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    ● Historical Documents Analysis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”
- 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!
Approximate Fitting a Circular Arc When Two Points Are Known
Alexander Gribov
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
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.
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?