

Report, Kinetic project

Dorian Geraldés Pereira, Axel Demuth

March 2024

Contents

1	Objectives	2
2	Tools	2
2.1	CGAL	2
2.2	Kinetic	2

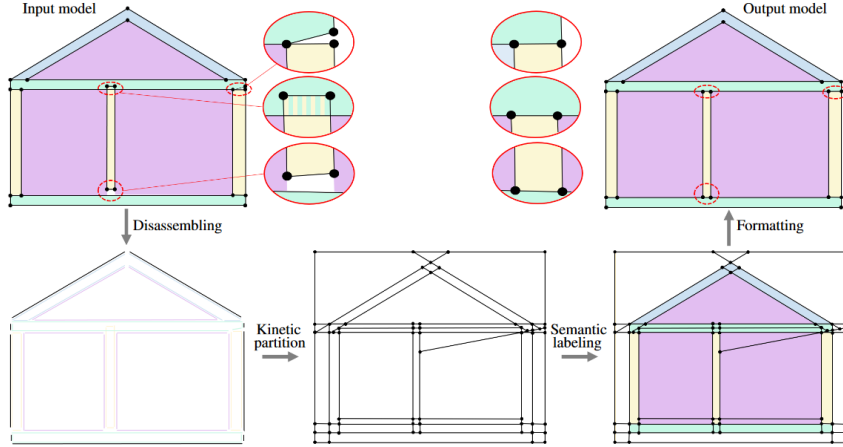
1 Objectives

To be able to solve equations on a mesh, we need it to be watertight.

The objectives of the project are:

- Repair mesh to make them watertight
 - watertight building model
 - watertight urban model

In our project we will have to use files in IFC format containing building meshes that are not watertight in an algorithm repairing geometric error in a kinetic data structures. We will have to find a way to keep the label on the surfaces in the algorithm or relabel every surfaces at the end. we can see here an example of what we will need to do:



2 Tools

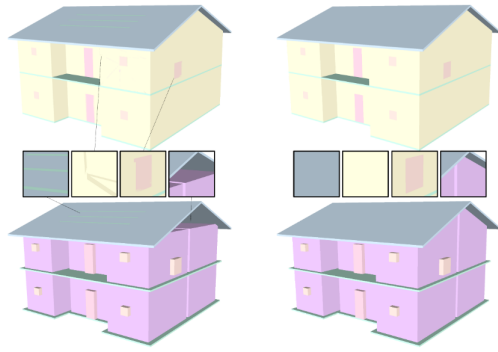
2.1 CGAL

CGAL is a comprehensive package for geometry algorithms, providing various data structures and algorithms for working on polygons, surfaces, mesh generation, and more. It offers a wide range of functionalities for geometric processing and analysis in various fields such as computer graphics, computational geometry, and geometric modeling.

2.2 Kinetic

Kinetic algorithms is a package from CGAL that allows working on meshes with some holes in them. When applied to the mesh, the Kinetic algorithms

will 'extend' some surfaces to fill the mesh and make it watertight. Here's what the algorithm is capable of:



texte v1 : To use the algortihm we are using an algortihm from CGAL, when given a bunch of parameter and a files with a scatter plot and the normal associated to the point. We had the chance to have a meeting with Florent Lafarge one of the creator of the algorithm, and he explain to us what parameter are important to analyse and which one gonna have a huge influence on the results. There are 2 important parameter: distance and qmin here an example with both parameter varying:

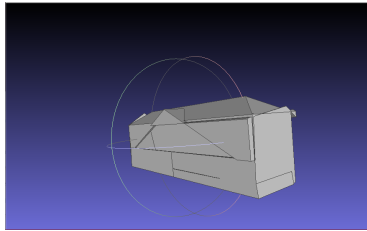


Figure 1: Image 1

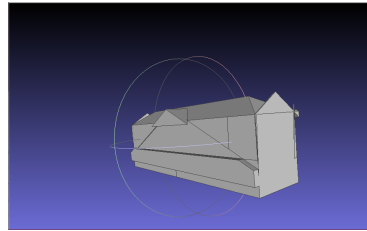


Figure 2: Image 2

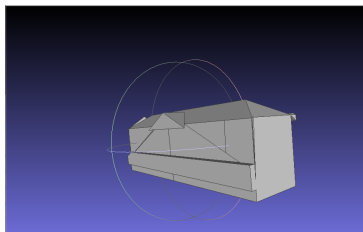


Figure 3: Image 3