ± .0155** ○	.4476 ± .0153
Yeast-alpha	.0201 ± .0002 •	.1093 ± .0085 •	.0139 ± .0003	.0358 ± .0022 •	.0147 ± .0002 •	**.0136 ± .0002**
Yeast-cdc	.0232 ± .0005 •	.1211 ± .0080 •	.0170 ± .0005	.0370 ± .0019 •	.0176 ± .0003 •	**.0168 ± .0003**
Yeast-cold	.0618 ± .0007 •	.2060 ± .0155 •	.0565 ± .0033 •	.0574 ± .0024 •	.0553 ± .0009 •	**.0541 ± .0009**
Yeast-diau	.0452 ± .0007 •	.1793 ± .0126 •	.0439 ± .0026 •	.0471 ± .0015 •	**.0395 ± .0006** ○	.0418 ± .0007
Yeast-dtt	.0491 ± .0010 •	.2019 ± .0188 •	.0380 ± .0016 •	.0443 ± .0022 •	.0391 ± .0007 •	**.0370 ± .0006**
Yeast-elu	.0239 ± .0004 •	.1254 ± .0076 •	.0171 ± .0004 •	.0363 ± .0015 •	.0177 ± .0002 •	**.0167 ± .0002**
Yeast-heat	.0526 ± .0006 •	.1942 ± .0086 •	.0441 ± .0009 •	.0520 ± .0013 •	.0453 ± .0003 •	**.0435 ± .0005**
Yeast-spo	.0653 ± .0010 •	.1855 ± .0112 •	.0625 ± .0019 •	.0664 ± .0035 •	.0636 ± .0008 •	**.0603 ± .0012**
Yeast-spo5	.0958 ± .0022 •	.2209 ± .0159 •	.0923 ± .0025 •	.0927 ± .0021 •	.0956 ± .0014 •	**.0908 ± .0015**
Yeast-spoem	.0930 ± .0019 •	.1909 ± .0144 •	.0916 ± .0022 •	.0892 ± .0050 •	.0919 ± .0022 •	**.0887 ± .0013**
Human Gene	.0535 ± .0007	.1826 ± .0198 •	.0540 ± .0040 •	.0602 ± .0009 •	.0647 ± .0007 •	**.0532 ± .0007**
LALOT W/ T/ L	10/ 5/ 0	14/ 1/ 0	13/ 2/ 0	13/ 0/ 2	12/ 0/ 3	rank first 12/ 15

LaTeX表格规范

小trick

- 控制表格宽度

\resizebox{0.85\textwidth}{!}{…}

demonstration.tex

```
\begin{table}[t]
\centering
\small
\caption{Statistics of 15 real-world datasets}
\label{table-datasets}
\resizebox{0.85\textwidth}{!}{
\begin{tabular}{c|c|ccc}\hline
\multicolumn{1}{c|}{Index} & \multicolumn{1}{c|}{Datasets}& \multicolumn{1}{c}{\#instance} & \
multicolumn{1}{c}{\#dim} & \multicolumn{1}{c}{\#label} \\\hline
1  & JAFFE-5        & 181       & 18    & 5       \\
2  & JAFFE-6        & 213       & 18    & 6       \\
3  & Emotions       & 593       & 72    & 6       \\
4  & Image          & 2000      & 135   & 5       \\
5  & Yeast-alpha    & 2,465     & 24    & 18      \\
6  & Yeast-cdc      & 2,465     & 24    & 15      \\
7  & Yeast-cold     & 2,465     & 24    & 4       \\
8  & Yeast-diau     & 2,465     & 24    & 7       \\
9  & Yeast-dtt      & 2,465     & 24    & 4       \\
10 & Yeast-elu      & 2,465     & 24    & 14      \\
11 & Yeast-heat     & 2,465     & 24    & 6       \\
12 & Yeast-spo      & 2,465     & 24    & 6       \\
13 & Yeast-spo5     & 2,465     & 24    & 3       \\
14 & Yeast-spoem    & 2,465     & 24    & 2       \\
15 & Human Gene     & 30,542    & 36    & 68      \\ \hline
\end{tabular}}
\end{table}
```

LaTeX表格规范

小trick

- 控制表格内字体大小以及字体样式

表 5.10　caption 宏包预定义的 font 选项值

类别	选项值	等价字体命令	效果
字号	scriptsize	\scriptsize	非常小
	footnotesize	\footnotesize	很小
	small	\small	较小
	normalsize	\normalsize	正文文字大小
	large	\large	较大
	Large	\Large	很大
字体族	rm	\rmfamily	罗马体 Roman family
	sf	\sffamily	无衬线体 Sans Serif family
	tt	\ttfamily	打字机体 Typewriter family

表格来源：LATEX入门，刘海洋，电子工业出版社，P344.

