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 $k = 0, 1, 2, \ldots M - 1$

1. compute $r_i = -y^i \phi'(y^i f(x^i))$
2. fit $b^k(x)$ to outputs r_i
3. find $\beta_k = \operatorname{argmin}_{\beta \in \mathbb{R}} \hat{L}(f^k + \beta b_k)$ (univariate optimization)

update $f^{k+1}(x) = f^k(x) + \beta^k b^k(x)$

Ouput $f^M(x)$