



YTU

Muhammet Ali Gümüřsoy

1906A018

Homework Assignment #1:

GUI Enhancements for Data Handling and Model Completion

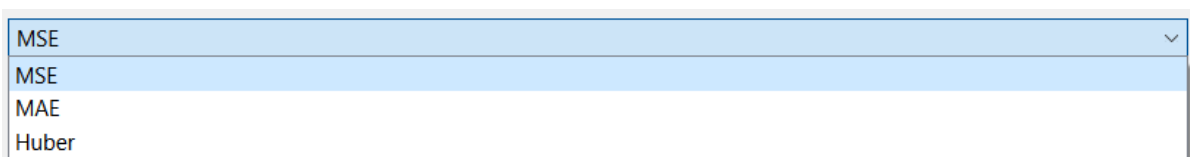
Ertuğrul Bayraktar

1. First, I updated the imports(keras instead of scikeras) and added new import “scikit-learn’s SimpleImputer” for missing data handling.
2. Added loss function selection to regression and classification tabs:

Under “def create_classical_ml_tab(self):”

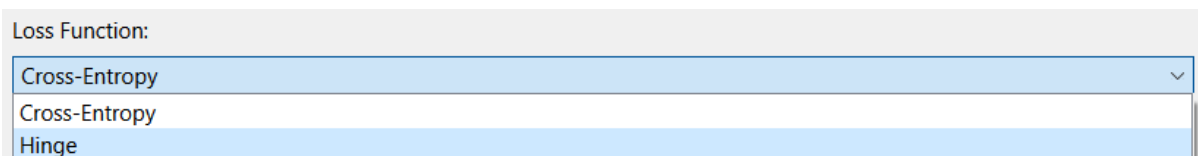
```
# Regression section
regression_group = QGroupBox("Regression")
regression_layout = QVBoxLayout()

self.regression_loss_combo = QComboBox()
self.regression_loss_combo.addItem("MSE")
self.regression_loss_combo.addItem("MAE")
self.regression_loss_combo.addItem("Huber")
regression_layout.addWidget(QLabel("Loss Function:"))
regression_layout.addWidget(self.regression_loss_combo)
```

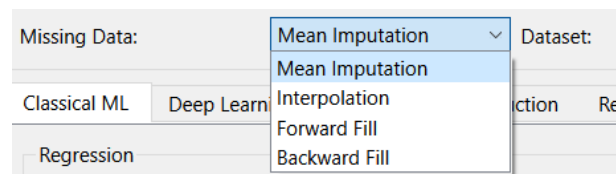


```
# Classification section
classification_group = QGroupBox("Classification")
classification_layout = QVBoxLayout()

self.classification_loss_combo = QComboBox()
self.classification_loss_combo.addItem("Cross-Entropy")
self.classification_loss_combo.addItem("Hinge")
classification_layout.addWidget(QLabel("Loss Function:"))
classification_layout.addWidget(self.classification_loss_combo)
```



3. Added select methods for handling missing values: Mean Imputation, Interpolation, Forward/Backward Fill. Under.



```
# methods for handling missing values
self.missing_data_combo = QComboBox()
self.missing_data_combo.addItem("Mean Imputation")
self.missing_data_combo.addItem("Interpolation")
self.missing_data_combo.addItem("Forward Fill")
self.missing_data_combo.addItem("Backward Fill")
```

and added new function “def apply_missing_data_handling(self, data):” for these methods.

```
def apply_missing_data_handling(self, data):  
    method = self.missing_data_combo.currentText()  
  
    if method == "Mean Imputation":  
        strategy = method.split()[0].lower()  
        imputer = SimpleImputer(strategy=strategy)  
        return imputer.fit_transform(data)  
  
    elif method == "Interpolation":  
        return pd.DataFrame(data).interpolate().values  
  
    elif method == "Forward Fill":  
        return pd.DataFrame(data).ffill().values  
  
    elif method == "Backward Fill":  
        return pd.DataFrame(data).bfill().values  
  
    return data
```

Comparison of Missing Data Handling Methods

Mean Imputation is simple, quick and prevents data loss. It is usually used for data with small missing values.

Interpolation is best for time series and continuous data with predictable pattern.

Forward Fill fills missing values with previous data while Backward Fill fills missing values with next data. Forward Fill is usually used for time series data where previous values are valid assumptions. Backward Fill is useful for structured data where future values can logically replace missing ones.

- *Unfortunately, I failed in visualizing.*