Lab Proposal — Session 1

AI Landscape Exploration and Tools Setup Lab

AI Fundamentals, Landscape Exploration, and Environment Setup Lab

2. Lab Objective

This laboratory exercise is designed to ensure that students are able to:

· Understand the main categories of Artificial Intelligence, including Narrow AI, General AI, Generative AI, and Agentic AI.

· Clearly distinguish between Generative AI and Agentic AI in terms of capabilities, behavior, and use cases.

· Successfully set up the required development environment, including Python, Jupyter Notebook, Visual Studio Code, Git, and GitHub.

· Reflect on ethical considerations related to modern AI systems.

· Connect theoretical concepts to real-world applications relevant to their professional or academic domains.

3. Tools Required

· Web browser

· Python 3.10 or later

· Jupyter Notebook

· Visual Studio Code

· Git

· GitHub account

· Internet connection

4. Lab Activities Overview

Activity	Title	Type	Expected Output
Activity 1	AI Categories Exploration	Conceptual	Comparative table
Activity	Generative vs Agentic AI	Analytical	Short comparison

2		writing	

Activity 3	Tools Setup Verification	Practical	Environment screenshots
Activity 4	Responsible AI Reflection	Critical thinking	Analytical paragraph
Activity 5	AI in the Student's Domain	Applied thinking	Relevant use case

Activity 1 — AI Categories Exploration

Task

Students must research and summarize the four main AI

categories. **Deliverable**

A table structured as follows:

AI Type	Definition	Real-World Example	Importance
Narrow AI	**AI designed and trained to perform a specific, single task or a very limited range of tasks. It operates within a pre-defined range and cannot perform outside of its programmed limitations.**	**Siri or Alexa (voice assistants), image recognition software, spam filters, Chess programs.**	**Currently the most widespread and practical form of AI, driving immediate efficiency and solving specific, focused problems across various industries.**
General AI	**Hypothetical AI with the ability to understand, learn, and apply its intelligence to solve any problem that a human being can. It possesses consciousness, self-awareness, and the capacity for abstract thought.**	**A hypothetical robot that could attend university classes, write a novel, and manage a company with equal proficiency.**	**Represents the ultimate goal of AI research, capable of revolutionizing science, technology, and human knowledge by matching or exceeding human cognitive ability.**
Generative AI	**A type of AI that is trained on vast datasets to create new content (e.g., text, images,**	**ChatGPT (creating text/code or Midjourney (creating**	**Transforming creative industries, content production, and software development by enabling the**

	code, video) that is similar to its training data but original. It focuses on the creation/output rather than classification/prediction.	images), deepfake technology.	rapid, automated generation of high-quality, novel output.
Agentic AI	AI systems designed to act as an autonomous 'agent'—taking initiative, setting goals, planning steps, executing tasks, and reflecting on results to achieve a high-level objective, often interacting with real-world tools.	An AI system that is given the goal "Plan a trip to London," and then independently books flights, hotels, and creates an itinerary by interacting with various online tools.	Focuses on automating complex, multi-step workflows and decision-making processes, moving AI from passive tools to active, goal-driven collaborators.

Recommended References

- https://ai.google/education/

- https://www.ibm.com/topics/artificial-intelligence

- https://stanfordai.stanford.edu/

Activity 2 — Generative vs Agentic AI

Task

Students must write a short comparison (5–7 sentences) that

includes: · A clear definition of both Generative AI and Agentic AI

- · The fundamental differences between the two

- · Examples of each

- · One real scenario where Agentic AI offers an advantage over Generative AI

Recommended References

- https://platform.openai.com/docs/guides
- https://python.langchain.com/docs/modules/agents/

- https://www.crewai.com/docs

Answer: Generative AI Creates original content (text, images, audio, code). Works by learning patterns from huge datasets. Reactive → responds to prompts; doesn't take initiative. Examples: ChatGPT, Midjourney but **Agentic AI** AI that can act autonomously toward goals. Combines LLMs + planning + tools + memory. Proactive → can decide next steps without asking the user. Used in robotics, workflows, assistants.The fundamental difference lies in their primary function: Generative AI focuses on the output (e.g., creating a report draft), while Agentic AI focuses on the process and ultimate outcome (e.g., successfully submitting a report).

Activity 3 — Tools Setup Verification

Task

Students must verify that their environment is installed correctly.

