Can CT Radiomics Predict Recurrence in Head and Neck Cancer? Early Results from a Prospective Imaging Trial

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Abstract No: OT 21

INTRODUCTION

- Head and Neck Cancers have a high risk of disease recurrence despite curative treatments, impacting survival and quality of life.1
- Clinical factors such as tumor size, subsite, and stage provide limited predictive power for recurrence, making it challenging to identify high-risk recurrence patients.2
- Radiomics extracts quantitative image descriptors or features (e.g tumor texture, shape, and intensity) from radiological images and when integrated with ML techniques has shown to improve outcome prediction. 1,2

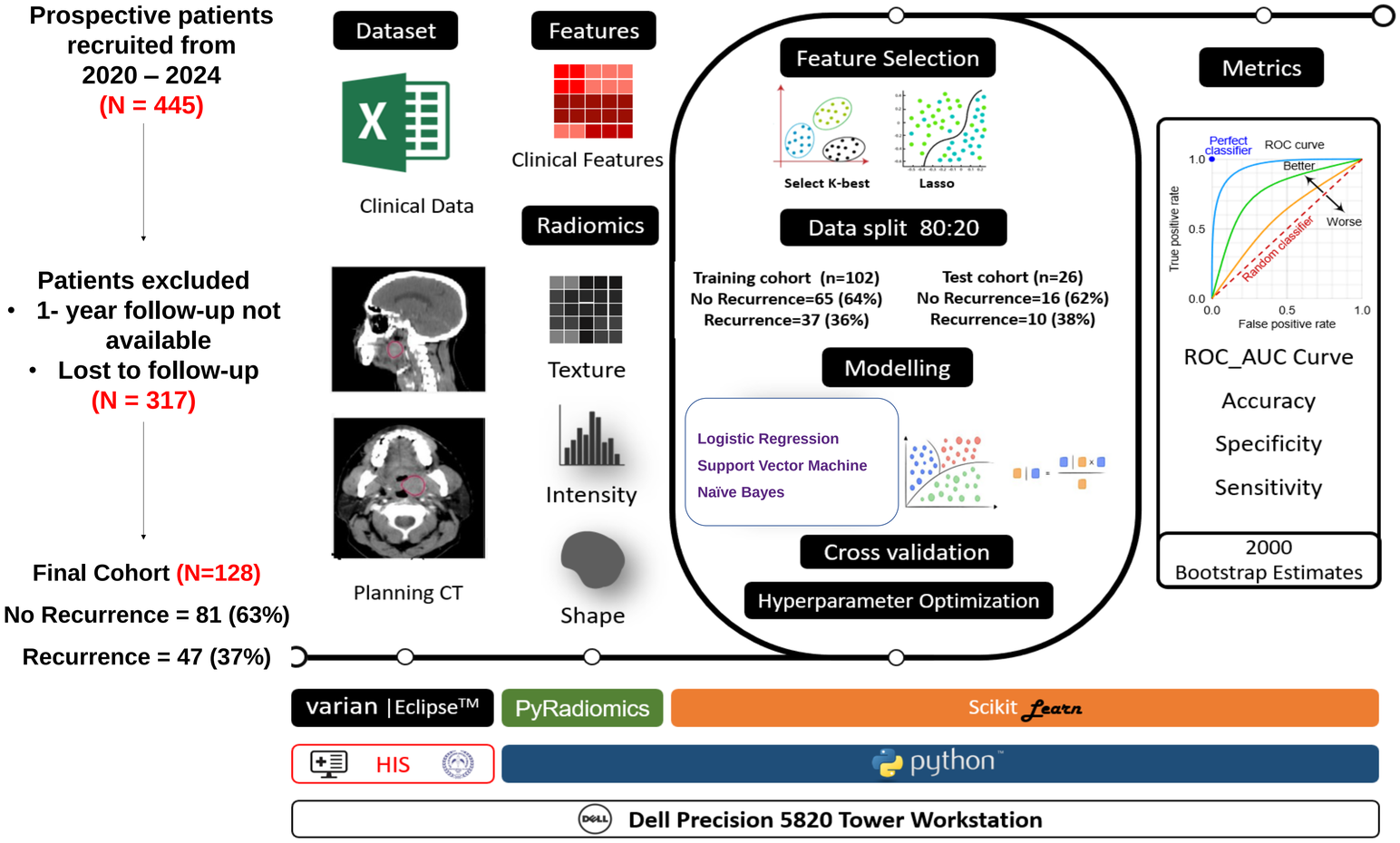
AIM

Evaluate the potential of CT-based radiomics to identify individual risk of locoregional recurrence (LRR) at one-year post-treatment in head and neck cancer.

KEY FINDING

- Naive Bayes model provided the best balance between training and testing performance in predicting locoregional recurrence (LRR) in head and neck cancer patients.
- The performance of the models may be limited by the small sample size, which will be evaluated further as the data matures.

