Supervised Learning Framework

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	Regression	Classification
Dataset:	$\mathcal{D} = \{(x_i, y_i)\}_{i=1}^N, (x_i, y_i) \in \mathcal{X} \times \mathcal{Y}$	
	$\mathcal{Y} = \mathbb{R}^d$	$\mathcal{Y}$ is a finite set.
Model:	$y = f_\theta(x) + \varepsilon$	
	$f_\theta(x)(\approx \mathbb{E}[y\|x])$	$f_\theta(x)(\approx \mathbb{P}[y\|x])$
Empirical Loss:	$L(\theta\|\mathcal{D}) \rightarrow$Minimize	
	(e.g. MSE)	(e.g. Cross entropy)
Optimization:	$\theta^* = \arg\min_\theta(L(\theta\|\mathcal{D}))$	
Prediction:	$\hat{y}_* = f_{\theta^*}(x_*)$.	$\hat{y}_* = \arg\max_{i \in \mathcal{Y}} f^i_{\theta^*}(x_*)$.
Validation:	Compute the test metrics	
	e.g. MSE.	e.g. Accuracy.

Table: Summary of the framework of regression and classification. The difference between them is highlighted in blue.

Thanks for your attention!