Fake News Detection using NLP and Machine Learning

Step 1:- Study Existing Research (Literature Review)
→ Google Scholar, arXiv, Semantic Scholar
→ “Fake news detection machine learning”
→ “BERT fake news classification”
→ Data Set, Methodology, Results, Limitations {Atleast 5}

Step 2:- Design Your Approach
~Dataset → Preprocessing → Feature Extraction → ML Model → Evaluation → Optional: Explainability

~Note:- Will you use TF-IDF or Word2Vec?
~Note:- Which ML models? (Start with Logistic Regression, then SVM, Random Forest, BERT)
~Note:- Will you explore model explainability (LIME/SHAP)?

Step 3:- Start Implementing in Python
~Get hands-on with code. Use Jupyter Notebook or Google Colab.
→Load dataset
→Clean + tokenize text
→Convert to numerical features (TF-IDF)
→Train your ML models
→Evaluate with F1-score, confusion matrix, ROC-AUC
→(Optional) Visualize word clouds, explain predictions

Step 4:- Document Everything (Start Your Paper or Report)
→What worked? What failed?
→Your model results
→Comparisons between models
→Challenges and insights

Literature Review Starter List (Papers)

1. "Fake News Detection on Social Media: A Data Mining Perspective" – Shu et al.
   🔗 https://arxiv.org/abs/1708.01967
   → Covers key models and challenges in detecting fake news.

2. "Fake News Detection Using Machine Learning Algorithms" – Ruchansky et al. (CSI model)
   🔗 https://arxiv.org/abs/1703.09368
   → Introduces a hybrid approach combining content and social context.

3. "BERT for Fake News Detection" – Kaliyar et al.
   🔗 https://arxiv.org/abs/2004.14991
   → Shows how transformers can outperform traditional models.

4. "LIAR Dataset: A Benchmark Dataset for Fake News Detection" – Wang, 2017
   🔗 https://www.aclweb.org/anthology/P17-2067/
   → Introduces a challenging dataset with short text and truth labels.

5. "A Survey on Fake News Detection: Data, Methods and Challenges" – Sharma et al.
   🔗 https://arxiv.org/abs/1901.03438
   → A good overview of datasets, features, and open issues.