

Geomatics Graduation Topic: Optimal Cycling Infrastructure

Graduation theme: GIS and Spatial analysis

Company or institution: TU Delft possibly in collaboration with the Samenwerkingsverband Regio Eindhoven or Gemeente Delft

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Website: URL of website (if applicable).

Project duration: 8 months

Requirements and skills: Graph Theory, experience with Object Oriented Programming and OSM are desirable

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Introduction

Given the European priorities in the areas of energy and transport, there is a trend for increasing the role of walking and cycling in urban transportation in order to reduce urban road congestion and use of fossil fuels. Walking and Cycling are referred to as active modes in transportation engineering, as they necessitate active physical and cognitive involvement of travellers. Convenient paths for cycling can be identified as those that are convenient both in term of physical ease of cycling and cognitive ease of way finding; to these two we can also add a social dimension: safety and desirable social interactions. It is workable to address the three aspects largely by studying (3D) maps and models of built environment. Any model principally reduces the complexity of real world; therefore, there are always aspects that cannot be addressed in models; however, models can be used as bases for explanatory theories. When using a theory, we can predict what would happen if an intervention takes place. With the ever-decreasing public budgets of municipal and regional authorities, it is of outmost importance to be able to plan knowingly for any intervention. Theories that associate the human behaviour to spatial structure and configuration (such as –but not limited to- Space Syntax) can play an important role in studying the so-called ‘what-if scenarios’.

Proposed Graduation Topic(s)

Convenient paths for cycling can be identified as those that are convenient both in term of physical ease of cycling and cognitive ease of way finding; to these two we can also add a social dimension: e.g. safety and desirable social interactions. It is workable to address the three aspects largely by studying (3D) maps and models of built environment. Theories that associate the human behaviour to spatial structure and configuration (such as –but not limited to- Space Syntax) can play an important role in analysing different scenarios.

Path finding and network studies are central to this research. The ultimate goal is to come up with a methodology for finding optimal cycling paths, mapping cycling accessibility and predicating usage of cycling network utilising spatial network models and graph algorithms.