Phantomless calibration dataset

Readme file

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Abstract

The phantomless calibration dataset contains information about 34 postmenopausal subjects selected from the previously published cohort HF-Valid (https://doi.org/10.6092/unibo/amsacta/7277), including subject's CT scans details and calibration coefficients obtained for both phantom-based and phantomless calibration.

General information

Data Set Title: "Phantomless calibration dataset".

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Dataset description

The Phantomless calibration dataset is composed of 34 postmenopausal women selected from the previously published cohort *HFValid* avaiable at https://doi.org/10.6092/unibo/amsacta/7277. The published cohort was previosuly employed for Bologna Biomechanical Computed Tomography (BBCT) that aims to estimate proximal femur resistance to side-falls, taking as inputs the patient calibrated CT scan, the femur segmentation, and some anatomical landmarks (femur head center, greater trochanter, knee rotation center, head direction) [Aldieri 2023]. Each subject's CT scan was calibrated employing the available phantom-based calibration and developped phantomless calibration. The phantomless calibration utilized air, adipose, and muscle tissues, with reference density values of -797, -95, and 38 mg/cm3 extracted from previously performed phantom-based calibration. The HU values for selected tissues were extracted by identifying the peaks from the HU distribution within the VOI and patient-specific calibration lines identified through linear regression between the HU and reference densities. Hence the obtained HU values for each patient are also reported.

A CSV file with subject cohort data (Phantomless_calibration_dataset.csv) is provided. For each subject, the file reports the following data:

- Subject's ID from 1 to 34
- Subject's sex
- Subject's age at the time of the CT scan
- Subject's height (in cm)
- Subject's weight (in kg)
- Aqusition year of the CT scan
- Spacing between slices (in mm)
- Slice thickness (in mm)
- KVP (in kV)
- X-ray tube current (in mA)
- Reconstruction kernel
- CT scanner manufacturer
- CT scanner model
- Calibration coefficients obtained from both phantom-based and phantomless calibration - a & b to obtain the radiological density from the HU as: *Density (mg/cm3) = a + b * HU*
- HU values for selected air, adipose and muscle

Licensing

Reference

Aldieri A, Curreli C, Szyszko JA, La Mattina AA, Viceconti M. Credibility assessment of computational models according to ASME V&V40: Application to the Bologna Biomechanical Computed Tomography solution. Comput Methods Programs Biomed. 2023 Oct;240:107727.

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