-Tutorial article form for journal publication

-Single PDF

-Repository on GitHub for python code. Short description of codes and link in appendic of report

Literature Review of ML and Radiomics and applications in brain tumor assessment

-Include prediction of brain tumor grade and meningioma grades

Introduction

Machine Learning and application

Radiomics and application

Layout

**Abstract (5) (250 words)**

**Introduction (5)**

What is meningioma?

Some numerical figures

Current Treatment options

What is machine learning and radiomics

How may these be beneficial?

What will this essay serve to do?

**Literature Review (20)**

Section 1: Machine Learning and Applications in Brain Tumour Assessment

Section 2: Radiomics and Applications in Brain Tumour Assessment

Section 3: Knowledge Gaps

**Methodology (40)**

**-Include model development for meningioma grade prediction?**

**Results (5)**

**Discussion (5)**

**Conclusion (5)**

**References (2.5)**

**Appendix (2.5)**

**Remove non numeric features**

**Removed highly correlated features**

**Use LASSO- choose only highest ranked features**

**Order**

**1.Clean data -> missingness, duplicates , non numeric features**

print(df.duplicated())

**2. Exploratory data. (visualisation, correlation analysis) and outliers**

**3.Reduce Dimensionality with collinearity threshold**

**4.Scale data**

**5.Outliers (local outlier factor)**

**6.Split dataset**

**7.Feature Select**

**8. Model stuff?? Random Forest model, SVM -> polynomial kernel (linear may be better)**

**RFE and correlation analysis??**

**Order (RS Stated)**

**-Read in Data. Do missingness check and duplicates check (complete)**

**-Exploratory statistics. Descriptive Stastitics, Fold Change and Boxplots (complete) Change boxplots**

**-Scale Data. Check method from class. (complete)**

**-optional step. Outlier detection and removal. Check if method is affected by scaling (completed)**

**-Split Data (Completed)**

**-feature Selection. – RFECV . Check Embedded method used? (Complete but edit code)**

**-Model Training. Train models using cross validation and then the training data. Compare performance with boxplots (complete)**

**-Validation on Test set. Google it (Complete)**

**Basics done**

**-Ensemble of top 3 with a voting classifier**

**-Hyperparameter tuning of top model. Grid search?**

**-ROC Graph of best model.**