LaTeX表格规范

小trick

- 加粗后字符不对齐问题

Table 2 Test table demonstration

Dataset	ECDD-WT	SVM-fix	SVM-ada	DWM	RLS	DFOP
hyperplane	76.10 ± 0.29 •	87.98 ± 0.03 •	81.94 ± 0.07 •	88.36 ± 0.25 •	69.67 ± 1.40 •	**90.14 ±0.05**
hyperplane	**76.10 ± 0.29** •	87.98 ± 0.03 •	**81.94 ± 0.07** •	88.36 ± 0.25 •	69.67 ± 1.40 •	90.14 ±0.05
hyperplane	76.10 ± 0.29 •	76.14 ± 0.11 •	81.94 ± 0.07 •	88.36 ± 0.25 •	69.67 ± 1.40 •	**90.14 ±0.05**
hyperplane	76.10 ± 0.29•	76.14 ± 0.11•	88.36 ± 0.25•	88.36 ± 0.25•	69.67 ± 1.40•	**90.14 ±0.05**
hyperplane	**76.10 ± 0.29**•	**76.14 ± 0.11**•	**88.36 ± 0.25**•	**88.36 ± 0.25**•	**69.67 ± 1.40**•	**90.14 ±0.05**

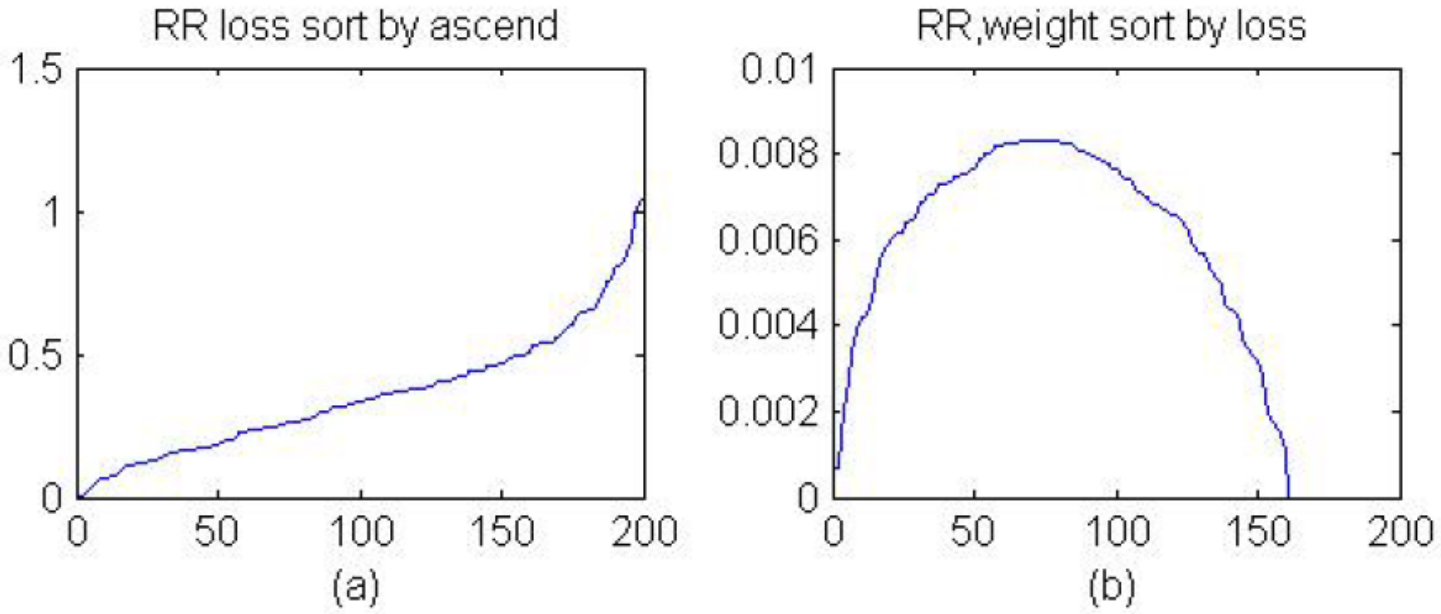
```
\DeclareFixedFont{\myfont}{OT1}{ptm}{m}{n}{8pt}
\DeclareFixedFont{\myfontb}{OT1}{ptm}{bx}{n}{8pt}
```

```
hyperplane  &\myfont{76.10 $\pm$ 0.29}$\bullet$   &\myfontb{76.14 $\pm$ 0.11}$\bullet$
```

