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Can texture analysis of mr images predict the outcome of ischemic stroke patients?

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Background: Radiomics is a cutting-edge method that extracts detailed features from medical images, such as MRI, to improve diagnosis, prognosis, and personalized treatment. Its potential to predict outcomes in ischemic stroke patients is still being explored.

Methods: Fifty two stroke patients undergone brain MRI on a 1.5T Philips MRI scanner equipped with an 8 channel head coil at the General University Hospital of Alexandroupolis using stroke protocol. The ITK-Snap software was used for ischemic lesion segmentation identified in high b-value diffusion weighted images (DWI), while Pyradiomics was employed for texture feature extraction. Then, we investigated linear correlations between radiomic features and the post treatment NIHSS stroke severity score. Analyses was performed firstly in the whole patient group and then into the divided two subgroups based on their severity (mild (NIHSS ≤5) and severe (NIHSS >5).

Results: In the severe group, the radiomic feature *LeastAxisLength* was a strong predictor of clinical outcomes (equation 1). This feature is simple to implement and holds potential for practical use in stroke care.

Equation 1: NIHSS=5.424+0.235LeastAxisLength

Conclusion: Our study indicates that radiomics, particularly the *LeastAxisLength* feature, could be a valuable tool for predicting stroke outcomes, enhancing medical services, and guiding further research.

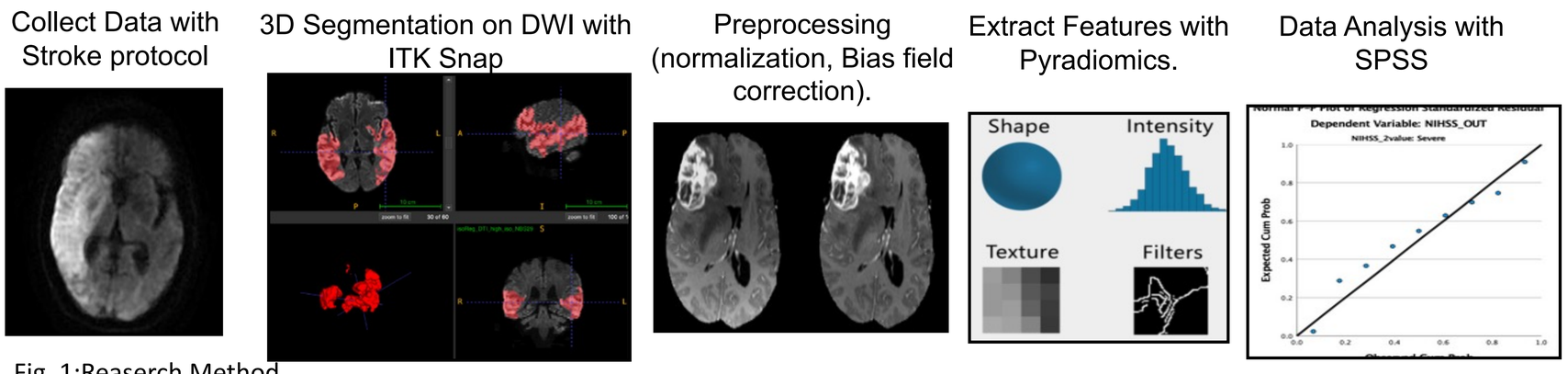

Fig. 1:Reaserch Method

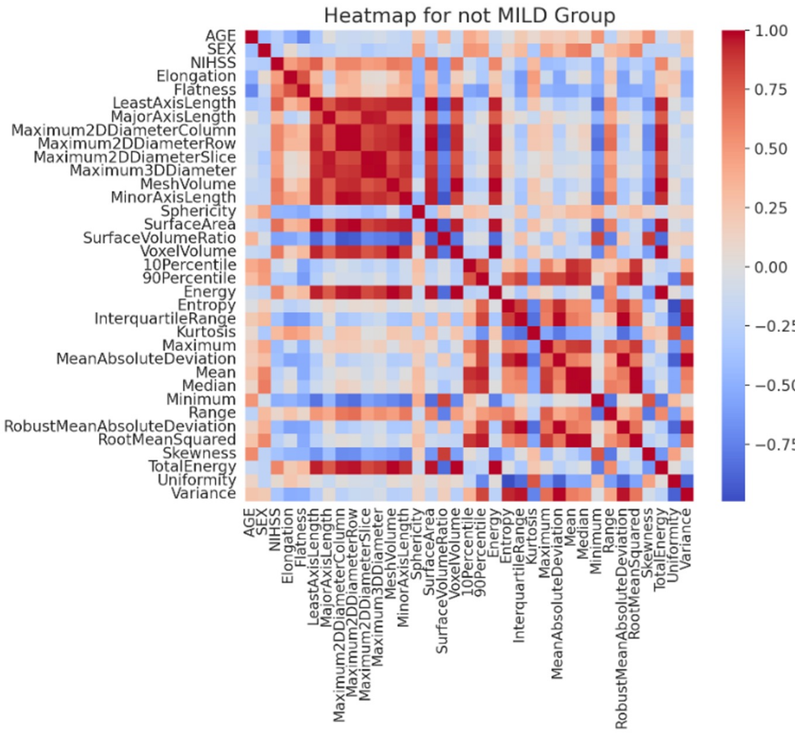

Fig. 2: Correlation heatmap for not MILD Group and all variables

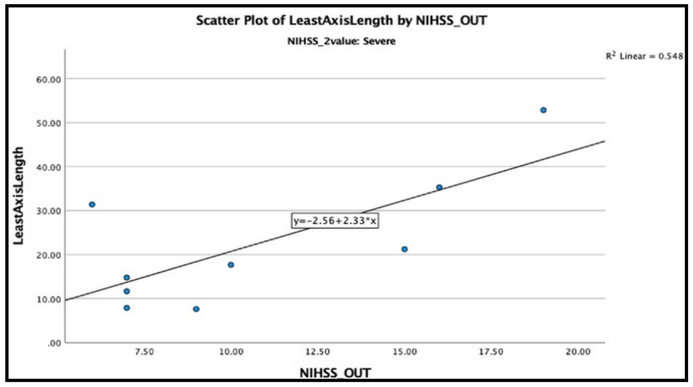

Fig. 3: Scatter Plot of Least Axis Length variable and NIHSS_Out