First Automated System to Quantify White and Brown Adipose Tissue at the Whole-Body, Body-Region and Organ Levels

Published date: Jan. 25, 2019

Technology description

Innovative system enables clinicians to better assess health risks of obese patients by accurately identifying and quantifying body fats

UCF researchers have developed the first automated system to provide accurate, quantitative data regarding a person’ s white and brown body fat (adipose tissue) levels. The innovation enables clinicians to better assess possible health issues and risks associated with abdominal obesity, one of the most prevalent health conditions today. Using imaging scans and a novel computerized automatic detection (CAD) system, the invention provides the distribution of a person’ s white adipose tissue (WAT) and brown adipose tissue (BAT) at the whole body, body region and organ levels.

Technical Details

The UCF system detects, distinguishes, and quantifies WAT and BAT from an imaging scan such as a PET/CT (positron emission tomography/computed tomography) or a PET/MRI (magnetic resonance imaging) scan. Various algorithms and equations support the system’ s two main modules. The first module identifies, separates and quantifies the WAT (both subcutaneous and visceral) in the abdominal and thorax regions. Based on deep learning features, the module uses a novel algorithm to differentiate between the two regions. A second module detects and separates BAT by using another algorithm. Structure cues automatically detect the body region and constrain the algorithm to focus only on potential BAT regions (head, neck, and thorax). An optional third module automatically detects specific organs containing adipose tissue. As required, the modules can operate independently or in combination with each other. In some embodiments, the first and second modules operate together, while other embodiments use all three modules. The system also includes a method of creating a risk profile based on the quantitative data.

Application area

Biomedical imaging and radiology
Hospitals and health centers

Advantages

Faster and more accurate than other methods
Enables clinicians to quantify white and brown fat during routine patient exams
Data-driven and easily adjusts for different personalized parameters of each patient
Can be extended for use as a mobile app that performs fat quantification using the images taken from a camera.

Institution

University of Central Florida

联系我们

叶先生

电 话：021-65679356
手 机：13414935137
邮 箱：yeyingsheng@zf-ym.com