

Ablation Experiment

LABEL ATTENTION GRAPH NETWORKS FOR MULTI-LABEL MEDICAL IMAGE CLASSIFICATION

To comprehensively assess the impact of incorporating the pathological consensus module on model performance, we conducted an extensive set of ablation experiments. These experiments encompass three distinct scenarios: utilizing the image feature module alone, incorporating the pathological co-occurrence graph generation module, and integrating the feature attention module (FAM) to train the model. The outcomes of these experiments are presented in Tables 1 and 2.

Table 1: Ablation Experiment in ChestX-Ray14

Label	IFEM	IFEM+LAGM	LAGNet
Atelectasis	0.767	0.802	0.816
Cardiomegaly	0.752	0.881	0.927
Effusion	0.828	0.847	0.900
Infiltration	0.661	0.726	0.728
Mass	0.632	0.832	0.845
Nodule	0.718	0.762	0.755
Pneumonia	0.749	0.733	0.796
Pneumothorax	0.748	0.863	0.877
Consolidation	0.820	0.791	0.818
Edema	0.856	0.894	0.927
Emphysema	0.765	0.860	0.879
Fibrosis	0.801	0.812	0.829
Pleural Thickening	0.779	0.824	0.809
Hernia	0.893	0.898	0.962
Mean	0.769	0.823	0.847

Table 2: Ablation Experiment in CheXpert

Label	IFEM	IFEM+LAGM	LAGNet
Enlarged Cardiomedastinum	0.662	0.723	0.793
Cardiomegaly	0.761	0.850	0.900
Lung Lesion	0.754	0.801	0.842
Lung Opacity	0.764	0.698	0.736
Edema	0.851	0.812	0.864
Consolidation	0.744	0.880	0.784
Pneumonia	0.707	0.655	0.868
Atelectasis	0.712	0.721	0.731
Pneumothorax	0.752	0.891	0.889
Effusion	0.826	0.819	0.881
Pleural Other	0.809	0.845	0.925
Fracture	0.736	0.811	0.853
Support Devices	0.812	0.881	0.860
Mean	0.760	0.799	0.840

The results indicate intriguing observations. While there are instances where the Individual Feature Embedding Module (IFEM) outperforms LAGNet for specific pathologies (e.g., Lung Opacity in the CheXpert dataset and consolidation in ChestX-Ray14), there are also scenarios where LAGNet

performs less effectively than IFEM+LAGM. Nevertheless, both LAGNet and IFEM+LAGM leverage the synergistic interplay between CXR features and pathological co-occurrence relationships. These findings collectively suggest that exploring and incorporating the co-occurrence relationships among pathologies can significantly enhance the diagnostic prowess of the model. Notably, our LAGNet excels in its overall performance across both datasets.