

# Module 10 – Conclusion

Linear Regression & Logistic Regression Wrap-Up

# What We Covered



## Regression & Best Fit Line

Understanding how to model relationships between variables using linear equations and finding the optimal line through data points.



## Cost Function & Gradient Descent

Learning how models minimize error iteratively, stepping toward the optimal solution through calculated adjustments.



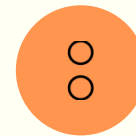
## Evaluation Metrics

Measuring model performance using  $R^2$ , MAE, and RMSE to quantify accuracy and prediction quality.



## Linear Regression Assumptions

Recognizing the conditions required for linear regression to work effectively, including linearity and independence.



## Logistic Regression & Sigmoid

Applying regression principles to classification problems using the sigmoid function to predict probabilities.

# Core Takeaways

## 1 Regression predicts continuous values

Linear regression excels at forecasting numerical outcomes like prices, temperatures, or sales figures based on input features.

## 2 Gradient descent improves models step by step

This optimization algorithm systematically reduces prediction error by adjusting model parameters in the direction of steepest improvement.

## 3 Metrics evaluate model performance

$R^2$ , MAE, and RMSE provide quantitative measures to assess accuracy, helping you compare models and identify areas for improvement.

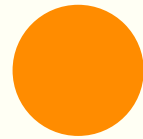
## 4 Linear regression has real limitations

The model assumes linearity, independence, and normally distributed errors—violations of these assumptions can lead to unreliable predictions.

## 5 Logistic regression handles classification

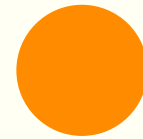
By transforming linear outputs through the sigmoid function, logistic regression elegantly solves binary classification problems with probability estimates.

# Why This Module Matters



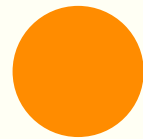
## Foundation for most ML models

These regression concepts underpin neural networks, ensemble methods, and advanced algorithms you'll encounter in your data science journey.



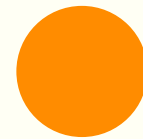
## Builds intuition for optimization

Understanding gradient descent gives you insight into how all machine learning models learn from data through iterative improvement.



## Prepares you for advanced models

Mastering these fundamentals makes complex architectures like deep learning and ensemble methods much more approachable and intuitive.



## Makes classification easier to understand

Logistic regression bridges the gap between regression and classification, providing a clear pathway to more sophisticated prediction techniques.



# What's Next

Get ready to explore a completely different approach to machine learning that complements everything you've learned about regression.

1

## Module 11: Decision

**Trees**  
Transitioning from continuous lines and probability curves to intuitive rule-based splits that segment data into actionable categories.

2

## New Visuals, New Logic

Discover how tree-based models use hierarchical decision rules, offering interpretable insights and powerful predictive capabilities.

3

## Fresh Intuition

Build on your regression knowledge to understand how models can learn complex, non-linear patterns through simple, logical partitions.