

Tentative Outline (Preliminary Proposal of Thematic Issue)

Special/Thematic Issue for the journal "Current Medical Imaging"

Title: Hyperspectral Image Processing and its Clinical Applications

Guest Editor: Dr. Ali Ahmadian

Scope of the Thematic Issue:

Intending to address the emerging challenges in the medical field, technologies like image processing play an important role. For extracting, storing, processing, and manipulating the imagery data that is available, hyperspectral image processing acts as a dedicated image analysis method. By assigning a wide spectrum of light to each pixel, this hyperspectral imaging is seen as an optical tool for visualizing 2D objects. Moreover, for accurate classification and segmentation, this image processing tool could elaborate on the relationship between different spectra in the adjacent pixels. As well, this technology serves as non-invasive tools that combine spectroscopy and traditional imaging to simultaneously obtain both spectral and spatial data from the images. Engaging this imaging modality explicitly in the healthcare sector could pragmatically set out many clinical applications like image-guided diagnosis and surgery, quantitative imaging, tissue optics, cancer detection, targeted drug delivery and tracking, and much more. As it possesses quantitative diagnostic information through absorbed, reflected, transmitted, scattering, and fluorescence characteristics of the tissues, it could potentially deliver the aforesaid applications. Moreover, with the higher spatial and spectral resolution, this huge dataset of the tissue spectra facilitates real-time intraoperative diagnostic medical applications. Thus, this hyperspectral image processing technology becomes a promising tool to conduct image-guided applications in the health sector.

Based on the fundamental principle that different tissues possess unique spectral responses, hyperspectral imaging becomes a promising tool for evolving healthcare applications. Also, these optical sorters improve the quality of the services along with enhanced accuracy. Even though this intelligent infrastructure has many beneficial factors, some challenges occur in the path of technology intruding the medical field. Commencing from inadequate huge data storage facilities, lack of sensitive detectors, complexities in merging multidimensional datasets, mixed-pixel interference, etc. are some problems that readily retards the performance of the system. Obviously, technology with minimal errors could envision the future of clinical applications with maximized efficiency. Aiming this objective, researchers, academicians, scholars, and other related professionals are encouraged to put forth their innovative ideas for the welfare of this domain. Therefore, this special issue that focuses on clinical applications with emerging hyperspectral imaging technologies creates various opportunities for the researchers to submit their qualitative research articles for the betterment of this technological infrastructure.

Keywords: Image Processing, Hyperspectral, Visualization Techniques, Clinical Applications, Spectroscopy and Latest Technologies

Sub-topics:

- Opportunities and challenges in implementing AI-driven hyperspectral imaging for clinical applications
- Deep learning-based hyperspectral image analysis for image-guided disease diagnosis
- Disease diagnosis and image-guided surgery using hyperspectral image processing and IoT
- Emerging pattern recognition and hyperspectral image processing algorithms for image-guided surgeries

- Trends in medical hyperspectral imaging and big data analytics for real-time medical applications
- Hyperspectral Imaging-based AI technology for image-guided surgeries
- Integrating cloud-based hyperspectral image processing with AI for autonomous disease diagnostic system
- Advances in hyperspectral image processing and neural networks for cancer diagnosis
- Cognitive robotics and hyperspectral image processing for dermatological care
- Computer-aided hyperspectral image processing for image-guided medical analysis

Schedule:

- ✧ Complete Thematic issue submission deadline: **15-10-2022**

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