CSCI 1430 Final Project Report
Data Augmented AI Generated Detector

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Abstract

This document is a template for your final project reports, presented in a conference-paper style. It is sightly-more complicated LaTeX, but not much more complex than the earlier project reports. This document, along with your code, any supplemental material, and your 2-minute presentation, are qualitatively what determines your grade.

1. Introduction

Currently, there are issues related to digital misinformation and privacy. As chatbots and generative AI become more sophisticated, they are able to create hyper-realistic fake media. This has significant implications for politics, social trust, and personal security. Deepfakes have already been involved in election interference, celebrity impersonations, and malicious pranks. In the context of media and news, this project becomes relevant for the authenticity of digital content in an era where images and videos can be fabricated easily. The difficulty lies in the fact that AI-generated content can replicate details like lighting, shadows, and facial expressions with astonishing precision, making traditional detection methods less effective. Manual verification is not feasible at scale which is why automated tools capable of detecting fakes are necessary.

In this paper, we propose a Data Augmented AI Generator capable of determining real images vs AI-generated. We want to test the hypothesis that AI-generated images have particular features that allow humans to differentiate them from real ones. For example, the smooth texture that seems to appear in AI-generated images. By leveraging computer vision and deep learning techniques, including neural networks trained on diverse datasets of real and synthetic media, this project aims to identify these distinguishing features. The use of data augmentation will ensure the model's robustness across various scenarios, enabling it to detect AI-generated content with greater accuracy.

2. Related Work

Cite and discuss work that you used in your project, including any software used. Citations are written into a .bib file in BibTeX format, and can be called like this: Alpher et al. [1]. Here's a brief intro: webpage. *Hint:* $> pdflatex %docu, bibtex %docu, pdflatex %docu, pdflatex %docu

3. Method

Describe the problem in a compact way. What was your approach to solving it? Include diagrams to help understanding. For instance, if you used a CNN, what was the architecture? Include equations as necessary, e.g., Pythagoras' theorem (Eq. 1):

$$x^2 + y^2 = z^2, \tag{1}$$

where x is the the 'adjacent edge' of a right-angled triangle, y is the 'opposite edge' of a right-angled triangle, and z is the hypotenuse.

My code snippet highlights an interesting point.

```
one = 1;
two = one + one;
if two != 2
    disp( 'This computer is broken.' );
end
```

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Method	Frobnability
Theirs	Frumpy
Yours	Frobbly
Ours	Makes one's heart Frob

Table 1. Results. Please write an explanatory caption that makes the table/figure self-contained.

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4. Results

Present the results of the changes. Include code snippets (just interesting things), figures (Figures 1 and 2), and tables (Table 1). Assess computational performance, accuracy performance, etc. Further, feel free to show screenshots, images; videos will have to be uploaded separately to Gradescope in a zip. Use whatever you need.

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Figure 1. Single-wide figure.

4.1. Technical Discussion

What about your method raises interesting questions? Are there any trade-offs? What is the right way to think about the changes that you made?

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5. Conclusion

What you did, why it matters, what the impact is going forward.

References

[1] A. Alpher, J. P. N. Fotheringham-Smythe, and G. Gamow. Can a machine frobnicate? *Journal of Foo*, 14(1):234–778, 2004. 1

Appendix

Team contributions

Please describe in one paragraph per team member what each of you contributed to the project.

Person 1 (put your real names) Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim

Figure 2. Double-wide figure. *Left:* My result was spectacular. *Right:* Curious.

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