The realization or parameter information of the other three models

Support Vector Machine (SVM) classifiers were implemented using a radial basis function (RBF) kernel to create optimal hyperplanes for class separation in high-dimensional space:

$$K\left(x, x^{'}\right) = \exp\left(-\gamma \left\| x - x^{'} \right\|^2\right)$$

where γ is the kernel coefficient optimized via grid search.

Logistic Regression models were applied to fit linear decision boundaries using maximum likelihood estimation, with predicted probabilities defined as:

$$P(y = 1 \mid x) = \frac{1}{1 + e^{-(\beta_0 + \beta^{\mathrm{T}} x)}}$$

where β_0 is the intercept and β is the coefficient vector.

Gradient Boosting classifiers were constructed by sequentially building weak learners (decision trees) to minimize a loss function, with each new model trained on the residuals of the previous one. Its prediction can be represented as:

$$F(x) = \sum_{m=1}^{M} \gamma_m h_m(x)$$

where h_m are weak learners, γ_m is the learning rate, and M is the number of iterations.