

Deep Dive into Data Science

Introduction

This training program aims to build AI expertise at Nexteer Automotive, enabling engineers to effectively apply AI in their roles. Designed for engineers with limited machine learning experience, it offers mentor-guided upskilling to an upper intermediate/lower advanced proficiency.

The curriculum leverages high-quality, publicly accessible educational resources, primarily drawing from **Coursera's Deep Learning Specialization, TensorFlow: Advanced Techniques Specialization, and Mathematics for Machine Learning and Data Science Specialization**. We gratefully acknowledge these resources are licensed under the **Creative Commons Attribution-ShareAlike 2.0 (CC BY-SA 2.0) license**, allowing adaptation and sharing for educational purposes with proper attribution, which we consistently provide to **DeepLearning.AI** and **Coursera**.

This training program is not a mere replication of Coursera content. Instead, it synthesizes and adapts these materials, incorporating **official TensorFlow documentation, original content, and other sources** (including, but not limited to, enhancements developed with the assistance of generative AI tools), to deliver a structured, accelerated learning experience tailored for Nexteer personnel. The objective is to build deep intuition, expedite learning, and equip engineers with practical AI skills to address real-world data science challenges.

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Modules

The training program is structured into these modules:

- **Part 1: Python Programming (Review)**
- **Part 2: Probability & Statistics (+ EDA Lab)**
- **Part 3: Deep Learning**
- **Part 4: Capstone Project**

Teaching Approach & Differences with Standard Training

Teaching Approach

This program's teaching approach differs from standard training. The goal is to **convey the intuition** behind the concepts and provide a **concise summary** to facilitate focus during sessions while maintaining accuracy. The provided training materials are designed to **serve as a reference** after completing the program and during data science projects. It is recommended to keep the content as is and use the **Sandbox** section in each notebook for practice.

Recommendations to Maximize Learning

To get the most out of this training, **focus on the big picture (intuition) during sessions**. Ensure you have a solid grasp of the main ideas before diving into details and hands-on practice. Initial concepts will be revisited and evolve into more complex ideas, which may require multiple attempts to grasp fully.

Recommended approach to practicing the material:

- Take a relaxed approach during sessions, listen attentively to understand the main concepts.
- After the session, review the summary. Then, set it aside and **try to reproduce the key points from memory**.
- Finally, move on to hands-on practice. **Code the discussed concept independently** before referring back to the original examples.

Lastly, regarding AI development tools (e.g., Copilot, ChatGPT): it is highly recommended **not to use AI to work out the EDA Lab (Part 2) or complete Capstone Project (Part 4)**. Do not allow it to generate the first draft or do the heavy lifting. The training is intended to help you become an expert in this area. You *may* use AI to help refine code you have already written, explain specific errors, or clarify concepts after making your own attempt.

Getting Started

Install VS Code and Python

Please download and install the following on your machine.

- **VS Code** ([direct download link](#))
- **Python 3.10** ([direct download link](#))

Once you have VS Code and Python installed, create a new folder for the training material (i.e., your **root** directory). Move the files that have been shared with you to this folder. From the top menu, select *File > Open Folder* and navigate to the folder that you created.