Automated SVG Map Labeling for Customizable Large Print Maps for Low Vision Individuals

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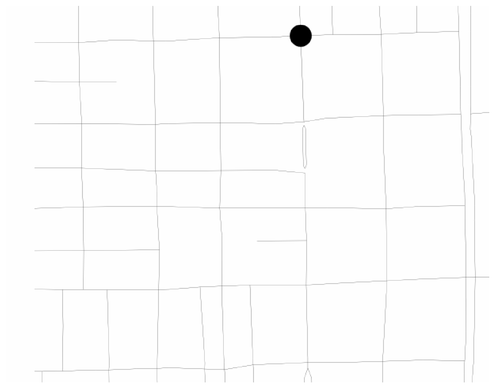
Abstract

Many people with visual impairments do not read Braille and have problems interpreting tactile information. Some of them have enough residual vision so that if streets and their names were presented in the proper color, size, and style, they could benefit from customizable large print maps. Such maps would allow people with low vision to study a new area, pre-plan travel, and have portable maps to consult while navigating in unfamiliar areas. This paper presents an algorithm for placing street names on street maps produced by the Tactile Map Automated Production (TMAP) software in the Scalable Vector Graphics (SVG) format.

SVG Map Labelling Problem

Input:

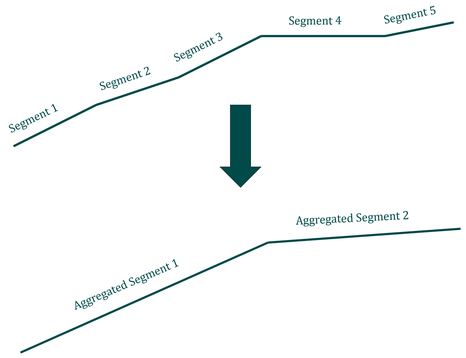


Part of the SVG map of downtown Chicago that the algorithm takes as input described in the paper. It contains the street lines but no street names. The street names are given as attributes of street segments in the SVG file and are not properly placed.

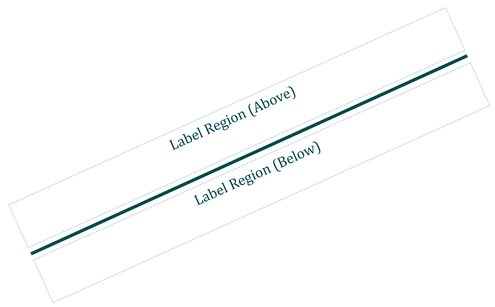
Output:

Part of the SVG map of downtown Chicago generated by the algorithm described in the paper. The streets form a grid of lines. The street lines are in red, the street names are in green. The street line widths and colors, the font style, size, and color can be changed by the user.

Algorithm: Step 1 – Aggregate Street Segments



Algorithm: Step 2 – Compute Label Regions

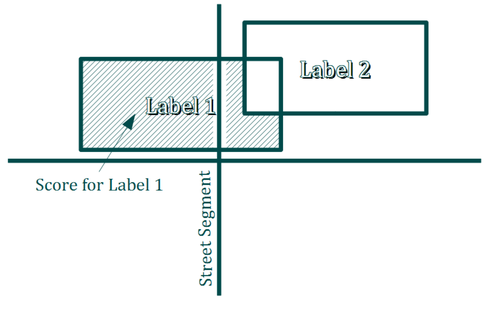


Algorithm: Step 3 – Reduce the Label

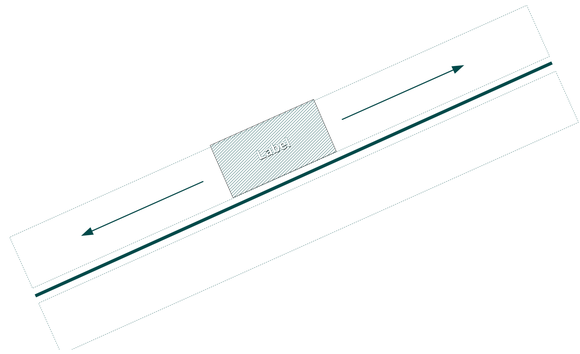
If a label region is smaller than the label, the label is iteratively reduced as follows:

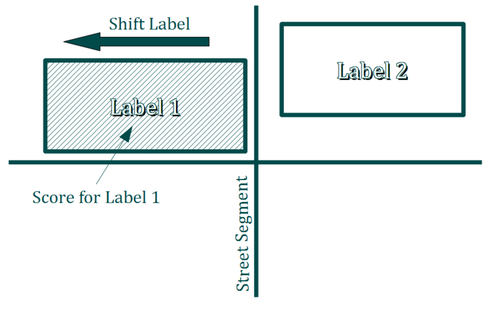
1) Using standard abbreviations: Drive becomes Dr.
2) Removing all vowels: Way becomes Wy
3) Iteratively removing last character

Algorithm: Step 4 – Score Candidate Label Positions

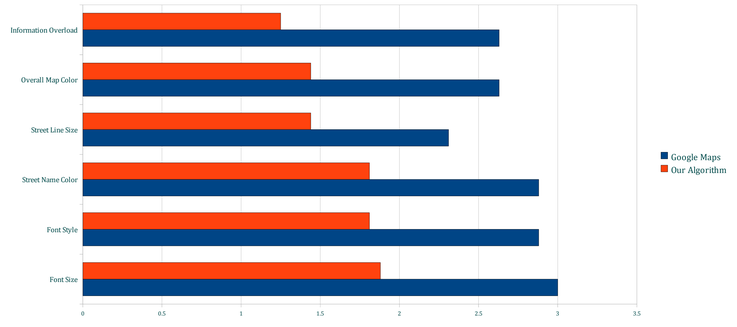


Algorithm: Step 5 – Shift Candidate Label Positions





Results



Acknowledgements

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