Required Screenshots
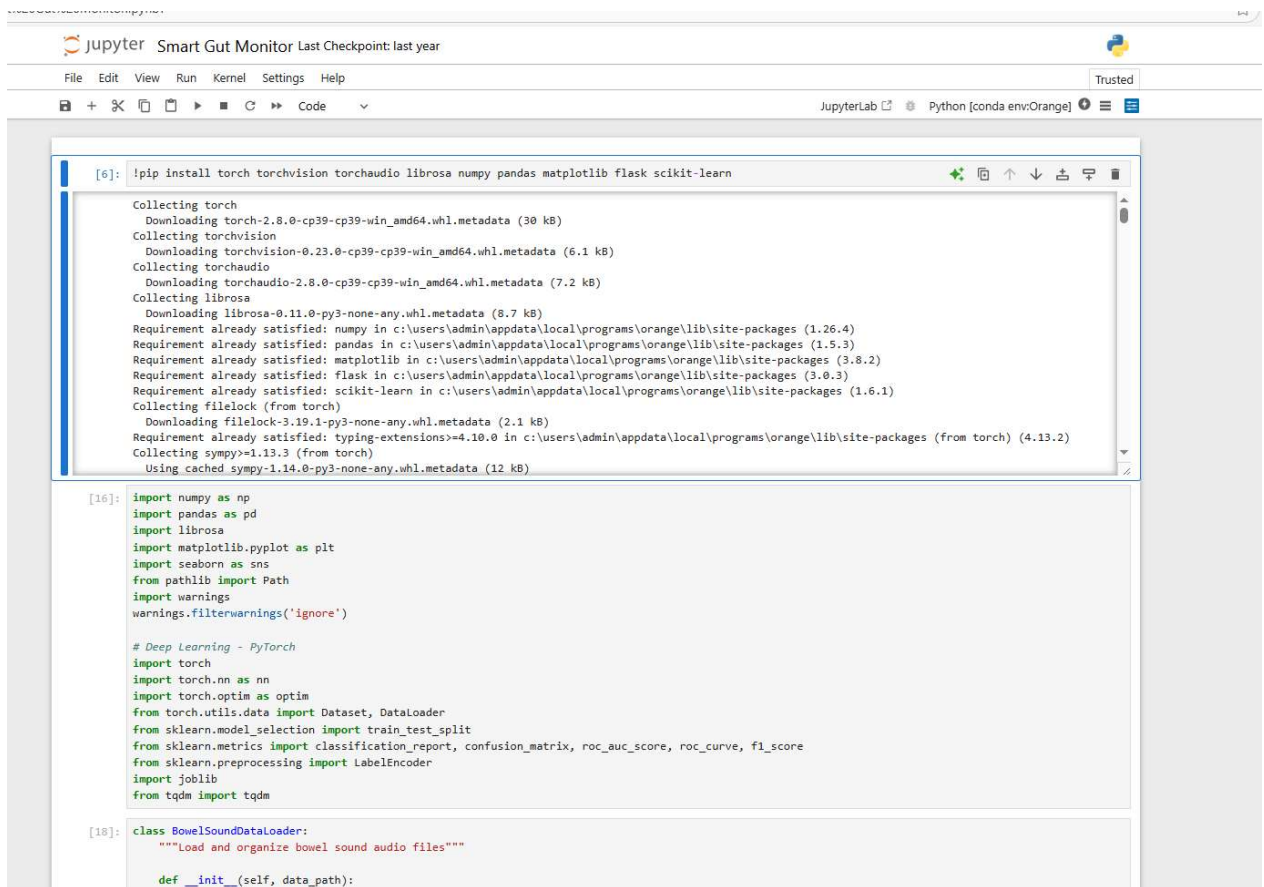
1. Python version:

2. python --version

3. Jupyter Notebook running successfully

4. Visual Studio Code with the Python extension installed

5. Git version:

6. git --version

7. GitHub account homepage
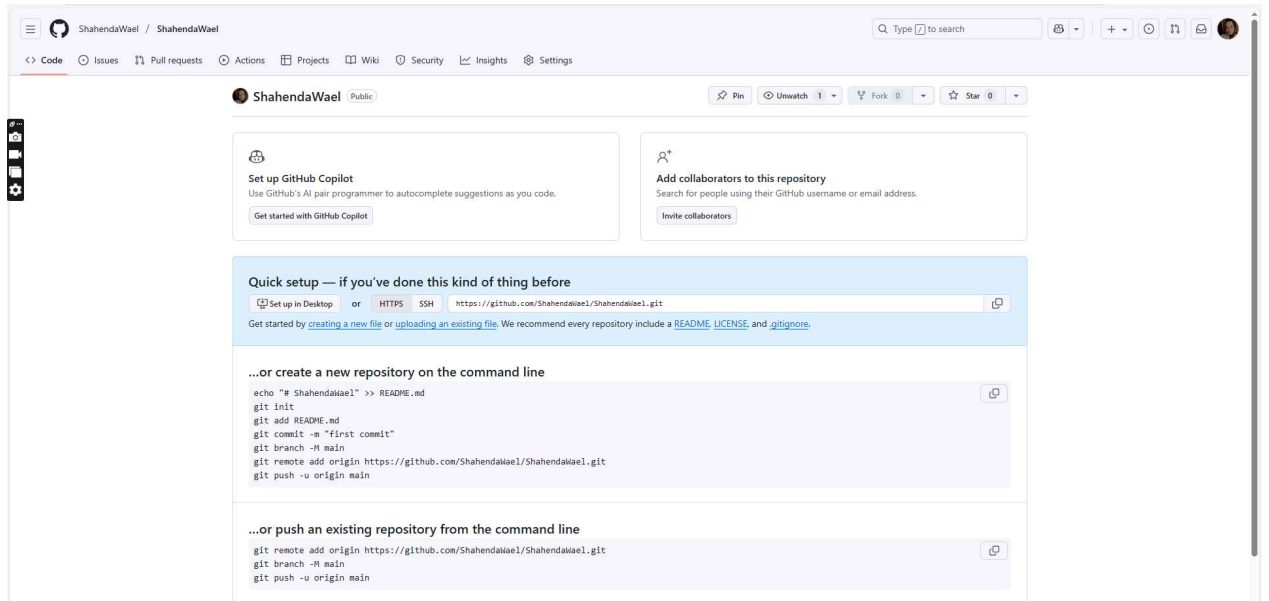
Optional Bonus Task

· Initialize a local Git repository :https://github.com/ShahendaWael/My-AI-Journey.git

