SRINIVAS UNIVERSITY INSTITUTE OF ENGINEERING AND TECHNOLOGY

MODULE 2

DATA ETHICS

ASSIGNMENT 4

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CSE 'A'

4TH SEM

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2.1. Introduction

In Machine Learning, multiple models are often trained to solve the same problem. After training, it is important to evaluate their performance using suitable metrics. Performance evaluation helps in selecting the best model that gives accurate and reliable predictions.

In this case, we are given the following performance values:

$U = 55$

$042 = 4$

$048 = 10$

$04 = 15$

These values represent the performance scores of four different models. Higher value indicates better performance

2. Understanding Performance Metric

Performance in machine learning is commonly measured using:

Accuracy

Precision

Recall

F1-score

Error rate

If we assume these given values represent **accuracy percentage**, then the model with the highest accuracy is considered the best.

Higher accuracy means:

More correct predictions

Better learning of data patterns

Better generalization ability

Lower accuracy means:

Poor prediction

Model may not be learning properly

Possible underfitting or poor training

3. Comparison of Given Models

Model U (55)

Model U has a performance value of 55.
It is the highest among all models.
This indicates that Model U predicts more accurately than others.
Therefore, it is the best performing model.

Model 04 (15)

Model 04 has a performance value of 15.
It performs better than 10 and 4 but is much lower than 55.
Its prediction capability is moderate.

Model 048 (10)

Model 048 has a performance value of 10.
It has low prediction accuracy.
The model needs improvement.

Model 042 (4)

Model 042 has the lowest value of 4.
This indicates very poor performance.
It may be underfitting or poorly trained.

4. Ranking of Models

Based on the given values:

55 > 15 > 10 > 4

Ranking from best to worst:

Model U (55) – Best

Model 04 (15)

Model 048 (10)

Model 042 (4) – Lowest

Thus, Model U is clearly superior in performance.

5. Graphical Interpretation

From the bar graph:

The tallest bar represents Model U (55).

Shorter bars represent lower performance.

Model 042 has the smallest bar, showing weakest performance.

The graphical representation clearly shows that Model U outperforms the others.

6. Relation to Bias and Variance

Poor performance (like 4 or 10) may occur due to:

High bias (Underfitting)

High variance (Overfitting)

Improper training

Insufficient data

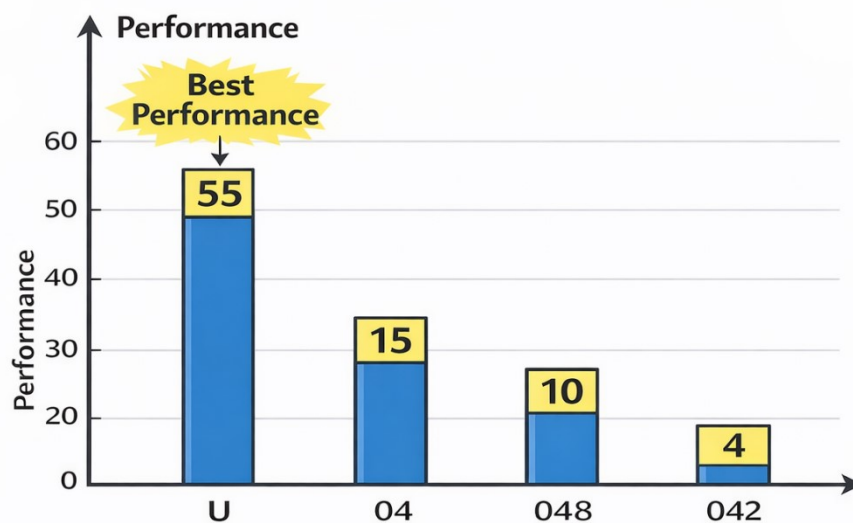\Better performance (like 55) indicates:

Balanced bias and variance

Proper learning

Better generalization

Thus, Model U likely has better bias-variance balance compared to others.

Model Performance Comparison

Given: U = 55, 04 = 15, 048 = 10, 042 = 4

Performance

Best
Performance
↓

Performance

60

55

50

40

30

15

20

10

4

0

U   04   048   042

7. Conclusion

From the given performance values (55, 15, 10, 4), Model U with value 55 is the best performing model because it has the highest accuracy. The other models show lower performance and may require further improvement.

Therefore, based on performance evaluation, Model U should be selected for prediction tasks as it provides better reliability and effectiveness.