METHOD

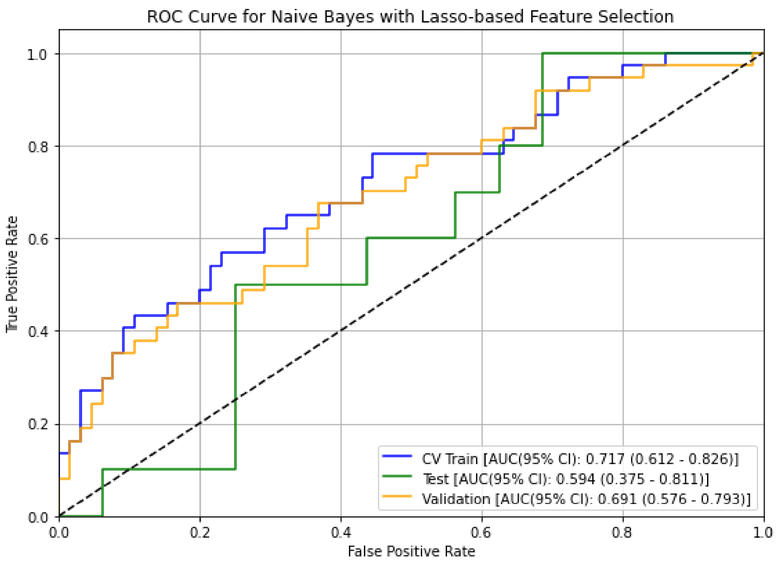


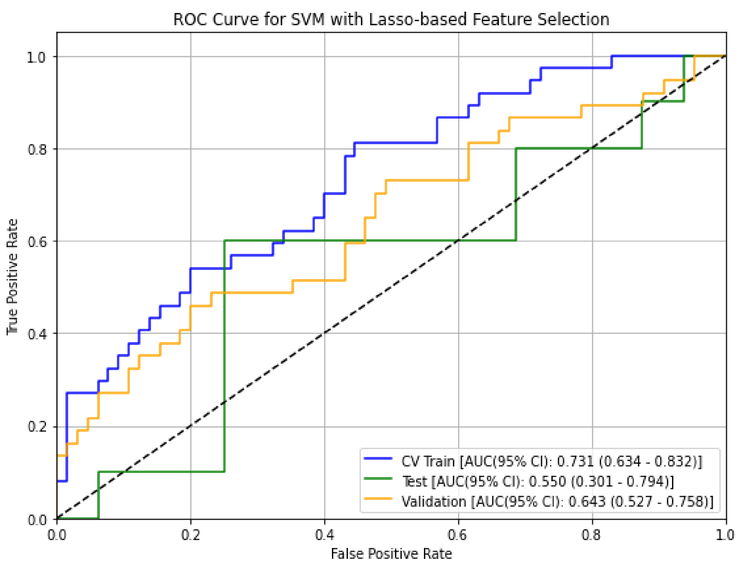
RESULTS

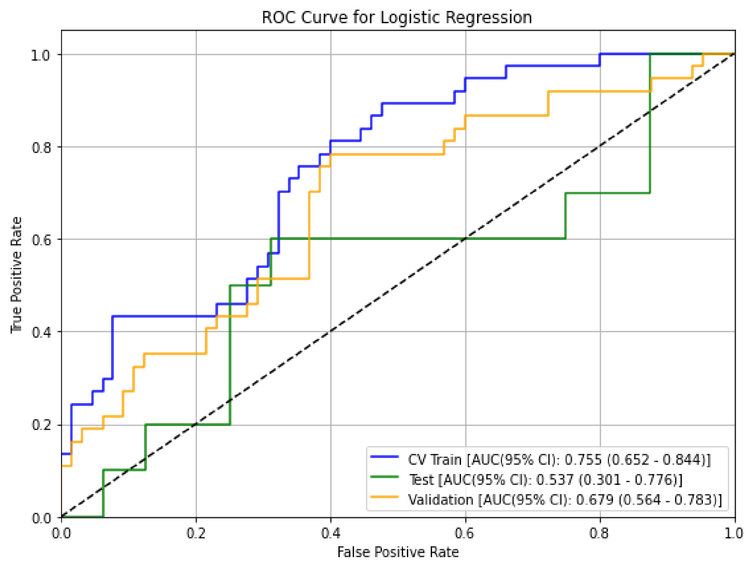
Top 5 Features

1.GLCM_Imc1
2.Shape_Maximum2DDiameterRow
3. NGDTM_Coarseness
4.Shape_Maximum2DDiameterSlice
5. Shape_Sphericity

Model	Training ROC AUC	Training Accuracy	Test ROC AUC	Test Accuracy
Logistic Regression	0.74 (0.66-0.84)	71.57%	0.54 (0.30-0.78)	57.69%
Support Vector Machine	0.73 (0.63-0.83)	69.61%	0.55 (0.30-0.80)	57.69%
Naïve Bayes	0.72 (0.61-0.83)	72.55%	0.60 (0.38-0.81)	61.54%







CONCLUSION

- Due to the limited dataset, we used simple machine learning models, but as the outcome data matures, we may be able to improve results.
- Future work will focus on enhancing predictive accuracy by including clinical and radiomics features.

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