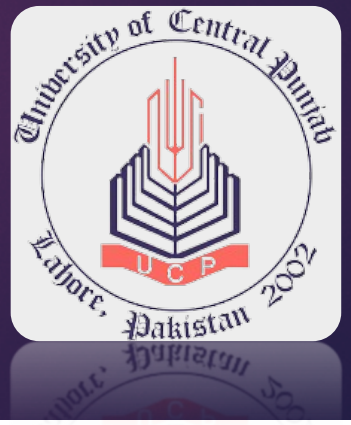
Artificial Intelligence – Lab

Introduction & Guidelines

FRAZ ASLAM



Contact

- **Email**: fraz.aslam@ucp.edu.pk
- **Office**: D-Building, 2nd Floor, Table 1
- You can directly communicate by messaging on **Microsoft Teams** for any queries.

Primary Factors

- Learning & Understanding
- Equality & Fairness
- Communication & Feedback

Attendance Policy

- Withdrawal (probably) after 13 absents/leaves
- Leniency in your punctuality
- But it can affect class participation

Course Outline Weightages

- Graded Labs (20%)
- Mid Term (20%)
- Project (10%)
- Class Participation (5%)
- Final Term (45%)

Graded Labs

- 4 Graded Labs throughout the semester (will be announced on portal and group) a week before
- All have to be selected
- In case of retake, do inform before

Class Participation

- Across 14 Weeks
- Can be based on lab tasks or attendance of any class slot

1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total / 5
0	0	1	1	1	1	1	1	0	1	1	1			3.75
1	1	0	0	1	1	0	0	0	0	0	0			1.666666667
0	1	0	1	0	0	0	0	0	1	0	0			1.25
1	0	1	0	1	1	1	1	1	1	1	1			4.166666667
1	0	1	1	1	1	0	0	1	0	1	1			3.333333333
0	0	1	1	1	1	0	0	1	0	1	1			2.916666667
0	0	1	1	1	1	0	0	0	0	1	1			2.5
1	1	1	1	1	0	0	0	0	0	0	1			2.5
1	1	1	0	1	1	0	0	0	1	1	0			2.916666667
0	0	1	0	0	0	0	0	0	0	0	1			0.833333333
0	0	0	1	0	0	1	1	1	1	1	1			2.916666667
0	0	0	1	1	1	1	1	1	0	1	1			3.333333333
1	1	1	1	1	1	1	1	0	1	1	1			4.583333333
0	0	0	0	0	0	0	0	0	0	0	0			0
1	1	1	0	1	1	0	0	0	1	1	1			3.333333333
0	0	0	0	1	1	0	0	0	0	0	0			0.833333333
0	0	1	0	1	1	1	1	0	0	0	1			2.5
0	0	1	0	1	1	0	0	0	1	0	1			2.083333333
0	0	0	1	1	1	1	1	1	1	1	1			3.75
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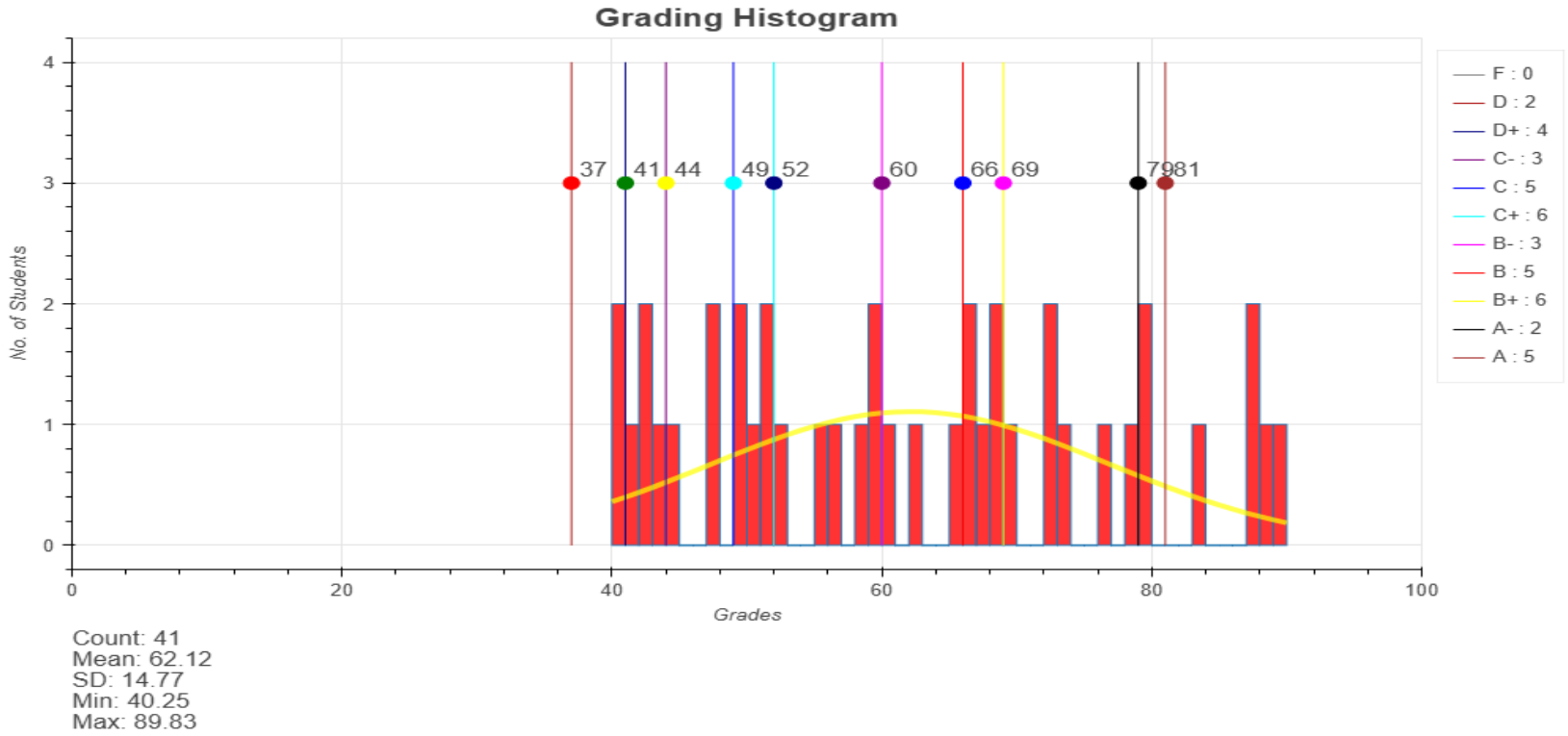
0	0	1	0	0	0	0	0	0	0	0	0			0.416666667
0	0	0	1	1	1	0	0	0	1	1	0			2.083333333
0	0	1	1	1	1	0	0	1	0	1	1			2.916666667

