Visual Reproduction Algorithm for Recasting Historical Images and Fonts

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Introduction

We present a short program, written in the freely-available programming language R and implementable on standard computers, that is able to extract high-quality digital copies of printed images and text from archival photographs. This program leverages optical character recognition (OCR) techniques to separate printed ink from discolored or foxed paper to allow for the recovery and reuse of fonts, woodcuts, or engraved text and images. In this way, both the original material and the program itself have interfaces to be leveraged.

```
install.packages("tesseract")
install.packages("imagerExtra")
install.packages("imager")
library(imager)
library(imagerExtra)
library(tesseract)
img <- load.image('[path to image].jpeg') # replace with local path or URL to image
img <- grayscale(img, method = "Luma", drop = TRUE)
clean_img <- ThresholdAdaptive(im=DenoiseDCT(img, 0.01),k= 0.1, windowsize = 21,range = c(0,1))
# alter k and windowsize to achieve desired effect
plot(clean_img) # visualizes output
clean_img_inv <- !clean_img
img <- as.cimg(clean_img_inv)
save.image(img,file = '[path to export].jpg', quality = 1) #replace with local path to desired save
```

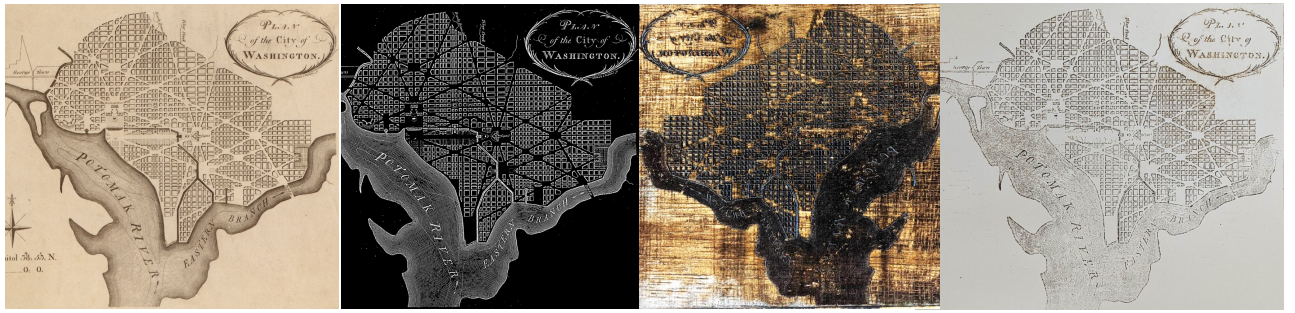
Results

The resulting engraved image can be printed in a printing press, stamped, displayed, or otherwise used in a manner similar to the original. By separating individual letters and submitting them as input to this program, previously lost or unavailable fonts can be recreated in both digital and physical form for use in letterpress printing. It also makes available historical typefaces to anyone with a 3D printer or laser engraver, creating a new, low-cost mass-producible way to “cast” metal type. This skeuomorphism can be used for educational and artistic means, affording old uses to new technology.

Original Processed Engraved Printed

Frontispiece for The Wood Beyond the World, by William Morris, Illustrated by Edmund Burne-Jones, Kelmscott Press, 1894. Original courtesy of the Victoria & Albert Museum.

Original Processed Engraved Printed



Plan of the City of Washington, Copy 1. Pierre Charles L’Enfant, Printed by Thackara & Vallance, Philadelphia 1792. Original courtesy of the Library of Congress.