Data Science Survival Skills

Homework 11

Description of the Homework

In this homework assignment, your task is to program a graphical user interface (GUI) to deploy your own deep neural network. The neural network, which you will design and train, should be capable of classifying images from the Fashion MNIST dataset. The choice of network architecture is entirely up to you. After training your model, convert it into TensorFlow Lite format, with or without applying quantization techniques. The GUI must allow users to classify images by dragging and dropping them into the interface, displaying the predicted class for each image.

Homework 11: Tasks 1/2

- Create a GUI that allows users to interact with your trained deep neural network.
- The GUI must support drag-and-drop functionality, enabling users to drag an image file directly into the interface for classification.
- We have demonstrated the PyQt framework during the exercises, but you are free to use an alternative GUI framework (e.g., Tkinter, PySide, or Kivy) if you prefer.
- The GUI should display the image that was drag-and-dropped into the interface, allowing users to verify the input visually.

➜ **Slide:** Screenshot of your code that implements the drag-and-drop functionality in your presentation.

Homework 11: Tasks 2/2

- Train a deep neural network using the **Fashion MNIST** dataset for image classification.
- Convert your trained model into TensorFlow Lite (TFLite) format to integrate it into your GUI.
- **Optional:** You may apply quantization to optimize the model for size and performance (not mandatory).
- Embed the TFLite model into your GUI from Task 1.
- Implement inference functionality that runs automatically whenever a new image is drag-and-dropped into the GUI.
- Add a label below the displayed image in your GUI to show the predicted class for the drag-and-dropped image.
- **Optional:** Package your application as an executable file so that users can launch the GUI by simply double-clicking it, without needing to run a Python script manually (not mandatory).

➜ **Slide:** Screenshot showing your training/validation loss and accuracy during the training process.

➜ **Slide:** Screenshot of your chosen model architecture (e.g., summary output).

➜ **Slide:** Screenshot of your GUI showing: a) The image that was drag-and-dropped;
and b) The predicted class displayed as a label below the image.

Homework: Requirements

You must complete **all** homework assignments (**unless otherwise specified**) following these guidelines:

- **One** slide/page.
- **PDF** file format only.
- It has to contain your **name, student** (**matriculation**) **number** and **IdM** in the down-left corner.
- Font: **Arial,** Font-size: **> 10 Pt.**
- Answer **all** the questions and solve all the tasks requested.
- Be careful with **plagiarism**. Repeated solutions will not be accepted!