Crop Yield Prediction with R

Using Linear Regression

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Introduction

- This presentation demonstrates crop yield prediction using R.
- We'll use a linear regression model.

R Code

```r
# Generate synthetic data
set.seed(123)
n <- 100
rainfall <- rnorm(n, mean = 50, sd = 10)
temperature <- rnorm(n, mean = 25, sd = 5)
crop_yield <- 30 + 2 * rainfall - 1.5 * temperature + rnorm(
    n, mean = 0, sd = 5)

# Create a data frame
crop_data <- data.frame(Rainfall = rainfall, Temperature =
    temperature, CropYield = crop_yield)

```

Model Building

- We split the data into training and testing sets.
- Then, we build a linear regression model.

R Code (Continued)

```r
# Split the data into training and testing sets
library(caTools)
set.seed(123)
split <- sample.split(crop_data$CropYield, SplitRatio = 0.7)
train_data <- crop_data[split, ]
test_data <- crop_data[!split, ]

# Build a linear regression model
crop_model <- lm(CropYield ~ Rainfall + Temperature, data =
    train_data)

```

Model Summary

- Let's see the summary of our linear regression model.

R Code (Summary)

```r
# Summary of the model
summary(crop_model)

```

Model Evaluation

- Now, let's evaluate our model.
- We'll calculate the Root Mean Squared Error (RMSE).

R Code (Evaluation)

```r
# Make predictions on the test data
predictions <- predict(crop_model, newdata = test_data)

# Evaluate the model
library(Metrics)
rmse_value <- rmse(test_data$CropYield, predictions)
cat("Root Mean Squared Error (RMSE):", rmse_value, "\n")

```

Visualization

- Finally, let's visualize the results.
- We'll create a scatter plot to compare actual and predicted crop yields.

R Code (Visualization)

```r
# Visualize the results
library(ggplot2)
ggplot(test_data, aes(x = CropYield, y = predictions)) +
  geom_point() +
  geom_abline(intercept = 0, slope = 1, color = "red") +
  labs(x = "Actual Crop Yield", y = "Predicted Crop Yield")
    +
  ggtitle("Crop Yield Prediction")

```

Conclusion

- In this presentation, we demonstrated crop yield prediction using R and a linear regression model.
- We also visualized the results and calculated RMSE for model evaluation.

Thank You

Thank you for your attention!