

Great! Let's calculate accuracy, precision, recall, and F1-score for the new scenario where you have 100 emotions for each class (Happy, Sad, Angry), totaling 300 samples. Here's the breakdown:

Confusion Matrix

The confusion matrix for this scenario is:

Actual \ Predicted	Happy	Sad	Angry
Happy	100	0	0
Sad	0	100	0
Angry	10	6	84

Step 1: Calculate Accuracy

Accuracy measures the overall correctness of the model.

$$\text{Accuracy} = \frac{\text{Number of Correct Predictions}}{\text{Total Number of Predictions}}$$

From the confusion matrix:

- Correct predictions = 100 (Happy) + 100 (Sad) + 84 (Angry) = **284**
- Total predictions = 300

$$\text{Accuracy} = \frac{284}{300} = 0.9467 \quad \text{or} \quad 94.67\%$$

Step 2: Calculate Precision

Precision measures how many of the predicted positives are actually correct.

$$\text{Precision} = \frac{\text{True Positives (TP)}}{\text{True Positives (TP)} + \text{False Positives (FP)}}$$

For each class:

- **Happy:**
 - TP = 100
 - FP = 10 (misclassified as Happy)
 - Precision = $\frac{100}{100+10} = \frac{100}{110} = 0.9091$ or 90.91%
- **Sad:**
 - TP = 100

- FP = 6 (misclassified as Sad)
- Precision = $\frac{100}{100+6} = \frac{100}{106} = 0.9434$ or 94.34%

- **Angry:**

- TP = 84
- FP = 0 (no misclassifications for Angry)
- Precision = $\frac{84}{84+0} = 1$ or 100%

Step 3: Calculate Recall

Recall measures how many of the actual positives were correctly predicted.

$$\text{Recall} = \frac{\text{True Positives (TP)}}{\text{True Positives (TP)} + \text{False Negatives (FN)}}$$

For each class:

- **Happy:**

- TP = 100
- FN = 0 (no misclassifications for Happy)
- Recall = $\frac{100}{100+0} = 1$ or 100%

- **Sad:**

- TP = 100
- FN = 0 (no misclassifications for Sad)
- Recall = $\frac{100}{100+0} = 1$ or 100%

- **Angry:**

- TP = 84
- FN = 10 (misclassified as Happy) + 6 (misclassified as Sad) = 16
- Recall = $\frac{84}{84+16} = \frac{84}{100} = 0.84$ or 84%

Step 4: Calculate F1-Score

The F1-score is the harmonic mean of precision and recall.

$$\text{F1-Score} = 2 \cdot \frac{\text{Precision} \cdot \text{Recall}}{\text{Precision} + \text{Recall}}$$

For each class:

- **Happy:**

- Precision = 0.9091

- Recall = 1
- F1-Score = $2 \cdot \frac{0.9091 \cdot 1}{0.9091 + 1} = 0.9524$ or 95.24%

- **Sad:**

- Precision = 0.9434
- Recall = 1
- F1-Score = $2 \cdot \frac{0.9434 \cdot 1}{0.9434 + 1} = 0.9709$ or 97.09%

- **Angry:**

- Precision = 1
- Recall = 0.84
- F1-Score = $2 \cdot \frac{1 \cdot 0.84}{1 + 0.84} = 0.9130$ or 91.30%

Summary of Results

Metric	Happy	Sad	Angry
Precision	90.91%	94.34%	100%
Recall	100%	100%	84%
F1-Score	95.24%	97.09%	91.30%

Accuracy:

94.67%

Let me know if you need further clarification!