Assessment Criteria

- Assessed through **viva** (same day)
- No need to rot syntax
- Focus on your logics and explanation of the code
- And obviously no plagiarism or use of Generative AI

Relative Grading

- No hard and fast rule…



Roadmap (Before Mid-Term Exam)

- Using Jupyter Notebook
- Python (ITC, PF, OOP, DSA)
- Searching Algorithms (BFS, DFS, UCS, GBFS, A*)

Roadmap (After Mid-Term Exam)

- Minimax, Alpha Beta Pruning
- Genetic Algorithm
- Machine Learning (Naïve Bayes, KNN, and KMeans Algorithms)

Your Expectations…

Artificial Intelligence

- When computers and machines are designed to think, learn, and make decisions **like humans**.
- Tasks that are usually associated with **human capabilities**.
- Learning, reasoning, problem-solving, perception, decision-making.

Types

Artificial General Intelligence

- Hypothetical AI technology that would be able to think, learn, and solve problems just like humans.
- No need for human modifications and inputs.
- AGI doesn't exist yet, and might not in the foreseeable future.

Artificial Narrow Intelligence

- What we have today.
- Designed for specific tasks, like recognizing faces, translating languages, or recommending movies.

“

Artificial Intelligence is the new electricity.

”

DR. ANDREW NG

Just as electricity transformed industries 100 years ago, AI will now do the same.

Why Learn AI?

- Revolutionizing every aspect of lives
- Being a creator, not just a consumer
- Solving real-world problems
- Limitless career opportunities

Career Paths

- Machine Learning Engineer
- Data Scientist
- Data Analyst
- AI Research Scientist
- Software Engineer
- Data Engineer
- Robotics Engineer
- Specializations (NLP, Computer Vision, etc.)