LaTeX图片规范

原则：self-contained；清晰；美观。

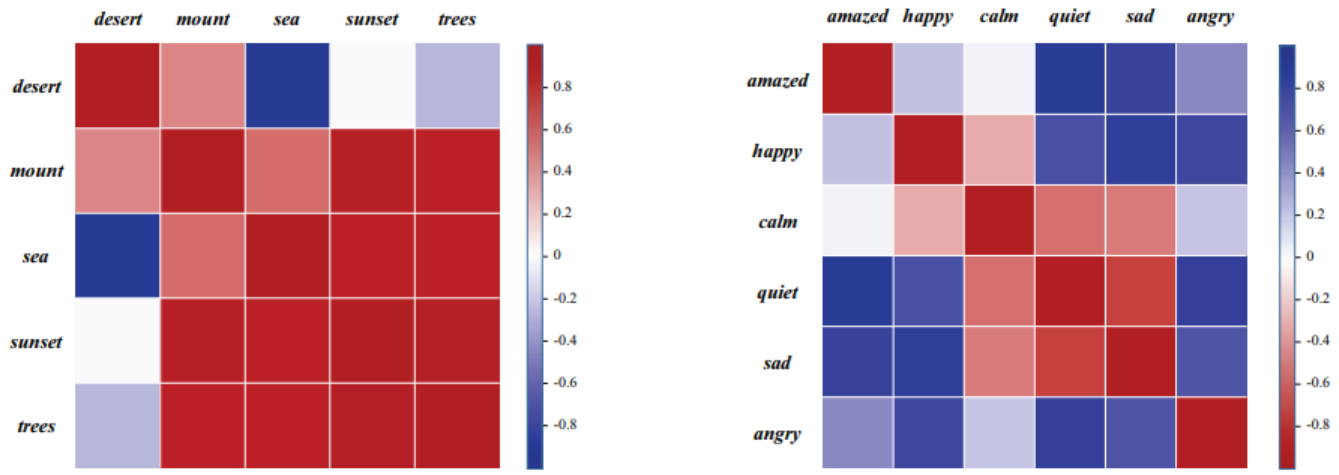
负样本



LaTeX图片规范

原则：self-contained；清晰；美观。

（相对）正样本



(a) *Image* Dataset (b) *Emotions* Dataset

Figure 1: Illustration of learned label correlations for different datasets, and the value has been scaled in [-1,1]. Red color indicates a positive correlation, and blue one indicates a negative correlation.

LaTeX图片规范

注意事项：

- 插入图片需要用eps或pdf格式（保证矢量）；
- 如果需要图片中出现并列，分开画，用\subfigure包插入tex文件中；
- 图（以及表格），都应处于文章最上方（或最下方）；
- ……

LaTeX表格规范

小\trick

- 多张图片并列放置（以及双栏显示）

  subfigure指令以及\begin{figure*} \end{figure*}

\usepackage{subfigure}

```
\begin{figure*}[!t]
    \centering
    \subfigure[\textit{Image} Dataset]{ \label{fig-metric-image}
        \includegraphics[height=0.27\textwidth]{figure/learned-metric/
        learned_metric-image.pdf}} \hspace{0.5in}
    \subfigure[\textit{Emotions} Dataset]{ \label{fig-metric-emotions}
        \includegraphics[height=0.27\textwidth]{figure/learned-metric/
        learned_metric-emotions.pdf}}
    \caption{Illustration of learned label correlations for different
    datasets, and the value has been scaled in [-1,1]. Red color indicates a
    positive correlation, and blue one indicates a negative correlation.}
    \label{fig-metric}
\end{figure*}
```

