



## A FULLY AUTOMATED SYSTEM FOR MUSCLE SEGMENTATION

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### The Invention

UW-Madison and NIH and other collaborators developed an automated system for muscle segmentation that works on CT scans. The system uses 3D U-Net models to segment the muscle in the chest, abdomen, and pelvis. From the segmentations, the system computes the volume and CT attenuation (density) of the muscle. The muscle volume and CT attenuation have been shown to be useful for detecting sarcopenia and myosteotosis, both of which are signs of frailty and adverse risk factors for patients with certain conditions or who are undergoing surgery, chemotherapy, and other treatments. Briefly, the muscle is segmented using a two stage approach. First a 2D U-Net model is trained to segment selected individual 2D CT slices in the body using manual segmentations prepared for those selected slices. The trained model is then used to segment all the CT slices in the body (not just the selected ones). These 2D automated segmentations are then used to train a 3D U-Net model. Finally, the trained 3D U-Net model can be used to segment all the muscles in 3D, assuring a smooth and continuous muscle segmentation in all three dimensions. The system then measures and outputs the muscle volume and CT attenuation for each individual slice and for the volume as a whole.

### Additional Information

#### For More Information About the Inventors

- [Perry Pickhardt](#)

#### Tech Fields

- [Medical Imaging : CT](#)

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