Text Detection and Recognition from Natural Scene using Stroke Width Transform and Deep Feature Classification

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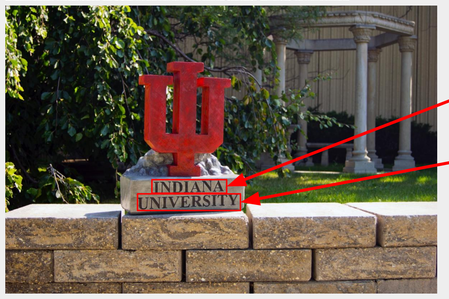
Introduction

- In a natural scenery, there could be multiple instances of texts that an agent may want to read.
- We detect and recognize texts present in an image.
- Two major parts: text detection and recognition.
- We use stroke width transform method with grouping and filtering to detect and localize texts.
- We extract the deep features of the text characters and classify the characters using a trained SVM.

Input Image:



Detected Texts:

SCHOOL

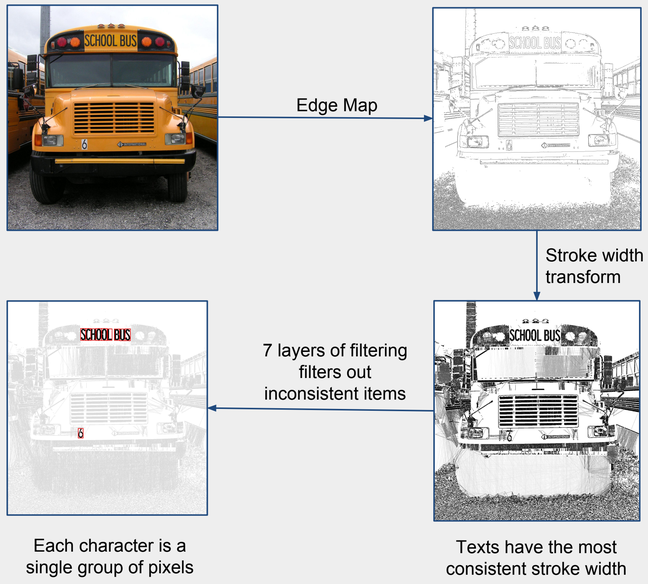
BUS

6

INDIANA

UNIVERSITY

Text Detection / Localization



Stroke Width Transform

- We generate edge map with Canny edge detector.
- For each edge pixel **p**, we search in the gradient direction of **p** for another edge pixel **q.** If gradient direction of **q** is opposite of **p,** all the pixels within the search ray has width of **|p-q|.**
- Text strokes have consistent width.

Fig 1:

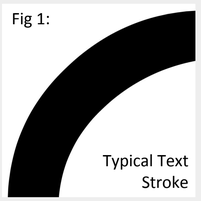
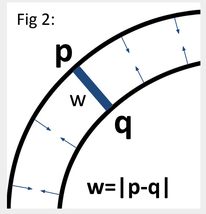


Fig 2:



Deep Text Recognition

- **Dataset:** char74k datasets with 7705 natural images with 64 classes (0-9, A-Z, a-z).
- **Deep feature:** Overfeat library extracts the deep features of the training images.
- **Training:** We trained a multiclass SVM with the extracted deep features.
- **Classify:** Overfeat library to extract the features and trained SVM model to classify.

Summary & Future Work

- Able to detect all the characters most of the times.
- Recognizes English letters correctly.
- False positive for foliage/texture similar to text.
- Cannot detect cursive texts.
- Detects dark texts on light background only.
- **Future Work:** To recognize the characters using deep learning which would eliminate the false positives.
- Research on cursive and light texts on dark background.

References

I. B. Epshtein, E. Ofek, and Y.Wexler. Detecting text in natural scenes with stroke width transform. In CVPR, 2010.
II. http://www.ee.surrey.ac.uk/CVSSP/demos/chars74k/
III. http://cilvr.nyu.edu/doku.php?id=software:overfeat:start
IV. J. Canny, “A Computational Approach To Edge Detection”, IEEE Trans, 1986.