CALCUL ET MODÉLISATION GÉOMÉTRIQUE POUR L'INFORMATIQUE GRAPHIQUE

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Lecturers: Mohsen ARDABILIAN

| Lecturers : 0.0 | TC : 0.0 | PW : 0.0 | Autonomy : 0.0 | Study : 0.0 | Project : 0.0 | Language : FR

Objectives

The popularization of 3D digitization techniques has led to the development of complex digital object models. It is indeed essential to benefit from efficient and fast treatments to obtain, transmit, edit and deform quality models that are produced from raw data that may be very noisy and redundant. The purpose of this course is to introduce the notion of Geometry Processing useful for shape modeling.
In particular, we will examine the problem of generating a surface mesh as a discretization of the geometry of a 2D or 3D shape, and we will present the approaches of Computational Geometry to generate, simplify, refine and manipulate them, by relying on geometric structures. with particular properties.

Keywords : Geometry processing, mesh generation, 3D reconstruction, mesh simplification and refinement, Techniques based on Delaunay triangulation and Voronoi diagram, virtual sculpture.

Programme

Meshes:
- Definitions
- Generation of meshes, 3D reconstruction and virtual sculpture
- Simplification and refinement of meshes
- Meshes improvement, coding

Geometry Processing and Computational Geometry (CG):
- Elementary notions of CG in 2D (planar maps, graphs, triangulation, convex hull)
- Construction of convex hull in 2D: optimal algorithm (divide and conquer)

Learning outcomes

Independent study

Objectifs :

Méhodes :

Core texts

Pascal Frey, Paul-Louis George, *MESH GENERATION*, 2nd Edition. Wiley-ISTE, 2008
Mario Botsch, Leif Kobb elt, Mark Pauly, Pierre Alliez, Bruno Levy *POLYGON MESH PROCESSING*, K Peters/CRC Press, 2011
M. de Berg, M. van Kreveld, M. Overmars, O. Schwar*COMPUTATIONAL GEOMETRY ALGORITHMS AND APPLICATIONS*, Springer-Verlag, 1997

Assessment

Final evaluation and score of the BE