Integrated Survival Prediction in Glioma Using MRI Tumor Segmentation and Clinical Biomarkers

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***Abstract*—This paper presents an integrated machine learning framework that combines MRI-based tumor segmentation with clinical biomarkers to predict survival outcomes in patients with glioma. By leveraging deep learning for tumor-aware feature extraction alongside clinical data, the proposed approach aims to improve diagnostic accuracy and support interpretable outcome prediction in neuro-oncology. Code available at: https://github.com/lukeblevins/mri-imgseg-Spr2026-CSCI7090**

***Index Terms*—glioma, glioblastoma, MRI tumor segmentation, integrated learning, survival prediction, clinical biomarkers, deep learning, medical imaging**

I. Introduction

Brain tumors such as gliomas exhibit complex heterogeneity in both imaging appearance and clinical outcomes, motivating the development of integrated imaging and clinical learning approaches for improved prognostic modeling.

II. Methodology

This study employs deep learning-based MRI tumor segmentation followed by feature extraction and integration with clinical biomarkers to train survival prediction models.

III. Results

The proposed integrated framework demonstrates improved predictive performance compared to models using imaging or clinical data alone.

IV. Discussion

These findings highlight the value of tumor-aware feature extraction and integrated learning for interpretable prognosis in neuro-oncology.

References

[1] Author, Title, Journal, Year.

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