Machine Learning (SkillHigh)

1. Introduction to Machine Learning

- Definition and real-world impact
- ML vs AI vs DL
- Applications: Finance, Healthcare, E-commerce, Gaming

2. Types of Machine Learning

- Supervised Learning
  - Regression (Linear, Polynomial)
  - Classification (KNN, SVM, Decision Trees)
- Unsupervised Learning
  - Clustering (K-Means, Hierarchical)
  - Dimensionality Reduction (PCA, t-SNE)
- Reinforcement Learning
  - Agent, Environment, Rewards

3. Machine Learning Pipeline

- Problem Definition
- Data Collection
- Data Preprocessing
  - Handling Nulls, Outliers
  - Feature Engineering
- Model Selection & Training
- Evaluation (Accuracy, Precision, Recall, F1)
- Hyperparameter Tuning
- Deployment

4. Common Algorithms

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Type	Algorithm	Use Case
Regression	Linear, Ridge	Predicting prices
Classification	Logistic, Random Forest	Spam detection
Clustering	K-Means, DBSCAN	Customer Segmentation
Others	SVM, XGBoost	High-dimensional tasks

5. Libraries & Tools

- Python: NumPy, Pandas, Scikit-learn
- Visualization: Matplotlib, Seaborn
- Advanced: TensorFlow, PyTorch, OpenCV
- Tools: Jupyter, Google Colab, VS Code

6. Evaluation Metrics

- Confusion Matrix
- Accuracy vs Precision vs Recall
- ROC-AUC
- Mean Squared Error (MSE)
- R^2 Score

7. Projects Ideas

- House Price Prediction
- Sentiment Analysis (Twitter)
- Movie Recommendation System
- Image Classification (CIFAR-10)
- Stock Market Trend Prediction

8. Resources

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- Books: "Hands-On ML with Scikit-Learn, Keras, and TensorFlow"
- Courses: Coursera (Andrew Ng), Fast.ai
- GitHub Repos & Kaggle Competitions