



Title	A Compact Encoding of Plane Triangulations with Efficient Query Supports
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Citation	2010年度科学技術振興機構ERATO湊離散構造処理系プロジェクト講究録. p.504.
Issue Date	2011-06
Doc URL	<a href="http://hdl.handle.net/2115/48327">http://hdl.handle.net/2115/48327</a>
Type	conference presentation
Note	ERATO湊離散構造処理系プロジェクトシンポジウム(第2回) : 第73回情報処理学会全国大会イベント企画. 2011年3月2日(水). 東京工業大学 大岡山キャンパス.
File Information	03.yamanaka.pdf



[Instructions for use](#)

# A Compact Encoding of Plane Triangulations with Efficient Query Supports



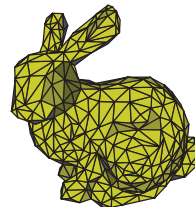
○ Katsuhisa Yamanaka (UEC Tokyo) and Shin-ichi Nakano (Gunma Univ.)

## Motivation

A *fine* 3D object is represented as *large* plane triangulation

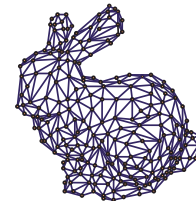


A *compact* representation



3D object

Representation as plane triangulation

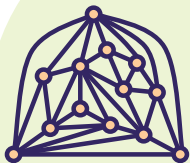


## Encoding Ideas

$n$  : # vertices  
 $m$  : # edges

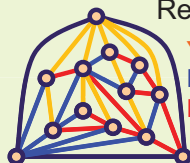
Plane triangulation

(A plane graph in which every face is a *triangle*)

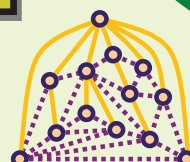


Realizer

Yellow tree  
Blue tree  
Red tree



Encode



- Spanning-tree (Yellow lines)
- Non-spanning-tree edges (Purple lines)

Binary string ( $6n$  bits)

11011001101001110001010100  
000011100110111001100111001010110110011001

Known results

Authors	Size (bits)	Published in
Chuang, Garg, et. al.	$7n + o(n)$	Proc. ICALP (1998)
Aleardi, Devillers, et. al.	$4.35n + o(n)$	Proc. WADS (2005)
Aleardi, Devillers, et. al.	$3.24n + o(n)$	Theoretical Computer Science (2008)
Ours	$6n + o(n)$	Information Processing Letters (2010)

## Query supports

With a help of *auxiliary table* of  $o(n)$  bits, we can support a variety of queries in  $O(1)$  time

- Adjacency query Adj.?
- Degree query Deg.?
- Clockwise neighbour query  $k$ -th clockwise neighbour query  
Next?

Compact representation of plane triangul.