IN4MATX119 Assignment 2

**Instructions for Submission**

This is a group assignment. Submit the following to Canvas.

1. Python Code

* File name: IN4MATX119\_A2.ipynb
* Must be in .ipynb format
* Your submission must include a comment at the top with your name and student ID
* Make sure to write comments explaining each function/method implemented

2. Demo Video

* Record a full demo of your application. The video must be in .mp4 format.
* The demo should clearly show the process of:
  + Uploading the code image
  + Transcribing the code snippet
  + Running static analysis to explain the code and suggest improvements
  + Technical details of the system design, and justification for why you decided to design your application in such a way

**Plagiarism warning**: Please be aware that although you may help each other understand the concepts that we are practicing, you may not provide each other with or receive the answers to these questions. Submitting someone else’s work will cause us to take action, including reporting such activity to the academic dishonesty office.

**Assignment 2: Code Whiteboard Tutor**

**Main goal**: Your main goal is to use a multimodal Large Language Model (LLM) to build a GUI application that allows users to upload a photo of their handwritten Python code and receive suggestions for code improvements. The main functionalities that must be included are:

* Transcribing handwritten Python code into a code snippet
* Running static analysis and explaining bugs (if any) in natural language
* Suggesting bug fixes, improvements, or efficiency tweaks to the code snippet

**Resources**: We recommend using Gradio, which allows you to directly display the UI of the app you are building. For the multimodal LLM, we have included "gemini-2.5-flash-lite" in the demo code. You are welcome to use any other open-source multimodal LLM that is compatible with your computing resources. However, we strongly discourage you from paying for model usage.

**Note**: You will not be graded on how well the multimodal LLM performs. Instead, grading will be based on the completeness of your assignment and the demo.

**Instructions for Assignment 2**:

**Step 1**. Download and unzip the IN4MATX119\_A2.zip, and read the instructions in IN4MATX119\_A2demo.ipynb.The ZIP folder contains examples of handwritten code and the corresponding test cases. You can use the Google Colab environment or your preferred IDE.

**Step 2**. Create your Google Gemini API key if you haven’t already done so.

**Step 3**. Add your API key to your copy. For Google Colab, use the Secrets tab (located on the left navigation bar, see Discussion 1 slides for reference) to add your API key.

**Step 4**. Write your code and test it using the images provided in the code\_images\_example folder within the ZIP file. You can also write the same function in your own handwriting to test it.

**Step 5**. Record a demo of your working application. You must use the version of the code you submitted.

Make sure to test that your application works under different scenarios (e.g., various handwriting styles, colored pens). We will be running your application with our own handwritten code examples. Write additional tests to ensure the robustness of your code. In the demo, make sure to describe the technical details of your application during the demo to demonstrate your understanding of the code and the overall functionality of your application.

**Helpful Guidelines to Complete Your Assignment**

Here is the relevant documentation for Gradio: <https://www.gradio.app/guides/quickstart>

The grading criteria are available on the course Canvas page. You are welcome to use the template code we provide or create your own. In both cases, you **must** include comments in the code to explain the purpose and key implementation details of each function or method.

The assignment will be graded based on the code (including the written comments) and the demo (a working UI demonstration). Make sure to follow the specified submission format. Failure to do so may result in a score of 0 due to incompatibility. No late submissions will be accepted for this assignment. We advise you to start early to avoid rate limit issues!