MATLAB Programming Section 07: Teacher Guide

Storyline

In this lesson, the students will be implementing techniques learned in previous lessons as they begin their final project. This lesson starts with an introduction to the final project followed by a discussion where the students can brainstorm ideas of what they need to complete it. This final project requires students to choose either a musician or an athlete to then import, extract, sort, and choose a machine learning model based on data from their chosen individual. The lecture portion of this lesson acts as an example of the final project guiding the students through the process they should take when approaching their assignment. Following the lecture, the students will start independently working on their final project, using the lecture as a reference. Once they have completed as much of their final project as possible in the time allotted, the students will reflect on their progress and brainstorm any next steps needed to finish the project.

Main Learning Goal

Students will compile all that they've learned in the previous programming and AI lessons to start on the final project. They will choose their musician or athlete and begin compiling data to sort or extract from. Students will then decide on a machine learning model that will best suit their data, and then implement the model in MATLAB.

Focus Question

What can you extract from the data about your musician or athlete that demonstrates success?

Elicit
How will I engage students and elicit their ideas?

Activity Name and Description	Teacher Moves	Student Moves	Resources
• **Brainstorm Session** • *5-10 minutes* • Reflecting on the requirements for the final project,	• Teachers will help students find a partner to discuss the final project as well as help facilitate the discussion.	• Students will discuss the questions with their peers. • Students will write down the ideas	

Activity Name and Description	Teacher Moves	Student Moves	Resources
students will brainstorm ideas and outline what they need to get started on their final project.	• Teachers will answer any questions that the students might have on the final project.	they brainstormed for reference later.	

Develop

How will I get students to explore, explain, and develop ideas?

Activity Name and Description	Teacher Moves	Student Moves	Resources
• **Building Your Model** • *30 minutes* • This lecture acts as a reference for the students demonstrating how they should find and import data, choose the best machine learning model, and determine the parameters to extract from the data for their project. • The Live Script file is available in the MATLAB Drive and available for download here: MATLAB_Sect	• The teacher will ensure the students have the correct Live Script file and data files so they can follow along. • The teacher will walk the students through the lecture. • The teacher should encourage questions and provide answers to students throughout the lecture.	• The students will either follow along on MATLAB online or download the Live Script file and data files to walk through the lecture. • The students should take notes so they can implement the methodology shown in the lecture in	• Classification Trees • Discriminant Analysis • Naive Bayes • Nearest Neighbors • Support Vector Machine Classification • Classification • Linear Regression • Generalized Linear Models • Nonlinear Regression • Support Vector Machine Regression • Regression • Help Function

Activity Name and Description	Teacher Moves	Student Moves	Resources
ion07_Reference_Document.mlx • The data files are available here: FIFA 23 male players.csv		their final project. • The students should actively engage throughout the lesson, asking questions as needed.	

Deploy

How will I get students to use and apply their ideas to what they've learned?

Activity Name and Description	Teacher Moves	Student Moves	Resources
• **Start Your Final Project** • *30-40 minutes* • Following the lecture, students will begin their final projects. • They will pick either a musician or an athlete to find data on to train their AI model. Then students will utilize the skills they've learned in the previous lessons to complete the project. • The assignment an be found	• The teacher will ensure the students have the necessary data files and Live Script file for reference as they complete the assignment. • The teacher will encourage independent work and help as needed.	• The students will independently begin their final projects, using the example set in the lecture as a reference. • The students should ask questions as necessary. • Once completing as much as possible in the allotted time, the	

Activity Name and Description	Teacher Moves	Student Moves	Resources
here: Section 07 Assignment		students will submit their work as a Live Script file in the assignment.	

Refine

How will I get students to extend, elaborate, and change their ideas based on what we now understand?

Activity Name and Description	Teacher Moves	Student Moves	Resources
• **Big Picture** • *5-10 minutes* • After starting their final project, the students will be posed with questions to evaluate their progress and brainstorm their next steps in this final project.	• The teacher will help students evaluate and reflect on their progress on the final project and answer any questions they might have.	• Depending on their status on the final project (completed or in progress), students should answer the respective questions and take notes on their reflections. • Students should brainstorm ideas on how to improve their already completed final project or any next steps they need to take to complete the final project.	