AzTE Arizona Technology Enterprises

www.azte.com

Automated Tumor Segmentation

AzTE Case # M13-149P

Inventors

Andreas Spanias

Professor

School of Electrical, Computer and Energy Engineering

David Frakes

Associate Professor

School of Biological and Health Systems Engineering

Jayaraman Thiagarajan

Graduate Student

School of Electrical, Computer and Energy Engineering

Karthikeyan Ramamurthy

Graduate Student

School of Electrical, Computer and Energy Engineering

Intellectual Property Status:

Patent Pending

Contact

Bill Loux

Director of Business Development, Physical Sciences

Arizona Technology Enterprises, LLC (AzTE)

P: 480.884.1992

F: 480.884.1984

BLOUX@AZTE.COM

TECHNOLOGYVENTURES@AZTE.COM

Background

A robust technique to automatically segment and identify tumor regions in medical images is extremely valuable for clinical diagnosis and disease modeling. In fact, brain tumor detection and segmentation have been of particular interest lately; however, currently no robust and automated algorithm has been clinically adopted. Automated approaches to segment tumors are often challenged by the variability in size, shape, and location of the tumor. As a result, existing unsupervised thresholding techniques have not been very successful in accurate tumor segmentation. Furthermore, approaches that incorporate prior knowledge require accurate non-rigid registration which may require user-intervention and/or a patient specific training system and are therefore not practical.

Invention Description

To address the limitations of current techniques in automated tumor segmentation, researchers at Arizona State University have developed a method to automatically segment and identify tumor regions through the use of sparse models to identify pixels belonging to tumorous regions. By using both the intensity and spatial location information of the pixels, this technique can automatically localize tumor regions without user intervention. The invention also provides a highly accurate, low-complexity procedure for cases when a user can provide an initial estimate of the tumor in a test image.

Potential Applications

- Medical imaging
  - Medical resonance imaging (MRI)
  - Computed tomography (CT)

Benefits and Advantages

- **Resilient to Change** – use sparse-methods that are adaptive to changes in size/shape of tumors.
- **Better Noise Handling** – being a sparsity based method, it is naturally immune to various types of noise present in brain images.
- **More Accurate –** pixel-wise sparse codes are computed for each pixel in the tumor image, in contrast to other sparse coding approaches that compute patch-wise or region-wise sparse codes.