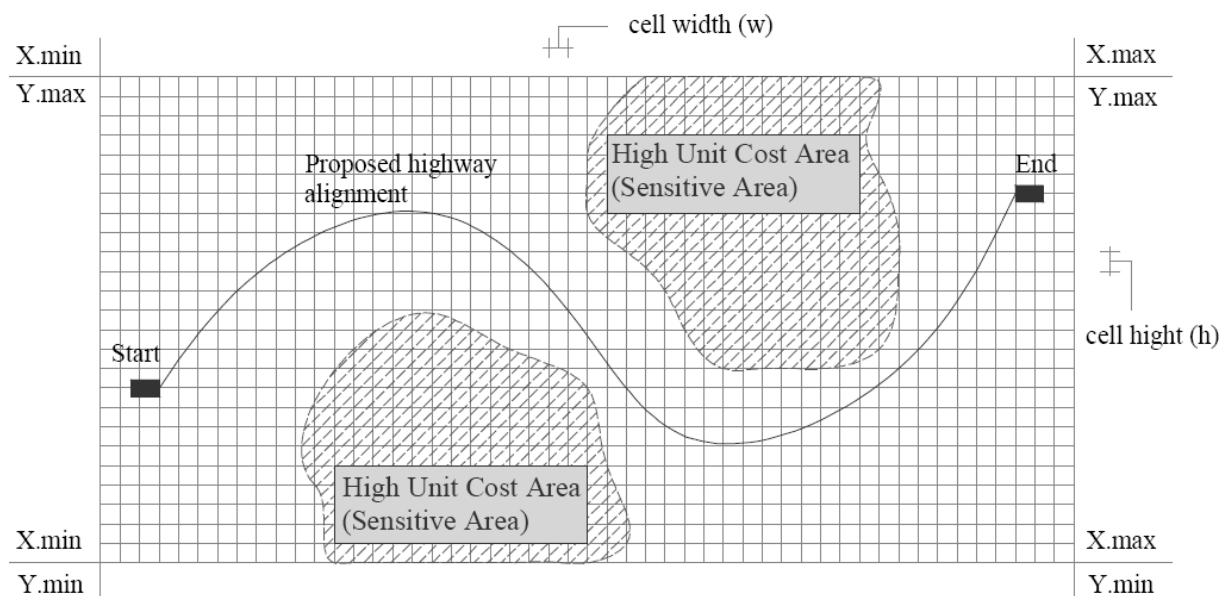# A Genetic Algorithm for the Horizontal Alignment Design of Highways

Highway alignment design is the oldest profession of civil engineers and remains up to date a complex planning task. For example, to plan a highway between two cities, there is a wide range of possible design variations according to the technical design standards. In general, two cost factors have to be considered for finding the optimal design solution: length dependent construction cost and land acquisition cost. Both cost factors are determinable for each alignment design solution by using a cell grid model depicted in the following figure. Each grid cell element has a unit size (length and height) and a unit cost value to represent land use costs [1].

The goal of this SoftwareLab project is to find the most cost-minimal horizontal alignment design of the highway using Genetic Algorithms (GAs). GAs belong to the class of heuristic optimization approaches and provide an efficient tool for solving multi-criteria planning problems. The developed algorithm must be implemented using an object-oriented programming language and evaluated with test cases.

Supervisor

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References

[1] Al-Hada, B. A., Mawdesley, M. J. and Stace, R. (2010). A Genetic Algorithm Approach to Highway Alignment Development. In Proc. Of the International Conference on Computing in Civil and Building Engineering, Nottingham, UK