Tree species detection model for agroforestry

Anonymous CVPR submission

Paper ID *****

Abstract

Section 0: Abstract (1-2 paragraphs) The abstract is required. It should contain a 1-2 sentence summary of each major section of the paper.

1. Introduction

Section 1: Introduction (0.5-1 page) Explain the problem and why it is important. Discuss your motivation for pursuing this problem. Give some background if necessary. Clearly state what the input and output is. Be very explicit: "The input to our algorithm is a image, video, patient age, 3D video, etc.. We then use a SVM, CNN, GAN, etc. to output a predicted age, cancer type, restaurant, ramen, etc.." This is very important since different teams have different inputs/outputs spanning different application domains. Being explicit about this

2. Related work

Section 2: Related Work (0.5-1 page)

You should find existing papers, group them into categories based on their approaches, and talk about exemplary ones in each category: Discuss strengths and weaknesses. In your opinion, which approaches were clever/good? What is the state-of-the-art? Do most people perform the task by hand? You should aim to have at least 10 references in the related work. Include previous attempts by others at your problem, previous technical methods, or previous learning algorithms. Google Scholar is very useful for this: https://scholar.google.com/ (search your paper, and you can click "cite" to generate the BibTeX for it.) You can also try http://www.arxiv-sanity.com/ to search for recent arXiv papers.

3. Methods

Section 3: Methods (2 pages)

Describe your learning algorithms, proposed algorithm(s), or theoretical proof(s). Make sure to include relevant mathematical notation, e.g. when you formulate your input(s), output(s) and the loss function(s). It is okay to use formulas from the lecture notes. For each algorithm, give a brief description (2-3 sentences) of how it works. Again, we are looking for your understanding of how these deep learning algorithms work. Although the teaching staff probably know the algorithms, future readers may not (reports will be posted on the class website). Additionally, if you are using a niche or cutting-edge algorithm (e.g. binary network, SURF features, or anything else not covered in the class), you may want to explain your algorithm using several paragraphs. Note: Theory/Algorithms projects may have an appendix showing extended proofs (see appendix description below). Assume the reader has completed CS231N. You don't need to explain filters and max-pooling, but if you use something like stochastic strides, you should explain that.

If you used an existing codebase and built on top of it, you must state this and explain what you wrote versus what the starter code already came with.

4. Dataset and features

Section 4: Dataset and Features (0.5-1 pages)

Give details about your dataset: How many training/validation/test examples do you have? Is there any data preprocessing you did? What about normalization or data augmentation? What is the resolution of your images? How is your time-series data discretized? Include a citation to where you got your dataset from. Depending on available space, show some examples from your dataset. You should also talk about the features you used. If you extracted features using Fourier transforms, word2vec, histogram of oriented gradients (HOG), PCA, ICA, etc. make sure to talk about it. Try to include examples of your data in the report (e.g. include an image, show a waveform, price graph, etc.).

5. Results and discussion

Section 5: Experiments/Results/Discussion (2-3 pages)

You should also briefly give details about what hyperparameters you chose (e.g. why did you use X learning rate for gradient descent, which optimizer did you pick, what was your mini-batch size and why) and how you chose them.

Did you do cross-validation, and if so, how many folds? This should not take more than 1-2 paragraphs. If you want to list more details, please do so in the supplemental material.

Before you list your results, make sure to list and explain what your primary metrics are: accuracy, mAP, inception/mode scores, etc. Provide equations for the metrics if necessary.

For results, you want to have a mixture of tables and plots. Both quantitative and qualitative results are necessary. To reiterate, you must have both quantitative and qualitative results! This includes unsupervised learning (talk with the TAs on how to quantify unsupervised methods). Include visualizations of results, heatmaps, saliency maps, examples of failure cases and a discussion of why certain algorithms failed or succeeded. In addition, explain whether you think you have overfitted to your training set and what, if anything, you did to mitigate that. Make sure to discuss the figures/tables in your main text throughout this section. Your plots should include legends, axis labels, and have font sizes that are readable when printed.

Heres a list of qualitative quantitative methods for analysis that might be helpful in your project. None of these are necessary nor will be explicitly looked for by graders rather, we wanted to provide some (non-exhaustive) guidance on analysis methods:

Saliency maps

Class visualization

t-SNE

Confusion matrices

Common qualitative errors

GANs: compare the generated output to NN in training set (quantitative and qualitative)

GANs: image quality metrics like Inception and Mode scores

VAE: Reporting measures like Annealed Importance Sampling (AIS)

6. Conclusion and future work

Section 6: Conclusion/Future Work (1-3 paragraphs)

Summarize your report and reiterate key points. Which algorithms were the highest-performing? Why do you think that some algorithms worked better than others? For future work, if you had more time, more team members, or more compute, what would you explore?

7. Appendices

Section 7: Appendices

All the text in sections before this point must fit on eight (8) CVPR-style pages or less. Extra figures can go beyond the limit, but please do not put all your figures at the end just to fit the page limit. TAs will also be focusing their attention largely on the previous sections, so anything critical to your project should go in those sections, if possible. (If you are unsure of something, please feel free to make a private Ed post).

This section is optional. Include additional derivations of proofs which weren't core to the understanding of your proposed algorithm. Usually, you put equations or other details here when you don't want to disrupt the flow of the main paper.

8. Contributions and acknowledgements

Section 8: Contributions Acknowledgements (not part of page limit)

In this section, you must explicitly state what each person on your team did for the project. If you made use of public code (e.g. from GitHub), please provide a link to the original repo. Additionally, you must mention any non-CS231N collaborators and include a brief sentence on what they did for your project. See the AlphaGo paper's contributions statement for an example. If you're part of a research lab and made use of their job scheduling, containerization, or GPUs, briefly include a sentence description on this as well.

9. References

Section 9: References/Bibliography (No page limit)

This section should include citations for: (1) Any papers mentioned in the related work section. (2) Papers describing algorithms that you used which were not covered in class. (3) Code or libraries you downloaded and used. This includes libraries such as scikit-learn, TensorFlow, PyTorch, etc. For simplicity, please use the provided BibTeX file in the template (see our "Section 2" suggestions for how to easily get BibTeX citations from Google Scholar). Main body text, figures, and any discussions are strictly forbidden from this section. We are excluding the references section from the page limit to encourage students to perform a thorough literature review/related work section without being space-penalized if they include more references.

References