Pan-Cancer Integrative Histology-Genomic Analysis via Interpretable Multimodal Deep Learning

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Abstract

• Cancer prognostication is a difficult task that is driven by markers in both histology and genomics.
• We present a landscape pan-cancer study that uses deep learning to integrate whole slide pathology images and molecular features to predict cancer prognosis, while also objectively identifying morphological and molecular features responsible for such prognostic predictions: (pancancer.mahmoodlab.org)

Pathology-Omic Research Platform (PORPOISE)

Quantitative Results

Multimodal Interpretability

Favorable Prognosis Correlates with Increased Immune Response

Unimodal to Multimodal Interpretability Shift

Conclusion

• PORPOISE is a research tool allow clinicians and researchers to devise their own hypotheses and investigate the discoveries explained using deep learning.
• Available at: pancancer.mahmoodlab.org

Demo – GitHub