Advanced Algorithm for Enhancement of Fashion Imagery

By Jean-Luc Peloquin
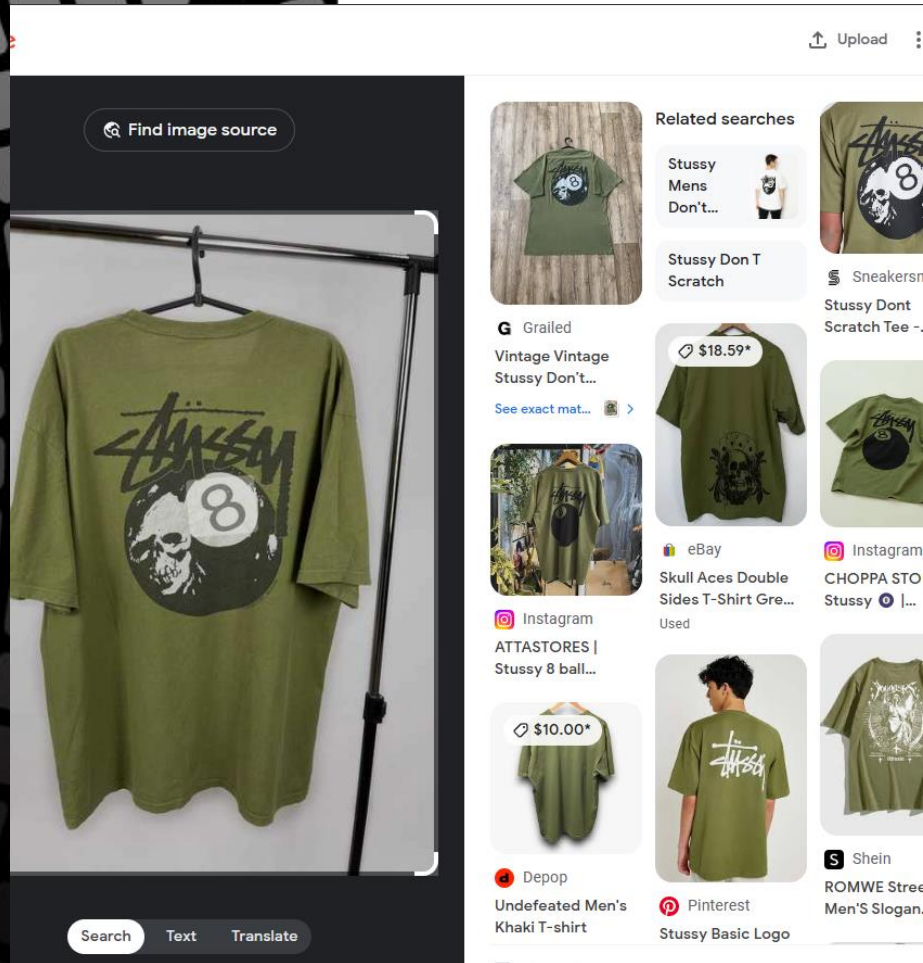Final Project: CS 469/669

Spring 2024

Outline

- Introduction
- Methodology
- Results and Analysis
- Conclusion
- References and Questions

Introduction

Problem

- Reverse image searching results either pretty accurate or too broad

Reason

- Image quality on blurry images with distracting backgrounds

Solution

- Create an application to automatically upscale and improve clarity on given image(s) with a focus on speed and no user interaction

Methodology

Upscaling
- Lanczos algorithm

Detail Enhancement
- High-pass filtering
- Unsharp Masking

Background Removal
- rembg() ML algorithm

Cropping and Conversion
- Contour-based cropping of transparent empty space (to .png)

Dataset
- Web scraped from Grailed.com

Results and Analysis

Higher Res = More Computational Time (Lanczos Upscaling)

Improves all images regardless of results

    – All enhanced in quality w/ background removal

Limitations

- Images with complex backgrounds / shadows

- Images with initial poor image quality do not get enhanced as well as medium-high quality

    – Less sample size for pixels to enhance

Conclusion

- Faster than Photoshop (6 sec per image average)
- Larger size image takes much longer (prob doesn't need processing anyways)
- Easy to use GUI with minimal input
- Quality of initial image results in better or worse results
  - ex: smaller images become much clearer, but background removal is more variable
- Accuracy in reverse image searching only improves
  - At very worst does nothing
  - At best increases results

References and Questions

[1] Adobe, "Smooth enhance fabric with generative fill," Adobe Photoshop Tutorials,
2024. [Online]. Available:
https://creativecloud.adobe.com/learn/photoshop/web/smooth-enhance-fabricgenerative-fill. [Accessed: Apr. 28, 2024].
[2] "Lanczos resampling," Wikipedia, 2024. [Online]. Available:
https://en.wikipedia.org/wiki/Lanczos_resampling. [Accessed: Apr. 28, 2024].
[3] "High-pass filter," Wikipedia, 2024. [Online]. Available:
https://en.wikipedia.org/wiki/High-pass_filter. [Accessed: Apr. 28, 2024].
[4] Cambridge in Colour, "Unsharp mask," 2024. [Online]. Available:
https://www.cambridgeincolour.com/tutorials/unsharp-mask.html. [Accessed: Apr. 28,
2024].
5
[5] "rembg," PyPI, 2024. [Online]. Available: https://pypi.org/project/rembg/.
[Accessed: Apr. 28, 2024].
[6] "Image background removal," YouTube, uploaded by D. Gatis, 2024. [Online].
Available: https://www.youtube.com/watch?v=2X9rxzZbYqg. [Accessed: Apr. 28,
2024].
[7] Grailed, "Grailed," 2024. [Online]. Available: https://www.grailed.com/. [Accessed:
Apr. 28, 2024].
[8] Data to Fish, "How to convert JPEG to PNG in Python," 2024. [Online]. Available:
https://datatofish.com/jpeg-to-png-python/. [Accessed: Apr. 28, 2024].
[9] "Plyer documentation," Read the Docs, 2024. [Online]. Available:
https://plyer.readthedocs.io/en/latest/. [Accessed: Apr. 28, 2024].
[10] "Pillow documentation," Read the Docs, 2024. [Online]. Available:
https://pillow.readthedocs.io/en/stable. [Accessed: Apr. 28, 2024].
[11] D. Gatis, "rembg," GitHub, 2024. [Online]. Available:
https://github.com/danielgatis/rembg. [Accessed: Apr. 28, 2024].
[12] "NumPy documentation," NumPy, 2024. [Online]. Available:
https://numpy.org/doc/. [Accessed: Apr. 28, 2024].
[13] "OpenCV documentation," OpenCV, 2024. [Online]. Available:
https://docs.opencv.org/4.x/d6/d00/tutorial_py_root.html. [Accessed: Apr. 28, 2024]