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Automated Tumor Segmentation

Counting the number of dots on an image has multiple applications. One such application is measuring the number of glomeruli (which appear as dots on images) in an intact kidney using non-destructive techniques to study renal and systemic failures. Some currently available techniques to count the glomeruli and measure their size require the destruction of the entire kidney. Other available techniques that do not require the destruction of the kidney, but do not perform direct measurements and cannot localize the identified glomeruli to specific parts of the kidney.

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.

For more information about the inventor(s) and their research, please see Dr. Andreas Spanias' directory webpageDr. David Frakes' directory webpage