



研究開発 – Article of the Future : Executable Paper (実行可能な論文)

紹介ビデオ: <https://www.youtube.com/watch?v=FQ5FaeHcdwo>

The screenshot shows a ScienceDirect article page. The article title is "Data-aware 3D partitioning for generic shape retrieval". The authors are Ivan Sipiran, Benjamin Bustos, and Tobias Schreck. The article is part of a "Special Section on 3D Object Retrieval".

Highlights:

- We propose a simple and effective partitioning algorithm for 3D meshes.
- The use of part descriptions enhances the use of global descriptors.
- We define a distance as an optimization problem, including both linear and quadratic constraints.
- Our experiments show that the partitioning algorithm has a great influence in the final effectiveness of retrieval tasks.

Abstract:

In this paper, we present a new approach for generic 3D shape retrieval based on a mesh partitioning scheme. Our method combines a mesh global description and mesh partition descriptions to represent a 3D shape. The partitioning is useful because it helps us to extract additional information in a more local sense. Thus, part descriptions can mitigate the semantic gap imposed by global description methods. We propose to find spatial agglomerations of local features to generate mesh partitions. Hence, the definition of a distance function is stated as an optimization problem to find the best match between two shape representations. We show that mesh partitions are representative and therefore it helps to improve the effectiveness in retrieval tasks. We present exhaustive experimentation using the SHREC'09 Generic Shape Retrieval Benchmark.

Graphical abstract:

The graphical abstract shows two columns of 3D models. The left column is labeled "Original Shape" and shows various bird-like shapes. The right column shows the same shapes partitioned into smaller, more detailed components.

Code Viewer (Right Panel):

- Code 1 (Bash): Retrieval demo (Code 1)
- Data 1: Query object
- Data 2: First ranked model
- Data 3: Second ranked model
- Data 4: Third ranked model
- Data 5: Fourth ranked model
- Data 6: Fifth ranked model
- Code 2 (Bash): Compute combined distance with DSR (Code 2)
- Code 3 (GnuPlot 4.2.6): Recall-Precision plot for "mu" (Code 3)
- Data 7: Recall-Precision plot for figure 3