

Berichte aus der Geoinformatik

Mai Phuong Vuong

Conversion of representations of 3D geo-objects

Shaker Verlag
Aachen 2012

Bibliographic information published by the Deutsche Nationalbibliothek

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at <http://dnb.d-nb.de>.

Zugl.: Freiberg, Univ., Diss., 2011

Copyright Shaker Verlag 2012

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publishers.

Printed in Germany.

ISBN 978-3-8440-0815-9

ISSN 1618-1034

Shaker Verlag GmbH • P.O. BOX 101818 • D-52018 Aachen

Phone: 0049/2407/9596-0 • Telefax: 0049/2407/9596-9

Internet: www.shaker.de • e-mail: info@shaker.de

Summary

Conversion of representations of 3D geo-objects
Mai Phuong Vuong

Ever increasingly huge sets of data indexed with reference to 2d, 3d or 4d real space are being collected in all fields of science and require intelligent data models for well performing management. Thus we experience a growing interest in more efficient data models to describe objects, both in terms of memory and management, especially search and retrieval.

Two features involve modeling objects: geometry and topology. The former gives the description about the location in space, the shape of objects. The latter describes the neighboring relationships between objects, and that between cells (i.e. vertices, edges, faces, etc) of objects.

The contributions of this work can be summarized into the following aspects:

- Defining the decomposition of objects into cells, and properties of such a decomposition;
- A novel model for modeling the topology of objects given in any spatial dimension;
- An approach for converting objects given in terms of pixel or voxel into boundary representation including topology;
- An application in Materials science to reconstruct grain boundaries from Electron backscatter diffraction data;