· Push a README.md file to a new GitHub repository entitled *My AI Journey*

[**My-AI-Journey/README.md at main · ShahendaWael/My-AI-Journey**](#)

Recommended Installation Links

· Python: https://www.python.org/downloads/

· Visual Studio Code: https://code.visualstudio.com/

· Git: https://git-scm.com/downloads

· GitHub: https://docs.github.com/en/get-started

Activity 4 — Responsible AI Reflection

Task

Students must select one real-world case involving misuse of AI and write a short reflection

addressing: · What happened

· What form of bias or ethical issue occurred

· How the issue could have been prevented
· Which Responsible AI principles apply
Answer:Case: Algorithmic Bias in Facial Recognition Systems

What Happened: Several studies found that commercial facial recognition software, when tested on diverse groups, performed significantly better (i.e., was more accurate) at identifying the faces of white men than the faces of women, particularly women with darker skin tones. This led to higher error rates (false matches or false non-matches) for these underrepresented groups. The systems were often deployed in law enforcement, raising concerns about wrongful identification and legal consequences.

Form of Bias or Ethical Issue Occurred: The primary issue was Data Bias (تحيز البيانات), specifically Underrepresentation Bias. The AI model's training data predominantly featured faces of lighter-skinned men, leading to poor generalization and accuracy when encountering other demographics. The ethical violation is Lack of Fairness (عدم الإنصاف) and the potential for Violation of Civil Liberties (انتهاك الحقوق المدنية) due to misidentification.

How the Issue Could Have Been Prevented:

1. Diverse Data Collection: Ensure that the training dataset is meticulously balanced and accurately represents the global population in terms of race, gender, and age. Data scientists must actively seek out and include high-quality data for historically marginalized groups.
2. Performance Metrics Audit: Instead of only looking at overall accuracy, developers should track accuracy metrics (like false positive rates) per demographic group to ensure parity and fairness

across the board.
3. Contextual Limitation: Restricting the deployment of such systems to low-stakes situations until full fairness is proven, rather than using them in high-stakes areas like arrests or legal decisions where error can cause severe harm.

Which Responsible AI Principles Apply:

- Fairness (الإنصاف): The central principle, demanding equitable performance and output for all users regardless of their background or appearance.
- Safety & Reliability (السلامة والموثوقية): The system is unreliable for specific groups, making it fundamentally unsafe for public deployment in critical scenarios.
- Accountability (المساءلة): The companies developing and deploying these tools must be held responsible for the demonstrable bias and resulting societal harm.

Recommended References

· https://ai.google/responsibility/

· https://www.microsoft.com/ai/responsible-ai

· https://ethics.harvard.edu/ai

Activity 5 — AI in the Student's Domain

Task

Students must identify:

· One potential Generative AI use case relevant to their field

· One potential Agentic AI use case relevant to their field

· A brief explanation of how each use case could impact their work or industry

5. Expected Deliverables

Students must submit:

· A completed AI categories comparison table

· A written comparison between Generative and Agentic AI

· Screenshots confirming the development environment setup ·

A short Responsible AI reflection

· A personalized use-case description

Answer:

1-Generative AI Use Case:

Use case:Creating Fake Data to Start Projects.

Explanation:

Using AI to make up small amounts of believable, simple data (like fake customer names and ages, or made-up sensor readings). This is useful when you need data *right now* to test if your model's code works correctly, before you get the complicated, real data.

Impact: start coding faster: you don't waste time waiting for the "perfect" data.You can build and test the basic structure of your AI model immediately, which helps you finish homework assignments and small projects much quicker.

2-Agentic AI Use Case:

Use case:Automating the Model Tuning Process (Finding the "Best Settings").

Explanation:An AI agent acts like a tireless assistant. It runs your machine learning model many times, changing the "dials" (the settings like the learning rate or batch size) each time. Its only goal is to find the combination of settings that makes your model perform the absolute best (highest accuracy).

Impact:G**et Better Results Easily:** It takes the hard work out of tuning models. Instead of guessing the right settings, the Agent finds them scientifically. This means your project results look professional and highly optimized without you having to spend hours on manual trial-and-error.

6. Submission Format

Allowed submission formats:

· PDF (preferred)

· Word document

· Google Document

· GitHub repository link

File name format:
Session1_Lab_StudentName.pdf
7. Optional Bonus Activity

Students may create a diagram illustrating the **Agentic AI Cycle**:

Perceive → Reason → Act → Learn

This can be created using any diagramming tool such as PowerPoint, Canva, or Draw.io.