Artificial Intelligence – Week 14

Instructor: Teerapong Panboonyuen

Course Repository:
https://github.com/kaopanboonyuen/SC310005_ArtificialIntelligence_2025s1

🎯 Objective

In this project, you will build an AI solution end-to-end! Pick a problem, choose an AI method (ML, DL, Vision, LLM, GenAI, RL), train a model, evaluate it, and present results in a clear, visual oral presentation. You will gain hands-on experience in dataset handling, model building, evaluation, visualization, and optionally a demo. 🖥️

📚 Dataset

Use public datasets for easy access:

- Kaggle: https://www.kaggle.com/
- Roboflow: https://roboflow.com/
- Hugging Face Datasets: https://huggingface.co/datasets
- Google Dataset Search: https://datasetsearch.research.google.com/

💡 Tip: Choose a dataset that matches your project idea and cite it properly.

🏗️ Assignment Tasks

1️⃣ Environment Setup

- Load dataset, explore number of samples per class, image shapes, etc. 📊

- Visualize random examples per class 🖼️
- Apply preprocessing/augmentation (resize, normalize, flip, rotate) 🎨

2️⃣ Model Building

- Select a suitable AI method: CNN / ViT / Transformer / LLM / RL 🖥️
- Define model architecture and training pipeline ⚙️
- Train model with proper loss & optimizer 💾

3️⃣ Evaluation

- Compute metrics: Accuracy ✅, F1-score ⚖️, Confusion Matrix 📈
- Visualize results for better understanding 🧐

4️⃣ Explainability (Optional)

- Apply XAI techniques (Grad-CAM / SHAP / LIME) 🌈
- Interpret why the model predicts certain outputs 🤔
- Show 5–10 sample explanations with visuals 🔥

5️⃣ Inference / Demo (Optional)

- Build a simple demo in Colab 💻
- Allow user to input data (image/text) 📤
- Show model prediction & optional explainability overlay 🌟

6️⃣ Deliverables

- Colab Notebook including:

    - Dataset exploration & visualization 🖼️
    - Preprocessing & augmentation pipeline 🎨
    - Model definition, training, evaluation ⚙️
    - Explainable AI visualizations (if implemented) 🌈
    - Optional inference demo 💻

⚡ Extra Credit

- Detailed explainability analysis 🔥
- Comparison of predictions & XAI insights 👀
- Clear plots, tables, and concise explanations 📝

💡 Tips for Students

- Keep images & data consistent for training & inference 🖼️
- Compare predictions with explainability regions 🔍
- Make notebook visual, organized, and concise 📊
- Randomness in training may lead to slightly different results 🔄
