

Introduction to Artificial Intelligence and Applications

Semester One | Course One

Unit 5: Introduction to

Generative AI and

Course Review

Introduction To Generative AI

INTORDUCTION TO GENERATIVE AI

Week Agenda

In this week, students will do the following:

- **Solve Assignment about building a Binary Classification Neural Network**
- **Cross presentation sessions for Introduction to Generative AI with the following topics:**
 - Introduction to Generative AI
 - Understanding Generative Models
 - Generative Adversarial Networks (GANs)
 - Transformers and Large Language Models
 - Applications of Generative AI in Creative Industries
 - Future Trends in Generative AI
 - Generative AI for Text Generation
 - Image and Video Synthesis with Generative AI
 - The Role of Generative AI in Business and Innovation
 - Ethics and Challenges in Generative AI
- **Course review of introduction to AI course**
- **Summary of the Course.**

Assignment

Diabetes Classification with a Feedforward Neural Network

INTORDUCTION TO GENERATIVE AI

Assignment #2

Diabetes Classification with a Feedforward Neural Network

This notebook demonstrates how to:

1. Load a CSV dataset with columns such as gender, age, hypertension, heart_disease, smoking_history, bmi, HbA1c_level, blood_glucose_level, and diabetes.
2. Perform exploratory data analysis (EDA).
3. Preprocess the data (encoding categorical features, handling missing values, etc.).
4. Split the data into train, validation, and test sets.
5. Build and train a feedforward neural network (using TensorFlow Keras).
6. Visualize the training history (loss, accuracy).
7. Evaluate on the test set.

Submission of the Assignment and Student Solution can be found here: [Assignment Submission Link](#)



Cross Presentations

Cross Presentations activity for Preparing generative AI Slides

CROSS PRESENTATIONS

Assignment #3

Objective:

To create a 7-10 slide presentation on a specific topic related to Generative AI. This assignment will help you practice presentation skills, reinforce understanding of Generative AI concepts, and demonstrate your ability to communicate technical topics effectively.

Instructions:

- Form teams of two students. Each team must choose a unique topic from the list below to avoid repetition.
- Coordinate with your classmates to finalize your topic.
- Presentation Requirements: Length: 7-10 slides.
- Content:
 - Clearly explain the chosen topic.
 - Include definitions, key concepts, and examples.
 - Highlight practical applications or case studies where applicable.
 - Use diagrams, charts, or images to enhance understanding.
 - Ensure visual elements are clear and relevant.
 - Provide a reference section at the end of the presentation.

CROSS PRESENTATIONS

Assignment #3

Guidelines:

- Do ****not**** use ChatGPT or similar AI tools to create the presentation.
- Ensure that all team members understand the content of each slide.
- Focus on clarity and simplicity; avoid overloading slides with text.
- Upload your presentation to the following link by the end of the day: [Submission Link](#)

Bonus Opportunity:

- ONE GRADE BONUS will be awarded to the best three teams. Make sure your presentation is well-designed, engaging, and you can explain it effectively!

Course Summary

COURSE SUMMARY

Course Overview & Key Concepts

1. Foundations of AI

- **Intelligence & AI Systems:** Definitions of intelligence, weak vs. strong AI, rational agents, PEAS framework, and environment types.
- **History & Philosophy:** Turing's contributions/objections, technological singularity, classical vs. modern AI.
- **Core Techniques:**
 - Search algorithms (Greedy, Minimax, Alpha-Beta Pruning).
 - Knowledge representation (ontologies, RDF/SPARQL, first-order logic).
 - Probabilistic reasoning (Bayes' theorem, uncertainty, Bayesian statistics).

2. Machine Learning & Neural Networks

- **ML Basics:** Supervised/unsupervised/reinforcement learning, regression vs. classification, hypothesis space, loss functions, gradient descent.
- **Deep Learning:**
 - Perceptrons, activation functions, feedforward networks.
 - CNNs (filtering, image applications), RNNs/LSTMs (sequence modeling).
 - Overfitting prevention (early stopping, hyperparameter tuning).

3. Generative AI

- Frameworks, GANs, transformers, text/image synthesis, ethical challenges.

COURSE SUMMARY

Practical Applications & Outcomes

1. Hands-On Skills:

- **Python Programming:** NumPy, file I/O, loops, dictionaries, Keras/TensorFlow.
- **AI Implementation:**
 - Expert systems (forward/backward inference).
 - Bayesian reasoning (probability problems).
 - Neural networks (XOR solver, diabetes classifier, multi-class CNN/RNN).

2. Key Projects & Assignments:

- Turing's objections essay.
- Car price prediction (ML regression).
- Diabetes classification (feedforward NN).
- Generative AI team presentations (GANs, LLMs, ethics).

3. Course Outcomes:

- **Technical Skills:** Problem-solving with search algorithms, probabilistic reasoning, ML model design, and neural network implementation.
- **Critical Thinking:** Evaluating AI ethics, limitations (e.g., XOR problem), and real-world applications.
- **Future Readiness:** Exposure to generative AI trends, industry tools, and collaborative problem-solving.

Done