Week 3 Assignment Rubric

1. Theory (30%)

🎯 **Objective:**

Demonstrate your understanding of core AI tools and frameworks. This should be written on a pdf.

✅ **What to Include:**

- Compare **TensorFlow**, **PyTorch**, and **Scikit-learn**:
    - Key differences in architecture, syntax, use cases.
    - When to use which and why.
- Overview of **spaCy**:
    - NLP tasks it supports (NER, POS tagging, dependency parsing).
    - Use cases where it shines.
- Real-world applications:
    - AI in Healthcare (e.g., disease prediction).
    - AI in Finance (e.g., fraud detection).

🧠 **Tips:**

- Use tables/diagrams for comparisons.
- Reference official documentation for accuracy.

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2. Practical (40%)

🎯 **Objective:**

Demonstrate proficiency in implementing and training ML/DL/NLP models.

✅ **Tasks to Choose From (select 1–2 per tool):**

- **TensorFlow or PyTorch**:

    - Build and train a CNN on **CIFAR-10 or MNIST**.
    - Visualize training accuracy/loss with Matplotlib or TensorBoard.
- **Scikit-learn**:
    - Classification/regression with Random Forest or SVM on **Titanic**, **Iris**, or **Wine Quality** dataset.
    - Show confusion matrix, accuracy score.
- **spaCy**:
    - Run NER on custom text data or news articles.
    - Show entities and labels using `displacy`.

🧪 **Implementation Format:**

- Use **Jupyter Notebooks** in **Google Colab**.
- Upload to **GitHub** with README.
- Comment each code block clearly.

📸 **Include:**

- Screenshots of:
    - Training graphs
    - Model metrics (accuracy, confusion matrix)
    - spaCy's NER outputs

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3. Ethics and Optimization (15%)

🎯 **Objective:**

Reflect on ethical AI development and strategies to optimize models.

✅ **Ethical Points to Cover:**

- How to mitigate bias in data and models.

- Responsible use of AI (e.g., data privacy, transparency).
- Fairness in AI decision-making.

✅ **Optimization Tips:**

- Use model regularization, dropout (for deep learning).
- Data preprocessing/augmentation techniques.
- Hyperparameter tuning using GridSearchCV or Optuna.

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4. Presentation (15%)

🎯 **Objective:**

Summarize your project effectively and creatively.

✅ **Video Guidelines:**

- Duration: **3 minutes**
- All members must speak briefly.
- Include:
    - Project goals
    - Tools used
    - Short demo (e.g., code snippet or output)
    - Ethical takeaway

📹 **Tools for Recording:**

- Zoom (record + share screen)
- OBS Studio (for screen+webcam)
- Google Meet

Submission Checklist

Task	Deliverable	Format
Theory	Concept explanations & comparisons	PDF
Practical	Notebooks/scripts	GitHub Repo
Screenshots	Outputs of models	Included in PDF
Ethics & Optimization	Reflections	PDF
Video	Project summary	Link in PDF and Community Post

Tasks

1. Theory: Concept Explanations and Comparisons
2. Practical: Data Preprocessing/Feature Engineering and Ethics
3. Practical: Train a model using Scikit-Learn, TensorFlow + Report
4. Practical: Visualization using Pytorch and spaCy
5. Video Editing and Presentation

The Flow

1) Concept Explanations and Comparisons —>
2) Data Prep/Feature Engineering —>
3) Train Models (sklearn, tensorflow + report (outputs, screenshots)) —>
4) Reflection with Ethics and Optimization —>
5) Visualizations (pytorch and spacy) —>
6) Video Editing and Presentation

Order of Task Completion and Correlation

1) Task 1
2) Task 2 and Task 3
3) Task 3 and Task 2
4) Task 4 and Task 3
5) Task 5 and Task 4

Group Members Roles/Tasks

Name	Role/Task
	1. Concept Explanations and Comparisons
	2. Data Preprocessing and Feature Engineering, and Ethics
	3. Training Models
	4. Model results Visualization
	5. Video Editing and Presentation

Project Directory Structure

- The one building/training the models will find the datasets for the models then share the dataset to the person who will be working on feature engineering.
- An example of our working directory.

```
ai-tools-assignment-groupX/
├── README.md
├── notebooks/
│   ├── tensorflow_model.ipynb
│   ├── pytorch_model.ipynb
```

```
│   ├── sklearn_model.ipynb
│   └── spacy_ner_demo.ipynb
├── datasets/
│   ├── iris.csv
│   ├── mnist_sample.csv
│   └── articles.txt
├── outputs/
│   ├── accuracy_graph.png
│   ├── confusion_matrix.png
│   └── spacy_ner_result.png
├── ethics_optimization.md
├── report/
│   └── ai_tools_assignment_report.pdf
├── video/
│   └── project_presentation.mp4
└── .gitignore
```

Overview
This repository contains all resources related to our AI tools group assignment. We explore various frameworks including TensorFlow, PyTorch, Scikit-learn, and spaCy.

Contents
- Jupyter notebooks (`/notebooks`)
- Datasets used (`/datasets`)
- Model outputs and screenshots (`/outputs`)
- Ethical reflections and optimization strategies (`ethics_optimization.md`)
- PDF Report (`/report`)
- Group video presentation (`/video`)