

Latent Image-Derived Features for Prognostic Modeling

Summary

Researchers at Vanderbilt have developed a system to estimate prognostic metrics such as the length of a hospital stay, recovery status at discharge, and overall health at discharge, using only baseline imaging and clinical information gathered early in the hospital admission process. This system can assist with medical group operations and planning, it can help to educate families and patients regarding prognosis, and can be used to automatically stage patients for clinical trials.

Addressed Need

By coupling automated image segmentation with clinical admission data, the system can help reduce physician and patient uncertainty as to future health status. The system is also able to automatically estimate anatomical structures in clinical images in order to measure volume changes in assessing a patient's response to treatment.

Unique Features

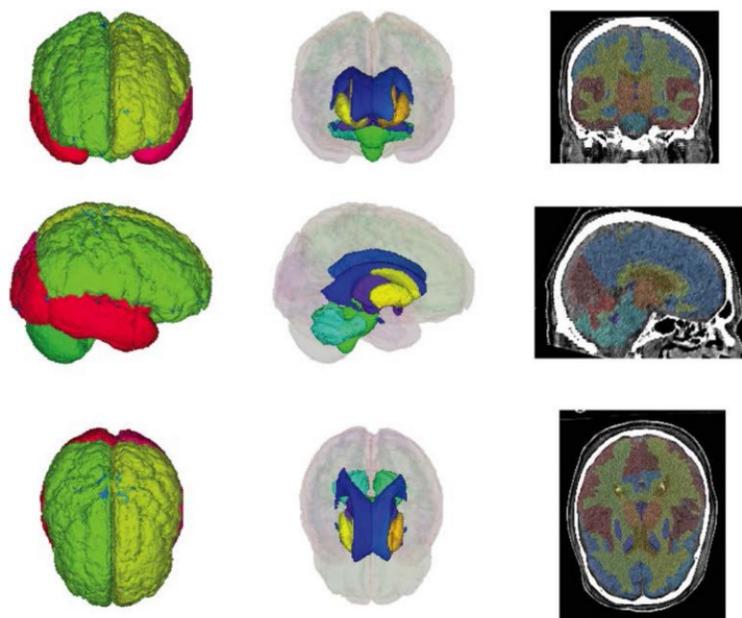
- ◇ Automated system for scoring of clinical grading scales using imaging data
- ◇ Automatic image segmentation via a multi-atlas based approach for a multitude of anatomical features
- ◇ The segmentations can be combined with imaging data to create dual-channel images for the use of machine learning

Technology Development Status

The system and algorithms are fully developed. Currently, a large scale trial of over 5,000 brain injury patients is nearly complete and a medium size trial is underway using abdominal imaging.

Intellectual Property Status

- ◇ A patent application has been filed



Empirical results of the automatic image segmentation system developed at Vanderbilt are shown above. 3D renderings of the cortical labels and the deep brain structures are shown in the coronal, sagittal, and axial planes. Labels are also shown overlaid onto mid-coronal, sagittal, and axial slices. Using the system, clinically relevant prognostic information can be gathered from imaging data.

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