STEM Fellowship Big Data Challenge 2021

Project Title

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Abstract

Your abstract will get published whether or not your team wins the challenge, so make sure to do a good job! It should reflect the objectives, methodology and findings of the research project. When writing your abstract, choose the right (amount of) words to convey your information. Avoid long sentences and long-winded explanations as they could make the reader lose focus. The order of your writing is also important. Maintain a logical order to your writing so that the reader links each aspect of your work coherently. Introduction/Background: Explains what problem the study examined and why. You may provide some background to the project, and the motivation behind it. Materials and Methods: Describes the data sources used and methodologies adopted for the data analysis. Key Findings/Results: Outlines the discoveries/what was observed from the analysis. When describing your results, strive to focus on the main finding(s), and list no more than two or three points. Conclusion: Provide a general interpretation of the results, specifying what is new/innovative of your project, and give any important recommendation for future research.Once you've written these, delete the keywords, edit for flow, and you have your abstract

Keywords
pick, 3-5, good, keywords

1 Introduction

Rising temperatures, melting ice caps, and the gradual degradation of the ozone layer are just a few realities that we are currently facing in the status quo—and, for the most part, they stem from carbon-based energy sources such as natural gas and oil.[1] With the urgency of climate deterioration, it is increasingly critical for individuals to gain unrestricted access to clean energy to counteract the implications of climate change that will ultimately affect all of humankind.

However, this transition into clean, low-carbon energy such as hydro and solar power will invariably create winners and losers. A small portion of people with economic leverage will have unobstructed access to clean energy, providing them with more employment, innovative opportunities, and even more economic benefits. However, a larger population is not only disenfranchised by a lack of sustainable energy sources but ultimately loses employment opportunities and fundamental aspects of their economies towards the transition to a greener future.

For example, countries in the Middle East rely heavily on the production and subsequent exports of oil and natural gas products. Over three million individuals are employed in the oil and gas industry in China alone. Despite having good intentions, when we transition towards more renewable energy sources, we widen socio-economic gaps between the rich and the poor because of the broad demographic which relies on carbon-based energy.

We want to expand on this disparity and focus on a more regional, smaller scale in this project, analyzing how accessibility to clean energy can affect or lead to inequality in regions of Canada such as Alberta and Ontario. By doing so, we can create effective solutions to address urgent issues that affect billions of individuals across the globe.

2 Materials & Methods

This is where you talk about the methods used to carry out the study. Be as concise and to-the-point as possible, and remember - **do not justify your methods here!** You simply need to state what you did. You can (and probably

should) mention the purpose of using a certain computational tool within the context of what you set out to achieve, but mentioning things like 'it's particularly efficient at this and better than all competing computational tools' is unnecessary in the methods section. However, you can definitely talk about all of this in the discussion, and talk about why your methods are, say, the most effective ones for the task.

Think of this section as a technical manual of sorts, that another team of researchers could read and easily follow in order to replicate what you did to carry out this study.

Because of the straightforward nature of the methods section, this might be the one your team wants to write first. It's essentially you just documenting what your team has already done, which should be no problem to write, since you will already have an established workflow by this point.

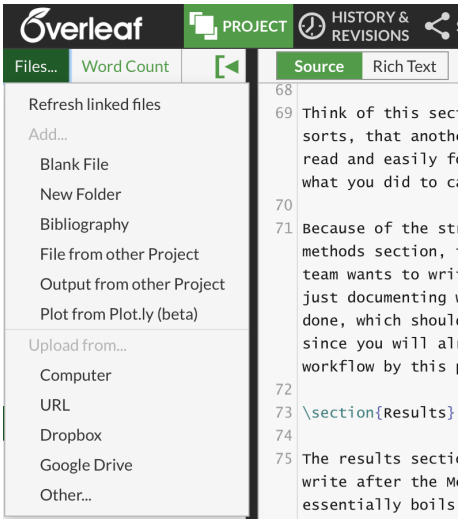

Figure 1: Notice how LaTeX automatically numbers this figure.

3 Results

The results section is probably next easiest to write after the Methods section, since it essentially boils down to presenting your data. If anything, the production of good, high quality figures is the most important and potentially time-consuming part of this. However, make sure to not analyze any of your results here! All of that belongs in the discussion.

Including figures into LaTeX can seem intimidating at first, but Overleaf makes it easy: simply click the 'Project' button above, select 'Files', and upload away from your computer. Then, insert the file name into the appropriate section of the code below. Figure 1 shows the output of such code. A pretty good guide to formatting figures can be found at https://en.wikibooks.org/wiki/LaTeX/Floats,_Figures_and_Captions#Figures.

```
\begin{figure}
    \centering
    \includegraphics[width=0.4\textwidth]{test.png}
    \caption{Hello!}
\end{figure}
```

4 Discussion

And here is the 'meat' of the paper, so to speak. This is where you interpret your results, pointing out interesting trends within your data and how they relate to your initial hypothesis. This is also the place to justify your methodology, if you're so inclined (i.e. Why did you specifically use a certain statistical test over another? Why this tool over that tool?). Lastly, you're going to want to discuss potential sources of error. Make sure to make explicit reference to figures/tables when discussing your data; it can be helpful to walk the reader through your own personal interpretation of each figure in order. Although we recommend looking at past winning papers over at the STEM Fellowship Journal's website anyways, referring to those papers might prove most helpful when it comes to writing your discussion.

Conclusions

What are the long-term implications of your findings? Wrap up your discussion succinctly while pointing out the significance of your work as well as it what it means for the fields you examined as much as possible. Lastly, suggest ideas for future studies that could build on your work, and justify why they might be useful. Otherwise, you're all done!

Acknowledgements

Anyone to thank/credit for helping your team along the way? This is the place to do it!

References

[1] N. Sönnichsen.