DSC Capstone LaTeX Template

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Abstract

TBA

Repository: https://github.com/rybplayer/DSCCapstone

1 Introduction

2 Methods

3 Results

4 Discussion

5 Conclusion

6 LaTeX Typesetting Examples

This is not a real section; it's just here to show examples of how to format various components. Remove it before submitting!

6.1 LaTeX Basics

Here's **bold** and *italicized* text. Here's `text_that_looks.like(code)`.

- Here's a regular bulleted list item.
- And another.

Here's a hyperlink. If you want to use a numbered list, you can experiment with:

1. This.
2. This.
3. And this.

Here's how you might include a snippet of actual code:

```
# If you want to use syntax highlighting, look into the minted package.
def f(x):
    return 2 * x + 3
```

Here's how you might format a single equation:

$$\int_{-\infty}^{\infty} f_X(x)dx = 1$$

And a chain of equations:

$$\begin{aligned}
\frac{1}{n}\sum_{i=1}^{n}(x_i-\bar{x})^2 &= \frac{1}{n}\sum_{i=1}^{n}(x_i^2-2x_i\bar{x}+\bar{x}^2)\\
&= \frac{1}{n}\sum_{i=1}^{n}x_i^2-\frac{2}{n}\bar{x}\sum_{i=1}^{n}x_i+\frac{\bar{x}^2}{n}\sum_{i=1}^{n}1\\
&= \frac{1}{n}\sum_{i=1}^{n}x_i^2-2\bar{x}^2+\bar{x}^2\\
&= \frac{1}{n}\sum_{i=1}^{n}x_i^2-\bar{x}^2
\end{aligned}$$

6.2 Figure Examples

Here are some example figures. Figure **??** presents a scatter plot.

Figure 1: Yes, put a few words or sentences here explaining what is in the figure.

Figure 2 presents some summaries of the performance of our model. The left panel of Figure 2 presents something. The right panel of Figure 2 presents some other things.

Figure 2: You can put figures side-by-side as well.

6.3 Table Examples

Table **??** presents some summary of the data.

Table 1: Some Table Caption

Table **??** presents some summaries of the performance of our model.

6.4 Equations and Algorithms Examples

Algorithm 1 implements Fuzzy K-means.

Algorithm 2 calculates net activation.

In Variational Autoencoder (VAE), we directly maximize the Evidence Lower Bound (ELBO)

Table 2: Some Other Table Caption

Algorithm 1: Fuzzy K-means clustering algorithm

1. Choose primary centroids v_k
2. Compute the membership degree of all feature vectors in all clusters

$$u_{ki} = \frac{1}{\sum_{j=1}^{K} \left(\frac{D^2(x_i - v_k)}{D^2(x_i - v_j)}\right)^{\frac{2}{m-1}}} \tag{1}$$

using the following Equations 2–4.

$$\mathbb{E}_{q_\phi(\boldsymbol{z}|\boldsymbol{x})}\left[\log \frac{p(\boldsymbol{x},\boldsymbol{z})}{q_\phi(\boldsymbol{z}\mid\boldsymbol{x})}\right] = \mathbb{E}_{q_\phi(\boldsymbol{z}|\boldsymbol{x})}\left[\log \frac{p_\theta(\boldsymbol{x}\mid\boldsymbol{z})p(\boldsymbol{z})}{q_\phi(\boldsymbol{z}\mid\boldsymbol{x})}\right] \tag{2}$$

$$= \mathbb{E}_{q_\phi(\boldsymbol{z}|\boldsymbol{x})}[\log p_\theta(\boldsymbol{x}\mid\boldsymbol{z})] + \mathbb{E}_{q_\phi(\boldsymbol{z}|\boldsymbol{x})}\left[\log \frac{p(\boldsymbol{z})}{q_\phi(\boldsymbol{z}\mid\boldsymbol{x})}\right] \tag{3}$$

$$= \underbrace{\mathbb{E}_{q_\phi(\boldsymbol{z}|\boldsymbol{x})}[\log p_\theta(\boldsymbol{x}\mid\boldsymbol{z})]}_{\text{reconstruction term}} - \underbrace{\mathscr{D}_{\mathrm{KL}}(q_\phi(\boldsymbol{z}\mid\boldsymbol{x}) \,||\, p(\boldsymbol{z}))}_{\text{prior matching term}} \tag{4}$$

6.5 Inline Citation Examples

Citation in text (no parentheses): use `\cite{citekey}`. For example, **?**, **?**.

Citation in parentheses: use `\citep{citekey}`. For example: (**?**), (**?**).

To edit the contents of the "References" section, edit `reference.bib`. Many conference websites format citations in BibTeX that you can copy into `reference.bib` directly; you can also search for the paper on Google Scholar, click "Cite", and then click "BibTeX" (here's an example).

Algorithm 2: Computing Net Activation

Input: $x_1, \ldots, x_n, w_1, \ldots, w_n$
Output: y, the net activation
$y \leftarrow 0$;
for $i \leftarrow 1$ **to** n **do**
    $y \leftarrow y + w_i * x_i$;

Appendices

A.1 Training Details

A.2 Additional Figures

A.3 Additional Tables