BIOENGINEERING AND MEDICAL-SURGICAL SCIENCES

UNITO - Computational methods for body size, shape and composition analysis from digital anthropometry

Funded By	UNIVERSITA' DEGLI STUDI DI TORINO [P.iva/CF:02099550010]
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Context of the research activity	This research focuses on the development of methods for the integration of clinical data and imaging techniques to investigate body size, shape, and composition in heathy and pathological subjects.
Objectives	Recent technological advances made available for physicians new tools such as smartphone camera technologies, optical body scanners, and photogrammetry devices that capture a three-dimensional image of the body (“humanoid avatar”) and provide useful biomarkers of body size and shape that enable to move beyond body mass index to precisely characterize the health status and the metabolic profile. Body size measurements such as the waist or limb circumferences and body shape variables such as the waist-to-hip ratio can also be adopted to provide an anthropometric assessment of body composition (e.g., estimation of body fat mass and appendicular lean mass). This project aims to develop new processing methods for body composition estimation from the integration of clinical data with body size and shape variables obtained by digital anthropometric approaches. Clinical data and humanoid avatars will be collected from large samples of healthy subjects and patients with musculo-skeletal and/or metabolic disorders (e.g., lower limb tendinopathies, low back pain, obesity). The computational approaches developed throughout the project will be validated through a comparison between body composition estimations obtained with new digital anthropometric methods and traditional approaches such as bioelectrical impedance and dual-energy X-ray absorptiometry.
Skills and competencies for the development of the activity	The candidate should have a background in biomedical engineering. He/she should have documented experience with the acquisition of images and photogrammetry processing. Knowledge of programming languages such as MATLAB and Python is required. Knowledge of the acquisition instrumentation, and skills in the management of an experimental acquisition protocols including the integration of several devices is also necessary.