

Unified Supervision For Vision-Language Modeling in 3D Computed Tomography

Supplementary Material

Table 1. List of tasks for training and validation.

CTRATE	Arterial wall calcification, Atelectasis, Bronchiectasis, Cardiomegaly, Consolidation, Coronary artery wall calcification, Emphysema, Hiatal hernia, Interlobular septal thickening, Lung nodule, Lung opacity, Lymphadenopathy, Medical material, Mosaic attenuation pattern, Peribronchial thickening, Pericardial effusion, Pleural effusion, Pulmonary fibrotic sequela
INSPECT (shared)	12_month_PH, 12_month_mortality, 12_month_readmission, 1_month_mortality, 1_month_readmission, 6_month_mortality, 6_month_readmission, pe_positive
INSPECT (unique)	Atelectasis, Bronchiectasis, Cardiomegaly, Consolidation, Coronary artery wall calcification, Emphysema, Hiatal hernia, Interlobular septal thickening, Lung nodule, Peribronchial thickening, Pericardial effusion, Pleural effusion
RADCHEST (shared)	atelectasis, bronchiectasis, cardiomegaly, consolidation, emphysema, pericardial_effusion, pleural_effusion
RADCHEST (unique)	air trapping, airspace disease, aspiration, bandlike.or.linear, bronchial wall thickening, bronchiolectasis, bronchiolitis, bronchitis, cabg, coronary_artery_disease, groundglass, heart_failure, heart_valve_replacement, hemothorax, honeycombing, infiltrate, interstitial lung disease, lung_resection, mucous_plugging, pacemaker_or_defib, pericardial_thickening, pleural_thickening, pneumonia, pneumonitis, pneumothorax, pulmonary_edema, reticulation, scattered_nodules, septal_thickening, sternotomy, tree_in_bud, tuberculosis
body segmentation tasks	liver, stomach, left upper pulmonary lobe, left lower pulmonary lobe, right upper pulmonary lobe, right middle pulmonary lobe, right lower pulmonary lobe, esophagus, tracheal airway, thoracic vertebra 1-12, cardiac organ, thoracic aorta, pulmonary vein, left atrial appendage, superior vena cava, inferior vena cava, left rib 1-12, right rib 1-12, sternal body, costal cartilaginous structures, lungs, thoracic vertebrae, ribs, right ribs, left ribs

Table 2. Prompt for identifying presence of abnormality in radiology reports.

Please review the radiology report and identify any findings indicative of{PATHOLOGY}, focusing on the lung region and heart. Return the following in a structured JSON format: <pre>{{ "KeySentence": "Provide the key sentence in the report that supports your answer. If no relevant sentences, return 'NONE'.", "PresenceOfPathology": "Answer with 'Yes' or 'No' based on the presence of{PATHOLOGY}. If no pathology is mentioned, assume 'No'." }}</pre> Return nothing else. Below is the report: {REPORT}



Figure 1. AUROC heatmap on CTRATE. The x-axis represents different training datasets, while the y-axis corresponds to the target classes. Color intensity indicates the area under the ROC curve (AUROC), with higher values reflecting better classification performance.

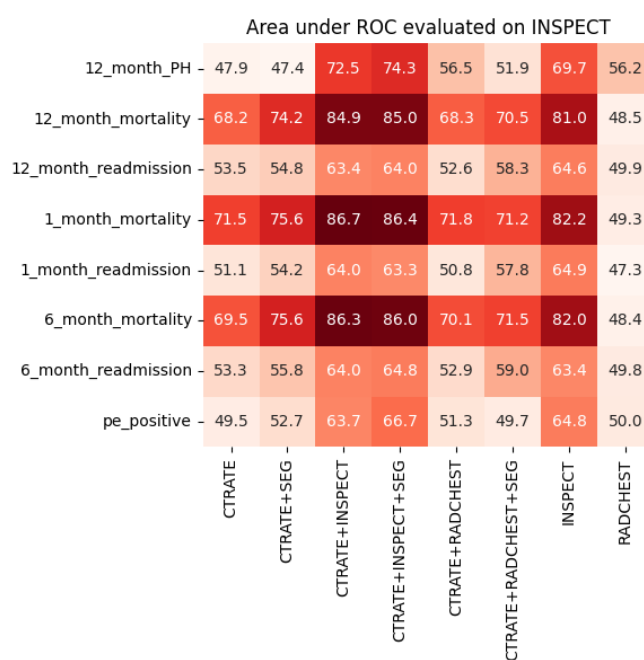


Figure 2. AUROC heatmap on INSPECT. The x-axis represents different training datasets, while the y-axis corresponds to the target classes. Color intensity indicates the area under the ROC curve (AUROC), with higher values reflecting better classification performance.



Figure 3. AUROC heatmap on RADCHEST. The x-axis represents different training datasets, while the y-axis corresponds to the target classes. Color intensity indicates the area under the ROC curve (AUROC), with higher values reflecting better classification performance.

Table 3. Performance comparison on classifying Lung nodules

model	training dataset	val dataset	auroc
Uniferum	CTRATE	CTRATE (Lung nodules)	0.6915
	CTRATE+SEG	CTRATE (Lung nodules)	0.6791
	CTRATE+INSPECT	CTRATE (Lung nodules)	0.6838
	CTRATE+INSPECT+SEG	CTRATE (Lung nodules)	0.68
	CTRATE+RADCHEST	CTRATE (Lung nodules)	0.6873
	CTRATE+RADCHEST+SEG	CTRATE (Lung nodules)	0.6884
	INSPECT	CTRATE (Lung nodules)	0.4891
	RADCHEST	CTRATE (Lung nodules)	0.463

Table 4. Average AUROCs of Uniferum initialized by GatorTron

training dataset	validation				
	CTRATE	INSPECT		RADCHEST	
		shared	unique	shared	unique
CTRATE	0.8255	0.7505	0.5872	0.7933	0.539
CTRATE+INSPECT	0.829	0.6896	0.735	0.79	0.5896
CTRATE+INSPECT+SEG	0.8291	0.7302	0.7412	0.7904	0.6174
CTRATE+RADCHEST	0.8278	0.7432	0.5714	0.8234	0.748
CTRATE+RADCHEST+SEG	0.8321	0.7692	0.5777	0.8205	0.7298
CTRATE+SEG	0.8305	0.746	0.5867	0.785	0.5589

Table 5. Area under precision recall curve. Model initialized by PubMedBert

model	training dataset	validation				
		CTRATE	INSPECT		RADCHEST	
			shared	unique	shared	unique
Uniferum	CTRATE	0.5583	0.7317	0.1677	0.5274	0.1617
	CTRATE+INSPECT	0.5377	0.7247	0.2949	0.5171	0.1565
	CTRATE+INSPECT+SEG	0.5543	0.7221	0.2998	0.5486	0.165
	CTRATE+RADCHEST	0.5505	0.747	0.172	0.5701	0.2566
	CTRATE+RADCHEST+SEG	0.5565	0.7671	0.1703	0.5862	0.2452
	CTRATE+SEG	0.5557	0.7555	0.18	0.5408	0.1476
	INSPECT	0.2859	0.6023	0.2661	0.2552	0.109
	RADCHEST	0.3588	0.668	0.1259	0.4587	0.1848