LaTeX表格规范

LAMDA
Learning And Mining from DatA

小\trick

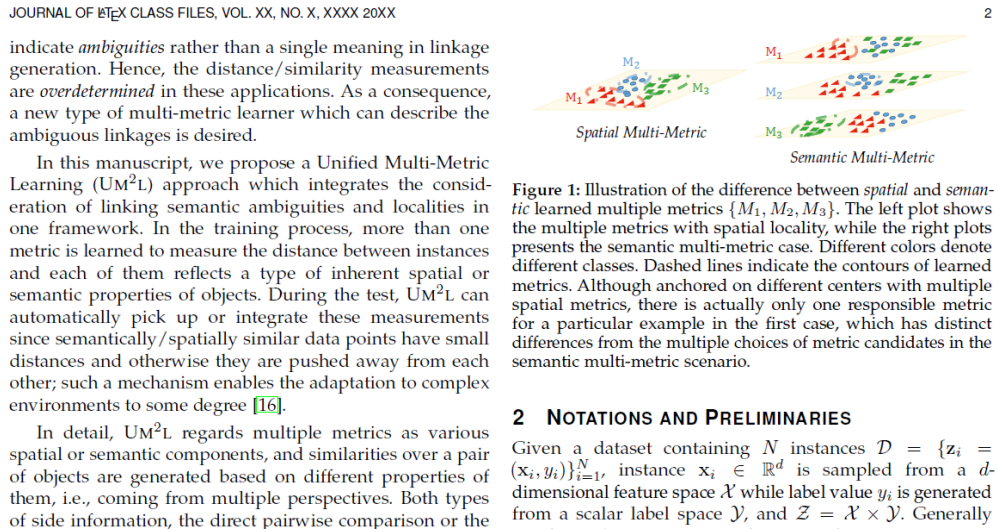
- 图片位置指定

一般使用figure[!t]指令，图片置于页面顶端

行内对齐

- 居中对齐\centering
- 左对齐 \raggedright
- 右对齐 \raggedleft

不要用\begin{center}和\end{center}，
否则前面和后面会有空白段落



JOURNAL OF LATEX CLASS FILES, VOL. XX, NO. X, XXXX 20XX 2

indicate *ambiguities* rather than a single meaning in linkage generation. Hence, the distance/similarity measurements are *overdetermined* in these applications. As a consequence, a new type of multi-metric learner which can describe the ambiguous linkages is desired.

In this manuscript, we propose a Unified Multi-Metric Learning (UM^{2}L) approach which integrates the consideration of linking semantic ambiguities and localities in one framework. In the training process, more than one metric is learned to measure the distance between instances and each of them reflects a type of inherent spatial or semantic properties of objects. During the test, UM^{2}L can automatically pick up or integrate these measurements since semantically/spatially similar data points have small distances and otherwise they are pushed away from each other; such a mechanism enables the adaptation to complex environments to some degree [16].

In detail, UM^{2}L regards multiple metrics as various spatial or semantic components, and similarities over a pair of objects are generated based on different properties of them, i.e., coming from multiple perspectives. Both types of side information, the direct pairwise comparison or the

Figure 1: Illustration of the difference between *spatial* and *semantic* learned multiple metrics $\{M_1, M_2, M_3\}$. The left plot shows the multiple metrics with spatial locality, while the right plots presents the semantic multi-metric case. Different colors denote different classes. Dashed lines indicate the contours of learned metrics. Although anchored on different centers with multiple spatial metrics, there is actually only one responsible metric for a particular example in the first case, which has distinct differences from the multiple choices of metric candidates in the semantic multi-metric scenario.

2 Notations and Preliminaries

Given a dataset containing N instances $\mathcal{D} = \{\mathbf{z}_i = (\mathbf{x}_i, y_i)\}_{i=1}^N$, instance $\mathbf{x}_i \in \mathbb{R}^d$ is sampled from a d-dimensional feature space $\mathcal{X}$ while label value y_i is generated from a scalar label space $\mathcal{Y}$, and $\mathcal{Z} = \mathcal{X} \times \mathcal{Y}$. Generally

