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## **Automatic label placement for city maps with the labelling library PAL**

**Automatic label placement on maps has been studied for many decades. This study has addressed the problem of automatic label placement by applying the labelling library PAL for labelling static, large scale city maps which the map company T-Kartor produces. Label placement rules were acquired from an interview with a person from the company. These rules were then applied on the labelling.**

The aim of this study was to develop a method for good automatic label placement. The label placement was meant to follow specific labelling rules set by the cities and T-Kartor, and the evaluation of the labelling was based on these rules, i.e. to which degree these rules have been followed in the labelling of maps. The objective was to find a new method of using open-source software to develop a label placement program that is easily accessed.

The method for automated label placement was chosen based on a literature review made, where different types methods applied in previous research were searched for. The labelling library PAL was chosen for the practical study. PAL applies combinatorial optimization methods for placing text labels. The label placement program was written in Python in the QGIS environment, in which PAL is also integrated. PAL parameters were set in the program to produce satisfactory labelling. The results showed that the label placement quality was not high enough for the program to be used professionally. However, using PAL for label placement could potentially produce better label placement quality if the parameter settings are refined.

Future studies on this topic should focus on exploring PAL parameter settings further, to find settings that produce label placement which follows the labelling rules to a larger extent. Moreover, a robust evaluation method is needed for grading and quantifying the label placement more accurately.

Keywords: Geography, Physical Geography and Ecosystem analysis, Cartography, Label Placement, Algorithms, Label Placement Rules, Labeling

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Master's degree project 30 credits in Geomatics, 2020

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