Appendix:   
Comparing Decision Tree and K-Nearest Neighbor for Cerebral Stroke Prediction

# Glossary:

**Accuracy**: A classification metric that indicates the percentage of correctly predicted observations.

**Bayesian Optimization**: An algorithm that minimizes an objective function, by setting optimal hyperparameters in a bounded domain.

**Class imbalance**: Describes a data set where one class is more common than another.

**Classification**: Prediction of a categorical variable.

**Correlation** **Matrix**: A table visually showing the correlations between different variables.

**Correlation**: Metric that describes the strength of the linear relationship between two variables.

**Cross-validation**: A method to estimate the model’s ability to generalize to new data, by repeatedly training and testing it on non-overlapping subsets of the training data.

**Decision Tree**: A machine learning model that is represented as a sequence of branching statements.

**F1-Score**: A classification metric, calculated as the harmonic mean of precision and recall.

**Feature**: The variables that the model uses to make predictions.

**Greedy**: Refers to the partitioning algorithm of decision trees, where at each step of the tree building the split that improves the prediction power the most is added (instead of looking ahead).

**Hyperparameters**: Higher level properties of a model.

**Instance-based**: A type of algorithm that does not try to model an underlying relationship, but simply compares new instances to the training observations.

**K-Nearest Neighbor**: A machine learning model, where predictions of new observations are based on the values of the k closest observation as defined by a distance function.

**Leaves**: Also referred to as leaf nodes, represents a class label, where no further splits are applied.

**Loss Function**: Also called objective function. Is the function a machine learning algorithm tries to minimize during training.

**Monotone transformation**: A transformation by a strictly increasing function.

**Noise**: Random fluctuations in the data.

**Non-parametric**: Non-parametric models, do not make strong assumptions about the form of the distribution of the underlying training data.

**One-hot-encoding**: Technique to represent categorical variables, where each category of a categorical feature is represented as a binary vector.

**Outliers**: A data point that is very different from the rest.

**Overfitting**: Describes a model that fits the training data too well, so that it models the noise in the training data, and does not generalize well to unseen data.

**Precision**: A classification metric that measures the model’s ability to classify the positive class, i.e., the percentage of correctly predicted observations out of all predictions of the positive class.

**Preprocessing**: Describes the manipulation or deletion of data before it is used in a machine learning algorithm to ensure or improve performance.

**Recall**: Also called sensitivity. A classification metric that indicates the “sensitivity” of the model to observations of the positive class, i.e., the percentage of correctly predicted positive observations out of all positive observations in the sample

**Regression**: Prediction of a numerical variable.

**Root (decision tree)**: The beginning of the tree. First split based on entire data.

**Sensitivity**: Also called Recall. A classification metric that indicates the “sensitivity” of the model to observations of the positive class, i.e., the percentage of correctly predicted positive observations out of all positive observations in the sample

**SMOTE**: Synthetic minority oversampling technique (SMOTE) is an algorithm that creates new synthetic examples of the minority class.

**Specificity**: A classification metric that measures the model’s ability to classify the negative class, i.e., the percentage of correctly predicted observations out of all predictions of the negative class.

**Standardization**: The process of putting different variables on the same scale.

**Stratified cross-validation**: Selects cross validation folds, so that the class distribution stays the same across all folds.

**Supervised learning**: A machine learning problem in which the models tries to learn a function that maps an input to an output based on example labelled input-output pairs.

**Target Variable**: The variable that the model is trying to predict.

**Top-Down**: Refers to the partitioning algorithm of decision trees, where the entire data or root is at the top, then splits are successively added.

**White-box**: A type of model where the behavior can be explained, and the process that led to a particular prediction is transparent. Opposite of a black-box model.

**References:**

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# Intermediate / Negative Results:

# Brief Description of Main Implementation Choices