图表注意细节

在图表中

- \label要在\caption后面，否则虽然不会报错，但实际的编号是错的

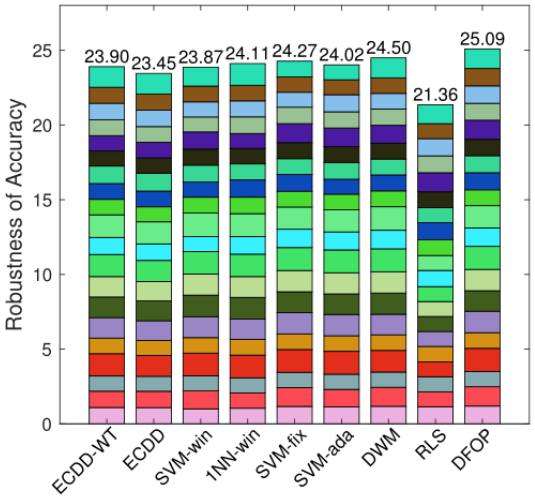


Fig. 6 A positive example.

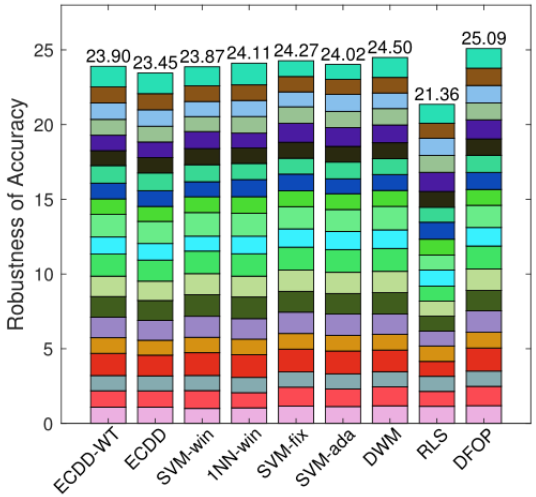


Fig. 7 A negative example.

Here, we show the positive example in Figure 6 and the negative example in Figure C.

图表注意细节

在图表中

- \label要在\caption后面，否则虽然不会报错，但实际的编号是错的

```latex
\begin{figure}[!ht]
\centering
\includegraphics[width=0.45\textwidth]{figure/robustness.pdf}
\caption{A positive example.}
\label{figure:positive}
\end{figure}

\begin{figure}[!ht]
\centering
\includegraphics[width=0.45\textwidth]{figure/robustness.pdf}
\label{figure:negative}
\caption{A negative example.}
\end{figure}
```

公式环境

要定义一些指令环境

```
\usepackage{amsthm}
\theoremstyle{definition}
\newtheorem{myDef}{Definition}
\newtheorem{myThm}{Theorem}
\newtheorem{myProp}{Proposition}
\newtheorem{myLemma}{Lemma}
\newtheorem{myConj}{Conjecture}
\newtheorem{myCor}{Corollary}
\newtheorem{myRemark}{Remark}
```

```
\begin{myDef}[$\Delta_p$-Reconstruction]
\begin{equation*}
    \Delta_p(\mathbf{y}) := \mathop{\arg\min}_{\mathbf{x} \in
     \mathbb{R}^D} \lVert \mathbf{x} \rVert_p, \text{ s.t. }
    M\mathbf{x} = \mathbf{y},
\end{equation*}
where the $\ell_p$-norm is defined by $\lVert \mathbf{u}\
rVert_p = (\sum |u_i|^p)^{1/p}$.
\end{myDef}
```

Definition 1 (Δ_p-Reconstruction).

$$\Delta_p(\mathbf{y}) := \arg\min_{\mathbf{x}\in\mathbb{R}^D} \|\mathbf{x}\|_p, \text{ s.t. } M\mathbf{x} = \mathbf{y},$$

where the ℓ_p-norm is defined by $\|\mathbf{u}\|_p = (\sum |u_i|^p)^{1/p}$.

公式环境

注意公式中的字符

- 当公式中出现一些字符时候，需要用\mbox间隔出来，注意字符前后的空格

```
\begin{equation}
  f(\mathbf{x}) =
  \begin{cases}
  \lVert \mathbf{x} \rVert & \mbox{ when } \mathbf{x} = 1 \mbox{ (positive
  example)}\\
  2\lVert \mathbf{x} \rVert & when \mathbf{x} = 1 (negative example)
  \end{cases}
\end{equation}
```

$$f(\mathbf{x}) = \begin{cases} \|\mathbf{x}\| & \text{when } \mathbf{x} = 1 \text{ (positive example)} \\ 2\|\mathbf{x}\| & when \mathbf{x} = 1 (negative example) \end{cases}$$

