Advances in Mathematical Physics

Special Issue on

Advanced Image Processing and Analysis Solutions using PDE-based Modeling of the Physics Phenomena

CALL FOR PAPERS

Partial differential equations (PDEs) have long been used to develop mathematical models in the physics of continuous media. Since these equations express continuous change, they have been used to model dynamical phenomena in heat conduction, elasticity, fluid mechanics, vibrating strings, electromagnetism, and other important physics and engineering fields.

Over the last 35 years, many such PDE-based models of physics phenomena have been successfully applied in both digital image processing and analysis and computer vision domains. Variational and nonvariational PDE-based techniques have been increasingly used in a variety of static and video image processing related fields, such as image restoration, inpainting, segmentation, compression, registration, and motion estimation, and have solved many challenges that still exist in these areas. Thus, PDEs have led to an entirely new image processing subdomain.

The major purpose of this special issue is to provide advanced research in these PDE-based image processing and analysis areas and to bring together the achievements of researchers in these fields. It aims to extend and improve the knowledge in these domains, by gathering articles disseminating novel research findings that answer the challenges that still remain in image denoising, interpolation, segmentation, (de)compression, and optical flow computation using continuous physics models like those based on nonlinear diffusion, reaction-diffusion, phase field, fluid, or Fokker–Planck equations. So, we encourage the authors to contribute original research articles describing new theoretical and practical accomplishments on relevant topics that are listed below, as well as review articles presenting the state of the art of the mentioned areas.

Potential topics include but are not limited to the following:

- Nonlinear second and fourth order anisotropic diffusion models for image restoration
- Image denoising and edge detection techniques using reaction-diffusion equations
- Advanced image interpolation using variational and nonvariational PDE-based models
- Structural inpainting approaches using fluid equations
- Hybrid restoration and inpainting methods combining PDE schemes of various orders
- Progressive halftoning solutions based on nonlinear diffusion equations
- Partial differential equation-based compression and decompression techniques
- Image segmentation solutions using phase-field models
- Variational level-set based algorithms for image segmentation
- Novel PDE-based solutions for optical flow estimation
- Image processing and computer vision frameworks using Fokker–Planck equations
- Novel variational models for image registration and fusion

Authors can submit their manuscripts through the Manuscript Tracking System at https://mts.hindawi.com/submit/journals/amp/aipas/.

Papers are published upon acceptance, regardless of the Special Issue publication date.

Lead Guest Editor
Tudor Barbu, Institute of Computer Science of the Romanian Academy, Iai, Romania
tudor.barbu@iit.academiaromana-is.ro

Guest Editors
Costică Moroanu, "Al. I. Cuza" University, Iaşi, Romania
costica.morosanu@uaic.ro

Liviu Gora, "Gheorghe Asachi" Tehnical University, Iaşi, Romania
lgoras@etti.tuiasi.ro

Submission Deadline
Friday, 5 July 2019

Publication Date
November 2019