

Signboard Optical Character Recognition

Isaac Wu (isaacwu@stanford.edu)
Hsiao-Chen Chang (hcchang7@stanford.edu)

Motivation

Imagine a world in which a person can walk down any street and take a picture of a random store's signboard with a mobile device, enabling him or her to know what goods or service the store provides, the ratings of the store, his or her geolocation, and even suggestions on nearby shops that may interest him or her.

Goal

We will specifically tackle the problem of the signboard character recognition. Although OCR has been around for a while and is now commonly used to convert scanned documents [3] and license plate [1] to text, the problem we are tackling here is more interesting. Specifically, the signboard can be of different color, the signboard text can be non-standard, the signboard image can be taken at an angle, and the exterior of the signboard has to be removed when performing OCR.

Example input:



Example output:

“STARBUCKS COFFEE”

Our Initial Thought on Implementation

1. Input of the original (RGB) image.
2. Convert the image to grayscale.
3. Remove all background and the noise. (Not sure how to implement this yet)
4. Image binarization with Otsu's method, taking the background to be either white or black depending on which color is more dominant in the image.
5. Perform homography and Hough transform to correct the angle and alignment of the signboard.
6. Use a traditional OCR technique to parse out the signboard characters.

Challenges

After being affirmed by the TA that this project proposal is not impossible, we would still like to have a mentor who can help us on these task. Specifically, we do not know where to start tackling Step 5 (angle correction) and Step 6 (traditional OCR technique).

Android Statement

We do not plan to implement on Android. Although the ultimate goal is to have this processing done on a mobile device, for this project, we only consider building the computation backend.

References

[1] Wanniarachchi, W.; Sonnadara, D.U.J.; Jayananda, M.K., "License plate identification based on image processing techniques," in *Industrial and Information Systems, 2007. ICIIS 2007. International Conference on*, vol., no., pp.373-378, 9-11 Aug. 2007
doi: 10.1109/ICIINFS.2007.4579205

[2] Oosterman, J.; Green, R., "Geolocation on the iPhone by automatic street sign reading," in *Image and Vision Computing New Zealand (IVCNZ), 2010 25th International Conference of*, vol., no., pp.1-6, 8-9 Nov. 2010

[3] Sharma, N.; Kumar, B.; Singh, V., "Recognition of off-line hand printed English Characters, Numerals and Special Symbols," in *Confluence The Next Generation Information Technology Summit (Confluence), 2014 5th International Conference -*, vol., no., pp.640-645, 25-26 Sept. 2014

[4] Cambra, A.B.; Murillo, A.C., "Towards robust and efficient text sign reading from a mobile phone," in *Computer Vision Workshops (ICCV Workshops), 2011 IEEE International Conference on*, vol., no., pp.64-71, 6-13 Nov. 2011

[5] Mullah et al. "Design of an Optical Character Recognition System for Camera- based Handheld Devices", in *IJCSI International Journal of Computer Science Issues*, Vol. 8, Issue 4, No 1, July 2011