公式环境

注意公式后的符号

- 未完结，使用，作为分隔；已结束，使用．作为分隔。

```
\begin{equation}
  \hat{\mathbf{w}} = \argmin_{\mathbf{w}\in \mathcal{W}} f(\mathbf{w}),
\end{equation}
where $\mathcal{W}$ is the domain of feasible $\mathbf{w}$.

Thus, for any $\mathbf{w}\in \mathcal{W}$, we have
\begin{equation}
  f(\hat{\mathbf{w}}) = f(\mathbf{w}).
\end{equation}

Hence, we complete the proof.
```

$$\hat{\mathbf{w}} = \underset{\mathbf{w}\in\mathcal{W}}{\operatorname{argmin}} f(\mathbf{w}), \tag{33}$$

where $\mathcal{W}$ is the domain of feasible $\mathbf{w}$.

Thus, for any $\mathbf{w} \in \mathcal{W}$, we have

$$f(\hat{\mathbf{w}}) = f(\mathbf{w}). \tag{34}$$

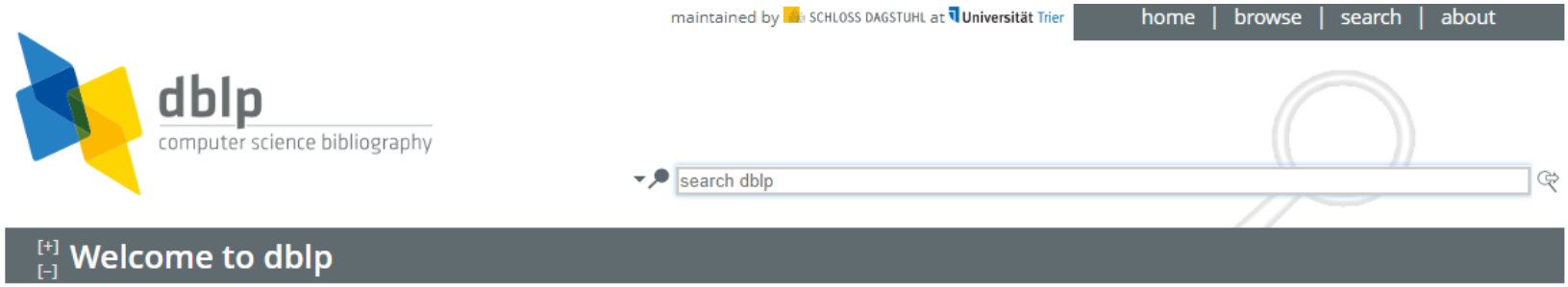
Hence, we complete the proof.

