PHY654

Machine Learning in Particle Physics

Saturday, 17 August, 2024

- ## Metrics of Evaluating ML Models:

1. Classification Problem:

(a)

$$\text{Precision} = \frac{TP}{TP + FP}$$

(b)

$$\text{Recall} = \frac{TP}{TP + FN}$$

Confusion Matrix

	Pred. (+)	Pred. (−)
Act. (+)	TP	FN
Act. (−)	FP	TN

(c)

$$\text{F1 score} = \frac{2 \times \text{Precision} \times \text{Recall}}{\text{Precision} + \text{Recall}}$$

$$= \frac{2 \times TP \times TP / [(TP+FP)(TP+FN)]}{\frac{TP}{TP+FP} + \frac{TP}{TP+FN}}$$

$$= \frac{2 \times TP}{2TP + FP + FN}$$

- F1 = 1 → perfect precision and recall
- F1 = 0 → either precision or recall is 0.
- If either the precision or the recall is low, F1 score is also low.