

GRADIENTBOOST ALGORITHM

Given \mathcal{B} contains real-valued functions, loss L_ϕ , ϕ differentiable
Input M , labeled training set \mathcal{D}
Initialize $f^0(x) = \beta_0 = \operatorname{argmin}_{\beta \in \mathbb{R}} \hat{L}(\beta)$
for $k = 0, 1, 2, \dots, M - 1$
 1. compute $r_i = -y^i \phi'(y^i f(x^i))$, for $i = 1 : n$
 2. fit $b^k(x)$ to outputs $\{r_{1:n}\}$
 3. find $\beta_k = \operatorname{argmin}_{\beta \in \mathbb{R}} \hat{L}(f^k + \beta b_k)$ (univariate optimization)
 update $f^{k+1}(x) = f^k(x) + \beta^k b^k(x)$

Output $f^M(x)$