注意红色箭头处，没有空行；
黄色箭头处，需要插入空行。

关于参考文献

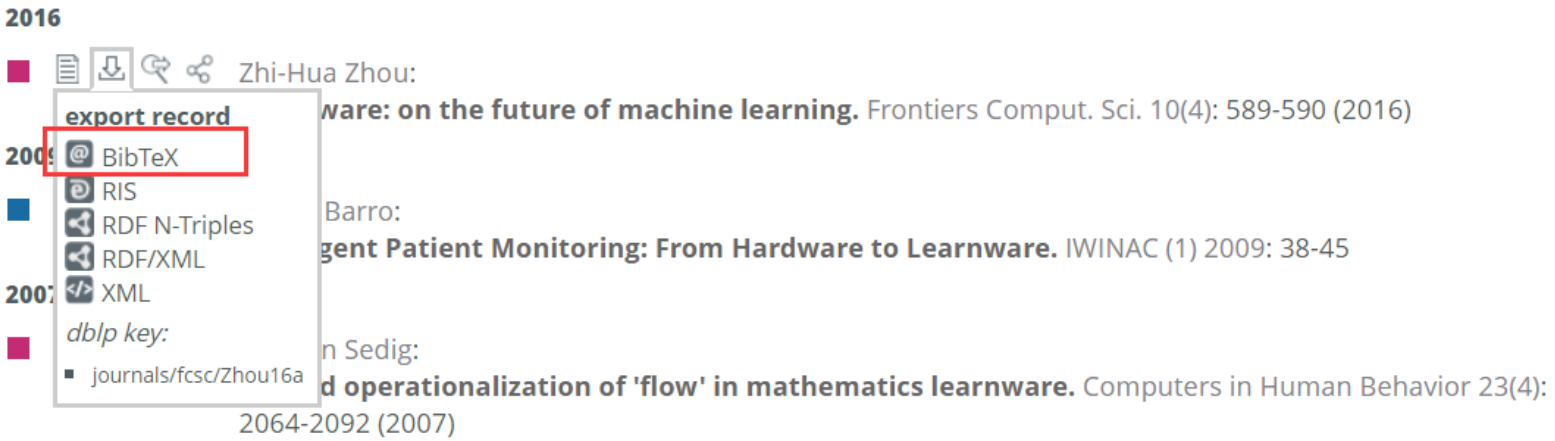
使用bibtex

- 利用好dblp网站(http://dblp.uni-trier.de/)



相比于google scholar，dblp更专注于计算机类的文献，提供的bibtex质量更好一些

关于参考文献




```
@article{DBLP:journals/fcsc/Zhou16a,
  author    = {Zhi{-}Hua Zhou},
  title     = {Learnware: on the future of machine learning},
  journal   = {Frontiers Comput. Sci.},
  volume    = {10},
  number    = {4},
  pages     = {589--590},
  year      = {2016},
  url       = {https://doi.org/10.1007/s11704-016-6906-3},
  doi       = {10.1007/s11704-016-6906-3},
  timestamp = {Mon, 19 Feb 2018 18:18:37 +0100},
  biburl    = {https://dblp.org/rec/bib/journals/fcsc/Zhou16a},
  bibsource = {dblp computer science bibliography, https://dblp.org}
}
```

整个bib文件中的期刊会议名称需**统一**，
例如会议名称，切勿有的写NIPS，有的写Advances in Neural Information Processing Systems…之类。

这部分不需要，删掉

只需要保留重要的会议/期刊信息

LaTeX使用细节

一些容易混淆的LaTeX符号

- \cdots vs \ldots

Some examples:

`a_1,\ldots,a_n` aligns better than `a_1,\cdots,a_n`.

But `a_1 \to \ldots \to a_n` aligns worse than `a_1 \to \cdots \to a_n`.

The alignment chosen by amsmath is usually the one commonly found in mathematical articles. However, I guess its not really wrong or anything to deviate from it.

$$a_1, \ldots, a_n \text{ vs. } a_1, \cdots, a_n.$$

$$a_1 \to \ldots \to a_n \text{ vs. } a_1 \to \cdots \to a_n.$$

https://tex.stackexchange.com/questions/117730/what-is-the-difference-between-ldots-and-cdots

LaTeX使用细节

一些容易混淆的LaTeX符号

- \emph vs \textit

在很多地方，实际上是可以通用的

positive example
positive example

```
\emph{positive example}

\textit{positive example}
```

但在一些情况宏包中，不是通过斜体来进行强调，这时二者不等价。比如[1]

the beamer class makes \emph text red as this works better in presentations than using italic

https://tex.stackexchange.com/questions/1980/emph-or-textit

LaTeX使用细节

一些容易混淆的LaTeX符号

- space (_) vs ~

~\cite ~\ref

negative example

Dynamic Environments are the real scenario for most learning algorithms to perform. Thus, machine learning under dynamic, non-stationary environments is of great importance (Sugiyama and Kawanabe, 2012). Plenty of efforts have paid in various directions, like dealing with distribution change in streaming data (Gama *et al.*, 2014); novel class detection (Zhu *et al.*, 2017; Mu *et al.*, 2017); dynamic pricing in the auction (Keskin and Zeevi, 2017); and also appear in many other applications (Hanneke *et al.*, 2015; Hou and Zhou, 2018).

positive example

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LaTeX使用细节

一些容易混淆的LaTeX符号

- 范数符号

  错误写法：||·||

  正确写法：\lVert \rVert

  $||X||$

  $\lVert X \rVert$

- 单双引号

  错误写法：“ ”

  正确写法：``”

  ”negative example”

  “positive example”

```
"negative example"
``positive example''
```

  错误写法：’ ’

  正确写法：` ’

  ’negative example’

  ‘positive example’

```
'negative example'
`positive example'
```

- .....

LaTeX使用细节

一些容易混淆的LaTeX符号

- \cdots vs \ldots

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https://tex.stackexchange.com/questions/117730/what-is-the-difference-between-ldots-and-cdots

LAMDA
Learning And Mining from DatA

未完待续

Thanks!