

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 text that an agent may want to read.
- We detect and recognize text from an image.
- We use stroke width transform^[1] with grouping and filtering to detect and localize characters.
- We extract the deep features of each character and classify the characters using a trained SVM^[5].
- All recognized characters are grouped together to get the text string.

Input Image:

Detected Text String:



Figure Reprinted from: <http://www.fts4buses.com/vehicles/2002-international-bus-8135>



Figure Reprinted from: <http://www.stonemascots.com/vspfiles/photos/2997-4.jpg>

SCHOOL

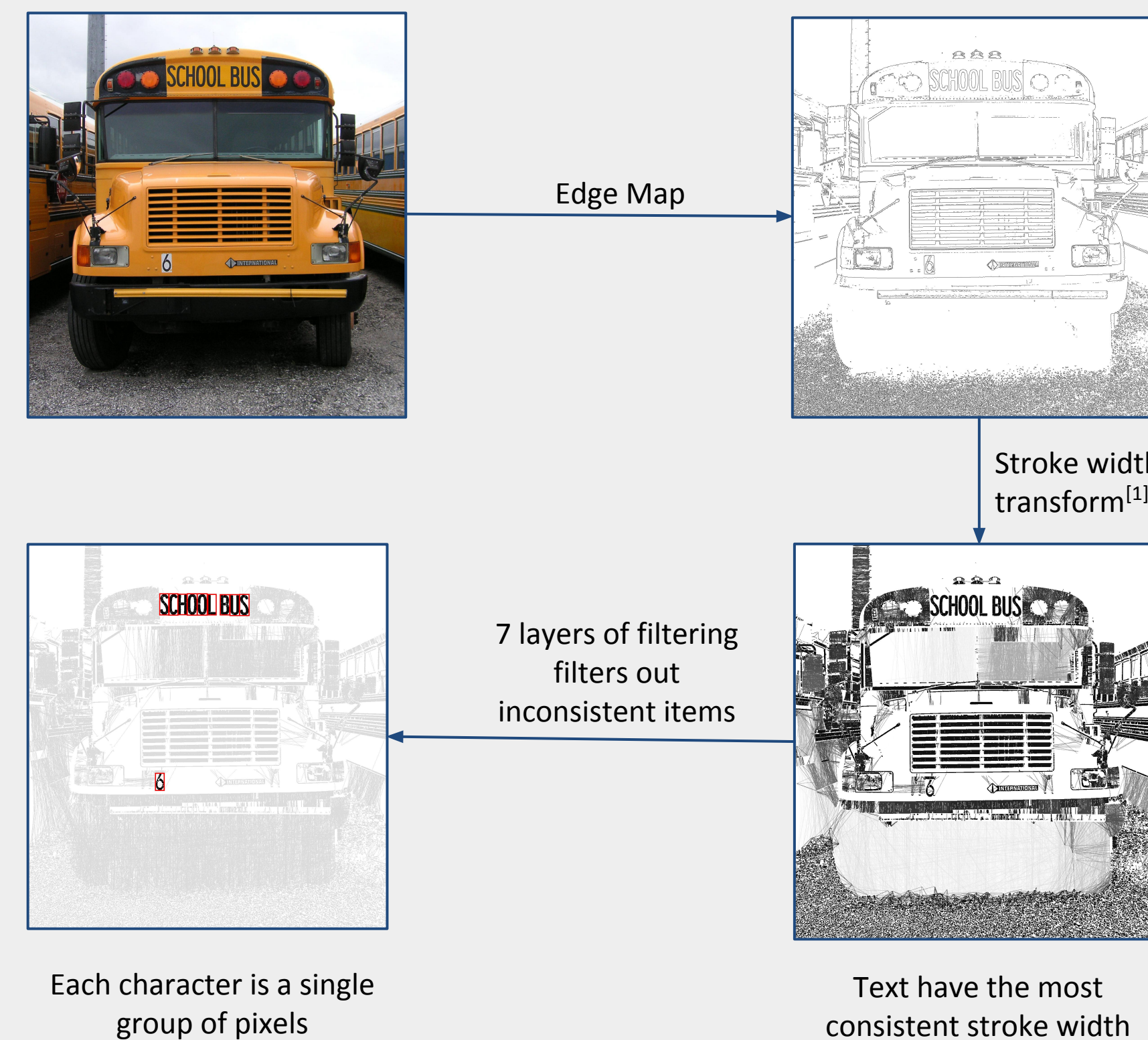
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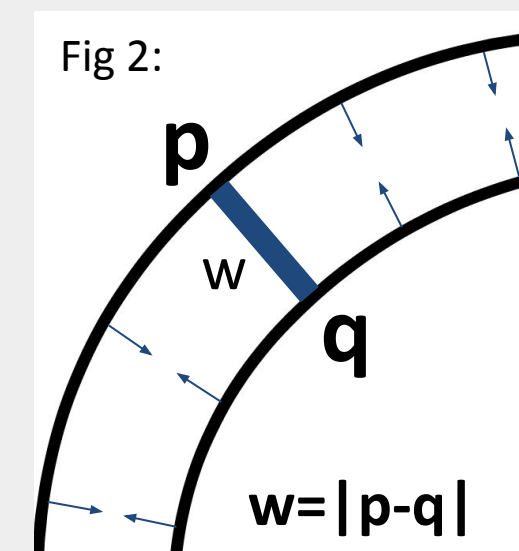
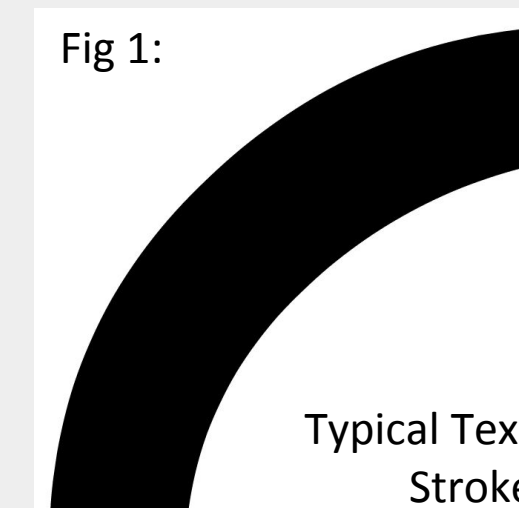
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Text Detection / Localization



Stroke Width Transform^[1]

- We generate edge map with Canny edge detector^[4].
- 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.



Deep Text Recognition

- **Dataset:** char74k datasets^[2] with 7705 natural images with 62 classes (0-9, A-Z, a-z).
- **Deep feature:** Overfeat library^[3] extracts the deep features of the training images.
- **Training:** We trained a multiclass SVM^[5] with the extracted deep features.
- **Classify:** Overfeat library^[3] to extract the features and trained SVM^[5] model to classify.



Fig: Sample Char74k dataset

Summary & Future Work

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

References

1. B. Epshtein, E. Ofek, and Y. Wexler. Detecting text in natural scenes with stroke width transform. In CVPR, 2010.
2. <http://www.ee.surrey.ac.uk/CVSSP/demos/chars74k/>
3. <http://cilvr.nyu.edu/doku.php?id=software:overfeat:start>
4. J. Canny, "A Computational Approach To Edge Detection", IEEE Trans, 1986.
5. https://www.cs.cornell.edu/people/tj/svm_light/svm_multiclass.html