Artificial Intelligence

Project Guideline

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1. Project Goal

Build and *explain* a complete image-classification pipeline on your **dataset**, moving from a hand-crafted CNN baseline to state-of-the-art transfer-learning and Vision-Transformer models, augmented with an XAI analysis and packaged as an interactive Streamlit application.

2. Mandatory Project Stages

Stage	What you must do	Minimum expectations
A. Data Prep.	• Verify class balance, image quality, train/val/test splits. • Apply sensible augmentations (flip, rotation, colour-jitter, ...).	Clear EDA plots & justification for each augmentation.
B. Custom CNN	Design, train, and evaluate *one* convolutional network **from scratch**.	Explain architecture choices; reach $\geq 65\%$ test accuracy (or justify shortfall).
C. Transfer Learning	Fine-tune **four *different*** pretrained CNN backbones not shown in the sample code.	• ImageNet weights. • Document freeze / unfreeze strategy. • Compare metrics in one table.
D. ViT	Train *one* Vision-Transformer classifier (e.g. ViT-B/16, DeiT-S).	Either full fine-tune or linear probe + MLP head.
E. XAI	Apply ≥ 1 saliency method (Grad-CAM, Score-CAM, LIME, SHAP, ...) to the *best* model.	Heat-maps for ≥ 10 random test images + interpretation.

F. Streamlit	Interactive web app: upload/choose image → prediction → toggle XAI overlay.	Neat one-page UI; runs via `streamlit run app.py`.
G. Report	Concise scientific report	Follow template in §3.

3. Technical Report Template

Report Link : https://www.overleaf.com/read/snxzsvrqcpbh Instruction to copy the report see figure 1.

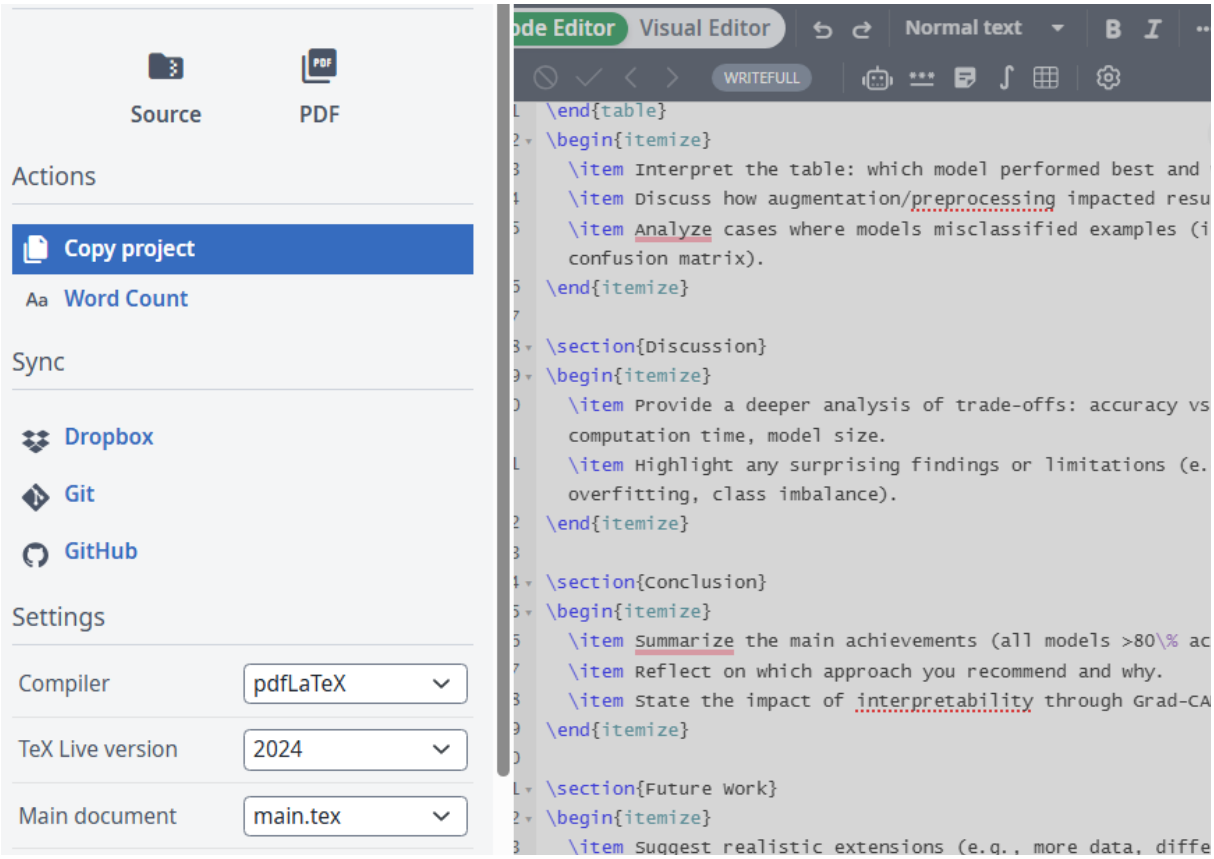

Figure 1: Copy Project from Overleaf