Artificial Intelligence

Is the field of study

Machine Learning

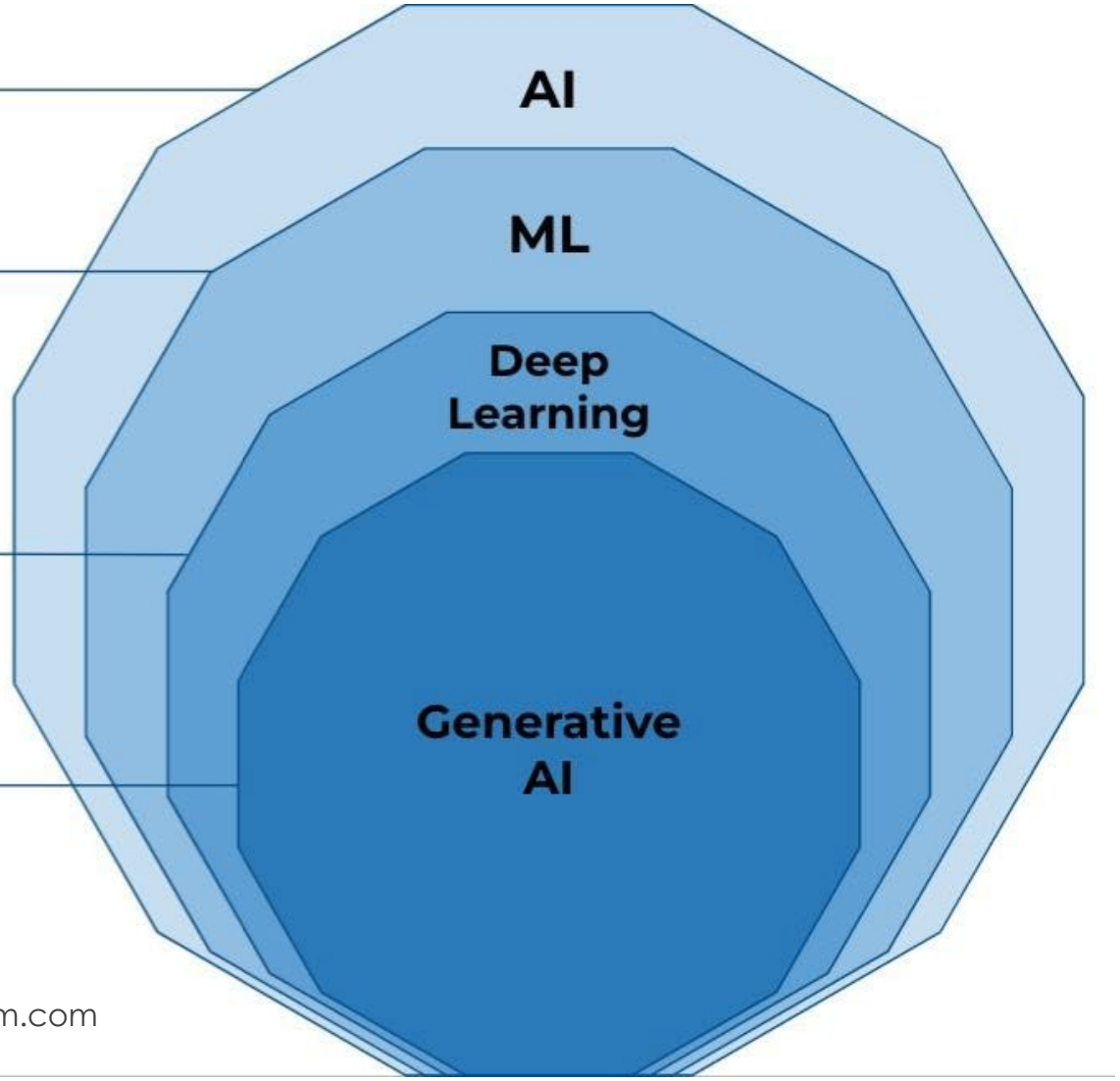
Is a branch of AI that focus on the creation of intelligent machines that learn from data. Another very well know branch inside AI is **Optimization**.

Deep Learning

Is a subset of Machine Learning methods, based on **Artificial Neural Networks.** Examples: CNNs, RNNs

Generative AI

A type of ANNs that generate data that is similar to the data it was trained on. Examples: GANs, LLMs



Reference: Ghazala Sultan, AI ML DL and GenAI, medium.com

Generative AI

- A subset of AI that **creates new content** like text, images, music, videos, and even computer code.
- Learns from vast amounts of data and generates human-like outputs.
- **Examples**: ChatGPT, Dall-E, Gemini, DeepSeek

Using Generative AI

- Boosts productivity and creativity in any field.
- **Discussion**: Programming, Writing, Researching, Data Analysis, Designing & Creating
- An incredible tool, but it must be used responsibly. It should assist humans, not replace them. Learn from it, but don't stop thinking for yourself.

AI Limitations

- Where is it **overhyped** and why?
- Points to **discuss**:
- Human-like creativity, No real emotions, Complex decision making, Data Dependency, Limited Adaptability

Risks with AI

- What are the **risks** associated with AI?
- Points to **discuss**:
- Job Displacement, Bias and Discrimination, Misinformation and Deepfakes, Hallucinations, Ethical Concerns, Dependency on AI Reduces Human Skills

“Artificial Intelligence is a double-edged sword—how we use it will define its impact!”

…

AI augmentation, not replacement. Always verify, and focus on creativity, problem-solving, and critical thinking.

Basic Roadmap

- Python (Pandas, NumPy, Matplotlib)
- Mathematics for ML (Stats & Prob., Linear Algebra, Calculus)
- Core ML Algorithms (Theoretical)
- Scikit Learn
- Deep Learning Architectures
- TensorFlow and PyTorch

More in detail later...

Thank You!