🎯 *Logistic Regression: Tackling Multiclass Classification* 🚦

Did you know that Logistic Regression isn’t just for binary classification? It can also handle multiclass classification problems efficiently! Let's explore how it works and where it shines.

📜 *Summary*

Multiclass Logistic Regression is an extension of the classic Logistic Regression algorithm that enables classification into more than two categories (e.g., classifying flowers into setosa, versicolor, or virginica). It achieves this using techniques like One-vs-Rest (OvR) or Softmax Regression.

✨ *Highlights*

🔀 ***Multiclass Capabilities:*** Logistic Regression can classify instances into more than two categories.

📚 ***Two Common Approaches:***

One-vs-Rest (OvR): Trains one binary classifier per class, then picks the class with the highest score.

Softmax Regression: Extends the logistic function to output probabilities across all classes (commonly used in deep learning).

🎲 ***Probabilistic Outputs:*** Assigns a probability score for each class, making it interpretable and practical for decision-making.

🔮 *Key Insights*

🚀 ***Scenarios to Use Multiclass Logistic Regression:***

Classifying handwritten digits (0–9).
Predicting the species of a plant or animal.
Categorizing news articles into topics like sports, politics, and technology.

⚖️ ***Why Choose Logistic Regression?***

Works well for linearly separable data.
Computationally efficient for small to medium-sized datasets.

📊 *Evaluation Metrics:*

Accuracy: Overall correctness.
Confusion Matrix: To identify performance across all classes.
Precision, Recall, F1-Score (Per Class): For detailed class-wise analysis.

GitHub Code: https://github.com/NafisAnsari786/Machine-Learning-Algorithms/blob/main/7%20Logistic%20Regression/Multiclass%20Classification/Logistics%20Reg%20Multiclass%20Classification.ipynb