

Session 5: Raster to Vector and drawings

Chairs: Jorge Calvo-Zaragoza & Wataru Ohyama

Session chairs

❖ Jorge Calvo-Zaragoza

- PhD candidate from 2012 to 2016
 - University of Alicante, Alicante (Spain)
- Postdoctoral Fellow
 - McGill University, Montreal (Canada)
- Main research topic: Optical Music Recognition

Session chairs

❖ **Wataru Ohyama, Ph.D**

- Assistant Professor, Mie University (Japan)
- Research Topic:
 - Handwriting Analysis and Recognition
 - Signature Verification
 - Music Score Recognition
 - Historical Documents Analysis
 - Camera-based OCR
 - Multilingual OCR

Introduction to the topics

- Catch-all session
 - Computational geometry
 - Polylines processing: fitting, compression, and searching
 - Architecture, Engineering & Construction (AEC) documents
 - Circular callout detection
 - Information retrieval from cosmic ray recordings
 - Case of study from a specific event
- Focusing on practical applications.

Session outline (each paper: 10 min presentation)

- Alexander Gribov: “***Approximate Fitting a Circular Arc When Two Points Are Known***”
- Sandip Maity, Bidyut Chaudhuri, Bhagesh Seraogi, Purnendu Banerjee, Supriya Das, Himadri Majumdar, Srinivas Mukkamala, Rahul Roy: “***A Novel Approach for Detecting Circular Callouts in AEC Drawing Documents***”
- Alexander Gribov: “***An Efficient Combinatorial Algorithm for Optimal Compression of a Polyline with Segments and Arcs***”
- Vincent Mattana, Gunther Drevin, Du Toit Strauss: “***Extracting the ground level enhancement event of February 1956 from legacy cosmic ray recordings***”
- Alexander Gribov: “**Searching for a Compressed Polyline with a Minimum Number of Vertices**”

NeuralNetwork-free Session!

Paper 1

Approximate Fitting a Circular Arc When Two Points Are Known

Alexander Gribov

Paper 2

A Novel Approach for Detecting Circular Callouts in AEC Drawing Documents

Sandip Maity, Bidyut Chaudhuri, Bhagesh Seraogi, Purnendu Banerjee, Supriya Das, Himadri Majumdar, Srinivas Mukkamala, Rahul Roy

Paper 3

An Efficient Combinatorial Algorithm for Optimal Compression of a Polyline with Segments and Arcs

Alexander Gribov

- An improved algorithm for polyline compression is proposed.
- The proposed algorithm employs modification of DP-based algorithm by replacing the iteration process to find farthest vertex.
- Efficiency improvement for two typical cases are shown.

Paper 4

Extracting the ground level enhancement event of February 1956 from legacy cosmic ray recordings

Vincent Mattana, Gunther Drevin, Du Toit Strauss

- A practical application for images of legacy cosmic ray recordings is reported.
- GLE #5 has been extracted from historical GLE records with an acceptable level of accuracy.
- Detail of extracting algorithm is expected.

Paper 5

Searching for a Compressed Polyline with a Minimum Number of Vertices

Alexander Gribov

- A practical algorithm for polyline compression is proposed.
- The algorithm is used for the reconstruction of orthogonal buildings and a viable solution to finding a polyline within a specified tolerance with the minimum number of vertices is described.
- The performance evaluation has been done using LIDAR data.

Discussion

Open questions:

- Performance improvement is important, however, how much performances (accuracy, processing time, required memory size) are required for each application?
- What is the next challenge in this research topic?
- Is it possible or What's happen using deep-learning based method for each application?