

If you are seriously interested in AI/ML

1. **Programming:** Python (Core & Data Science), SQL, and deep learning frameworks like PyTorch/TensorFlow
2. **Statistics & Probability:** Hypothesis testing, Mean, Median, Mode, Variance, Standard Deviation, Quartiles, Bayesian vs Frequentist, Correlation vs Causation p-values, Confidence intervals, Type I/II errors, Random sampling, Stratified sampling, Sampling bias, Probability distributions (normal, binomial, Poisson), Conditional probability, Bayes' theorem
3. **Data Wrangling & EDA:** Cleaning, transforming, and preparing data for analysis
4. **Data Visualization:** Tools like Matplotlib, Seaborn, Tableau or Power BI
5. **Feature Engineering:** Creating and selecting meaningful features from raw data
6. **Machine Learning**
 - **Supervised Learning:** Regression (Linear/polynomial regression, regularization (Ridge, Lasso), logistic regression), Classification (Decision Trees, Random Forests, SVM, Naive Bayes, K-NN), Ensemble Methods(Bagging, Boosting (XGBoost, LightGBM), Stacking)
 - **Unsupervised Learning:** Clustering (K-means, Hierarchical Clustering, DBSCAN), Dimensionality Reduction (PCA, t-SNE etc)
 - **Time Series Analysis:** Forecasting Methods (ARIMA, seasonal decomposition, exponential smoothing), Time Series Features (Trend, seasonality, stationarity, autocorrelation), Modern Approaches (Prophet, LSTM for time series)
7. **Deep Learning Fundamentals:** Neural Networks (Perceptrons, backpropagation, activation functions), Architectures (CNNs (computer vision), RNNs/LSTMs (sequences), Transformers), Training Techniques (Gradient descent variants, batch normalization, dropout)
8. **Model Evaluation & Selection:**
 - **Metrics:** Accuracy, precision, recall, F1-score, ROC-AUC, RMSE, MAE
 - **Validation:** Train/validation/test splits, cross-validation, stratified sampling
 - **Model Selection:** Bias-variance tradeoff, overfitting/underfitting, hyperparameter tuning
 - **Performance Analysis:** Learning curves, confusion matrices, feature importance
9. **Big Data Tech:** Spark, or cloud data platforms (AWS, Azure, GCP)
10. **Database Knowledge:** Relational (SQL) and NoSQL databases

11. **Mathematics:** Linear algebra, calculus (basics relevant to ML/LLM algorithms), Optimization (Gradient descent, local/global minima, cost functions), Understanding floating-point arithmetic, numerical stability
12. **Communication:** Ability to explain findings clearly to technical and non-technical audiences
13. **Domain Knowledge:** Understanding of the specific industry you work in
14. **Version Control:** Git and collaboration workflows
15. **Cloud Computing:** Deploying models and workflows on cloud infrastructure
16. **Experimentation:** A/B testing and designing experiments
17. **MLOPs:** Model deployment, monitoring & lifecycle management
18. **GenAI:** NLP & Transformer fundamentals, Working with LLMs, Prompt engineering, RAG, Vector Databases, Embedding Models, Multimodal, Model Optimisation Agentic AI, Fine-tuning open-source models, evaluation