



Mi-TAP (Michigan - Tomographic Analysis Pipeline) Codebook**Un-registered Features**

Name	Units	Description
ID		Unique identifier for subject (typically from clinical trial)
Exp_source		Location on machine/server of raw expiration CT data.
Ins_source		Location on machine/server of raw inspiration CT data.
ROI		Region of interest (e.g. whole lung, left/right lung, lobe)
Exp_Vol	liters	Whole lung volume (segmented VOI) at expiration (exp).
Exp_HU	HU	Mean HU (Hounsfield unit) of segmented lungs at exp.
Ins_Vol	liters	Whole lung volume (segmented VOI) at inspiration (ins).
Ins_HU	HU	Mean HU of segmented lungs at ins.
Exp_856	%	% of segmented lung < -856 HU at exp (gas trapping)
Ins_950	%	% of segmented lung < -950HU at ins (emphysema)
Ins_810	%	% of segmented lung >= -810 HU at ins and < -250 HU
Ins_810low	%	% of segmented lung >= -810 HU at ins and < -500 HU
Ins_500	%	% of segmented lung >= -500 HU at ins and < 0 HU
Ins_GGOI	%	% of segmented lung >= -810 HU at ins and < -700 HU
Ins_FIBI	%	% of segmented lung >= -700 HU at ins and < -250 HU
scatnetAT_pct	%	% of segmented lung classified by ScatterNet as Air Trapping on Exp
scatnetAT_mean	HU	Mean HU of ScatterNet Air Trapping segmentation
scatnetEmph_pct	%	% of segmented lung classified by ScatterNet as Emphysema on Ins
scatnetEmph_mean	HU	Mean HU of ScatterNet Emphysema segmentation
VESSEL_VOLUME	liters	Volume of segmented lung classed as blood vessel
NUM_VESSELS		Number of blood vessel voxels
NUM_COMPONENTS		Number of blood vessels identified
NUM_ENDPOINTS		Number of terminal vessels in vessel tree(s)
VESSEL_VOXELS_5DOWN	liters	Volume of vessels with CSA < 5 mm ²
VESSEL_VOXELS_5UP	liters	Volume of vessels with CSA > 5 mm ²
WallPct_3_8_1	%	Mean wall area % for airways of diameter between 3 and 8 mm.
WallPct_3_8_2	%	Number of points used for calculation of mean (above)
Wall_pct_1	%	Wall area % for the entire segmented tree
Wall_pct_2	%	Number of points used for calculation of mean (above)
Pi10	cm	average airway wall thickness normalized to a 'theoretical' airway lumen of 10-mm inner perimeter
Pi15	cm	average airway wall thickness normalized to a 'theoretical' airway lumen of 15-mm inner perimeter
BEI		Bronchiectasis index
BEI_gen		Number of generations used for calculation of BEI (above)
WT_seg	mm	Average wall thickness of the segmental airways (generation=4)
WT_subseg	mm	Average wall thickness of the subsegmental airways (generation>4)

**Thresholding****Machine learning classification****Vascular****Airways**

Registered Features

Name	Units	Description
Jac_mean		Mean value of the spatial Jacobian determinant resulting from image registration
Jac_var		Variance of the spatial Jacobian determinant
dBlood_mean	HU	Change in HU between Ins and Exp attributed to differences in blood volume
dBlood_var	HU	Variance of dBlood
PRM_1	%	Normal (sub-region)
PRM_2	%	Normal (sub-region)
PRM_3	%	Functional small airways disease
PRM_4	%	Emphysema (sub-region)
PRM_5	%	Emphysema (sub-region)
PRM_6	%	'emptying emphysema'
PRM_7	%	
PRM_8	%	Parenchymal disease (PD) (sub-region)
PRM_9	%	HAA/PD (sub-region)
PRM_10	%	HAA/PD (sub-region)
PRM_Norm	%	PRM_1+PRM_2 (normal lung)
PRM_fSAD	%	PRM_3 (functional small airways disease)
PRM_Emph	%	PRM_4+PRM_5 (emphysema)
PRM_PD	%	PRM_8+PRM_9+PRN_10 (parenchymal disease)
PRM_NS	%	
tPRM_norm_V		Mean topological PRM (tPRM) relative volume of Normal
tPRM_norm_S	mm ⁻¹	Mean tPRM relative surface area of Normal lung
tPRM_norm_B	mm ⁻²	Mean relative mean breadth of Normal lung
tPRM_norm_X		Mean Euler characteristic (homology) of Normal lung
tPRM_fsad_V		Mean relative volume of fSAD regions
tPRM_fsad_S	mm ⁻¹	Mean relative surface area of fSAD regions
tPRM_fsad_B	mm ⁻²	Mean relative mean breadth of fSAD regions
tPRM_fsad_X		Euler characteristic of fSAD regions
tPRM_emph_V		Mean relative volume of Emph regions
tPRM_emph_S	mm ⁻¹	Mean relative surface area of Emph regions
tPRM_emph_B	mm ⁻²	Mean relative mean breadth of Emph regions
tPRM_emph_X		Mean Euler characteristic of Emph regions
tPRM_pd_V		Mean relative volume of PD regions
tPRM_pd_S	mm ⁻¹	Mean relative surface area of PD regions
tPRM_pd_B	mm ⁻²	Mean relative mean breadth of PD regions
tPRM_pd_X		Mean Euler characteristic of PD regions

	Norm
	fSAD
	Emph
	PD