






Publications

- **Peter Horvath**, Ian Jermyn. **A 'gas of circles' phase field model and its application to tree crown extraction**. In Proceedings of the *European Signal Processing Conference (EUSIPCO'07)*, Poznan, Poland, September 2007. EURASIP 
- **Peter Horvath**, Ian Jermyn, Zoltan Kato, and Josiane Zerubia. **A new phase field model of a 'gas of circles' for tree crown extraction from aerial images**. In Proceedings of the *12th International Conference on Computer Analysis of Images and Patterns (CAIP'07)*, Vienna, Austria, August 2007. LNCS. 
- **Peter Horvath**. **A Multi-Spectral Data Model for Higher-Order Active Contours and its Application to Tree Crown Extraction**. In Proceedings of the *Advanced Concepts for Intelligent Vision Systems (ACIVS'07)*, Delft, the Netherlands, August 2007. LNCS. 
- **Peter Horvath**, Ian Jermyn, Zoltan Kato, and Josiane Zerubia. **Circular object segmentation using higher-order active contours**. In Proceedings of the *5th. Conference of the Hungarian Association for Image Analysis and Pattern Recognition (KEPAF'07)*, Debrecen, Hungary, January, 2007. 
- **Peter Horvath**, Ian Jermyn, Zoltan Kato, and Josiane Zerubia. **An improved 'gas of circles' higher-order active contour model and its application to tree crown extraction**. In Proceedings of *Indian Conference on Vision, Graphics and Image Processing (ICVGIP'06)*, Madurai, India, December 2006. LNCS. 
- **Peter Horvath**, Ian Jermyn, Zoltan Kato, and Josiane Zerubia. **A higher-order active contour model of a 'gas of circles' and its application to tree crown extraction**. Submitted to the *Pattern Recognition*, November 2006. 
- **Peter Horvath**, Ian Jermyn, Zoltan Kato, and Josiane Zerubia. **A higher-order active contour model of a 'gas of circles' and its application to tree crown extraction**. *Research Report 6026*, INRIA, Sophia Antipolis, France, November 2006. 
- **Peter Horvath**, Ian Jermyn, Zoltan Kato, and Josiane Zerubia. **A Higher-Order Active Contour Model for Tree Detection**. In Proceedings of *International Conference on Pattern Recognition (ICPR'06)*, Hong Kong, China, August 2006. IAPR, IEEE. 
- **Peter Horvath**, Ian Jermyn, Josiane Zerubia and Zoltan Kato: **Higher order Active Contours for Tree Detection**. *Research Report for the Marie Curie Fellowship program*, Sophia Antipolis, France, 2005 
- **Peter Horvath**, Avik Bhattacharya, Ian Jermyn, Zoltan Kato and Josiane Zerubia: **Shape Moments for Region Based Active Contours**. In Proceedings of the *Hungarian-Austrian Conference on Image Processing and Pattern Recognition (HACIPPR'05)*, Veszprem, Hungary, Mai, 2005. 
- **Peter Horvath** and Zoltan Kato: **Optical Flow Computation Using the Mumford-Shah Energy Minimization Approach**. In Proceedings of the *4th. Conference of the Hungarian Association for Image Analysis and Pattern Recognition (KEPAF'04)*, Miskolc-Tapolca, Hungary, January, 2004. 
- **Peter Horvath** and Zoltan Kato: **Color, Texture and Motion Segmentation Using Gradient Vector Flow**. In Proceedings of the *4th. Conference of the Hungarian Association for Image Analysis and Pattern Recognition (KEPAF'04)*, Miskolc-Tapolca, Hungary, January, 2004. 

Research projects

2004-2007 I work on image segmentation using a new active contour family called Higher-Order Active Contours (HOAC), introduced prior shape information into the segmentation to model circular objects. Used the method to find tree crowns on CIR aerial images. Also developed a new model provided us with better results. Later on introduced a new energy-minimization method using phase fields and achieved significantly faster running. Implemented all the programs in Matlab and C++. Made a contract with the Hungarian Forest Inventory (AESZ) enabling us to use color infrared aerial images. I was a co-supervisor of a Master student on variational models. (INRIA ARIANA Research Group; University of Szeged)

Developed a model and implemented it in C++, using confocal microscope- and nano-images to extract the 3D shape of laser shots into different metal materials. (Nanotechnology Department, University of Szeged)

- 2003-2004 Introduced a real time motion tracking algorithm using optical flow, and implemented the model in C++. Developed a pan-tilt robot camera, using the proposed algorithm tracking moving objects in real time.
- Proposed an active contour based segmentation method. The proposed model uses the results of the motion detection algorithm, combining them with color and texture. The implementation was in C++. (Image Processing and Computer Graphics Department, University of Szeged, Hungary)
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Expert

- Mathematical morphology, 3D application using OpenGL in Borland C Builder with GUI
- Active contour and level set implementation in Borland C Builder with GUI
- Real time motion detection using camera in Visual C++ with GUI
- Level set and different image manipulation programs in Matlab
- ACM European programming contest in 2002 and 2003 in Warsaw Poland, using C
- Scientific Student Contest 1st prize, real time motion detection in C++
- Small projects using SQL and Borland C Builder
- Java application for cellular phone with GPRS communication
- Different web pages in Html and Php
- Administrative platform for huge firms, in SQL, Delphi and Java at the Netcoach Ltd, Szeged
- Different mathematical computations using Maple
- Machine learning methods (PCA, ICA, ...) in C++
- Visual application for brain analysis in Borland C Builder for brain research
- 3D modeling and volume estimation for nanotechnology images in Borland C Builder
- 20+ scientific publications and reports in LaTeX
- 3D visualization in Visual C++, Borland Delphi and C Builder using OpenGL
- Small games in Pascal, C and C++ with GUI (Go-Moku, Minesweeper,...)
- Small Flash games (Bejeweled,...)
- Small Assembly games and graphical demos
- Hardware controllers using C, C++ and Pascal with GUI, Netprog Ltd, Oroshaza