ASSOCIAZIONE NAZIONALE DISEGNO E METODI

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FEATURES RECOGNITION IN 3D DISCRETE MODELS

Motivation

Shape representation, analysis, and interpretation have been central problems in many applications dealing with human manufactures, including graphics, CAD/CAM/CAE, reverse engineering, and additive manufacturing, as well as in cultural heritage and bioengineering.
The recent advancements of 3D imaging technologies resulted in a new generation of acquisition devices, such as laser scanning, photogrammetry, and computed tomography, capable of capturing both the global and local geometry of 3D objects.
However, directly reconstructing and tessellating these point clouds does not always produce suitable models, especially when the data are affected by noise or other defects. Furthermore, when traditional surface reconstruction techniques are employed, important surface details, such as feature curves, may be lost.

Background

With the widespread adoption of discrete models, there is a need to develop new methods for integrating various technologies and activities involved in model simulation and analysis within the above mentioned. A key limitation of this representation scheme lies in the low level of information available, which is typically restricted to point coordinates and normal triangles. To fully benefit from these models, high-level information must be extracted by recognising specific features of the field of application. Feature recognition in 3D discrete models has become a significant area of research in recent years. Traditional feature recognition techniques, often based on continuous models, do not always adequately address the challenges posed by discrete models, necessitating specific and innovative approaches.
In this special issue, we intend to address the problem of identifying features (curves, surfaces, patterns, etc) within 3D discrete models. This special issue solicits original contributions that can provide both theoretical and experimental insight into this fundamental problem. Topics we would like to cover here include but are not limited to:

- Shape acquisition, registration and reconstruction
- Curve representations for mesh manifolds and point cloud models
- Primitive fitting on surfaces
- Recognition of patterns on surfaces
- Comparison of model decorations and patterns
- Shape texture retrieval and classification
- Shape texture recognition and interpretation
- Learning paradigms for shape texture processing
- Applications

The Special Session proposers include:
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Structure of the session

Invited speaker
Oral presentations