AI Bootcamp

Model Selection and Multiclass Classification

Module 13 Day 3

Class Objectives

By the end of class, you will be able to:

1. Apply the model-fit-predict process on classification models with multiclass datasets.

2. Analyze and explain the results when training multiple models with the same dataset, comparing which model performs best.

Activity:

Everyone Do: Classification Warm Up

In this activity, you will recap preprocessing data, then training and evaluating multiple classification models.

Suggested Time:
15 Minutes

Activity:

Everyone Do: Classification Warm Up

Logistic Regression	SVM	KNN	Decision Tree	Random Forest
Train Accuracy: 0.986 Test Accuracy: 0.975	Train Accuracy: 0.986 Test Accuracy: 0.975	Train Accuracy: 0.947 Test Accuracy: 0.942	Train Accuracy: 1.000 Test Accuracy: 0.933	Train Accuracy: 1.000 Test Accuracy: 0.992

Suggested Time:
15 Minutes

Which model showed the **best accuracy** on the testing set?

Do you have any reason to be **skeptical** about the accuracy of this model?

Which **model(s)** would you choose to proceed with for the tic-tac-toe problem?

Questions?

Instructor **Demonstration**

Multiclass Classification

Instructor Demonstration

Multiclass classification of car acceptability:

Logistic Regression	SVM	KNN	Decision Tree	Random Forest
Train Accuracy: 0.925 Test Accuracy: 0.917	Train Accuracy: 0.998 Test Accuracy: 0.977	Train Accuracy: 0.960 Test Accuracy: 0.919	Train Accuracy: 1.000 Test Accuracy: 0.968	Train Accuracy: 1.000 Test Accuracy: 0.961

Which model showed the **best accuracy** on the testing set?

Are there any **models** that performed too well and raise suspicion?

Which **model** would you choose to proceed with for the car acceptability problem?

Instructor **Demonstration**

Introduction to Mini Projects

Activity:

Groups Do: Mini Projects Part 1 – Explore Datasets

In this activity, you will select a dataset that interests you from these five options: customer churn, sports article objectivity, letter recognition, website phishing, and orthopedic patient conditions.

Suggested Time:
10 Minutes

Activity:

Groups Do: Mini Projects Part 2 – Data Preprocessing

In this activity, you will perform preprocessing tasks on your selected dataset.

Suggested Time:
15 Minutes

Break

15 mins

Activity:

Groups Do: Mini Projects Part 3 – Model Training and Evaluation

In this activity, you will train and evaluate at least three classification models using your preprocessed data.

Suggested Time:
45 Minutes

Time’s up!

Let’s review

Activity:

Everyone Do: Discuss Mini Projects

In this activity, you will present your models to the class and discuss the process, challenges, and results.

Suggested Time:
30 Minutes

Everyone Do: Discuss Mini Projects

Some prompts for discussing your project findings and experiences:

Which dataset have you chosen to investigate?

How did you preprocess the dataset?

Why did you opt for that technique?

Did you face any issues trying to preprocess the data?

Which three model designs did you choose?

Why did you choose them?

Did you have any difficulties when building, fitting, or evaluating each model?

What were the results of your evaluation of the models?

Did you encounter anything concerning in the model evaluation (e.g., signs of overfitting)?

Which model would you choose to go forward with based on your evaluation?

Did you make any improvements to the workflow of your project?

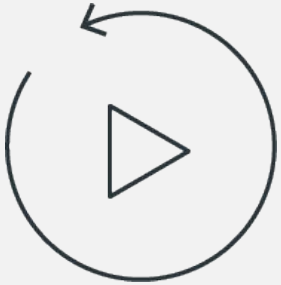
If not, is there anything you might like to implement next time that could streamline the workflow?

If you did make improvements, did you make the workflow better as you expected, or were there some issues?

Instructor **Demonstration**

Familiar Regressors

Questions?



Let’s **recap**

Review the Class Objective

In this lesson you learned how to:

1. Apply the model-fit-predict process on classification models with multiclass datasets.

2. Analyze and explain the results when training multiple models with the same dataset, comparing which model performs best.

Challenge

Spam Detection Classification Model

Questions?

The End