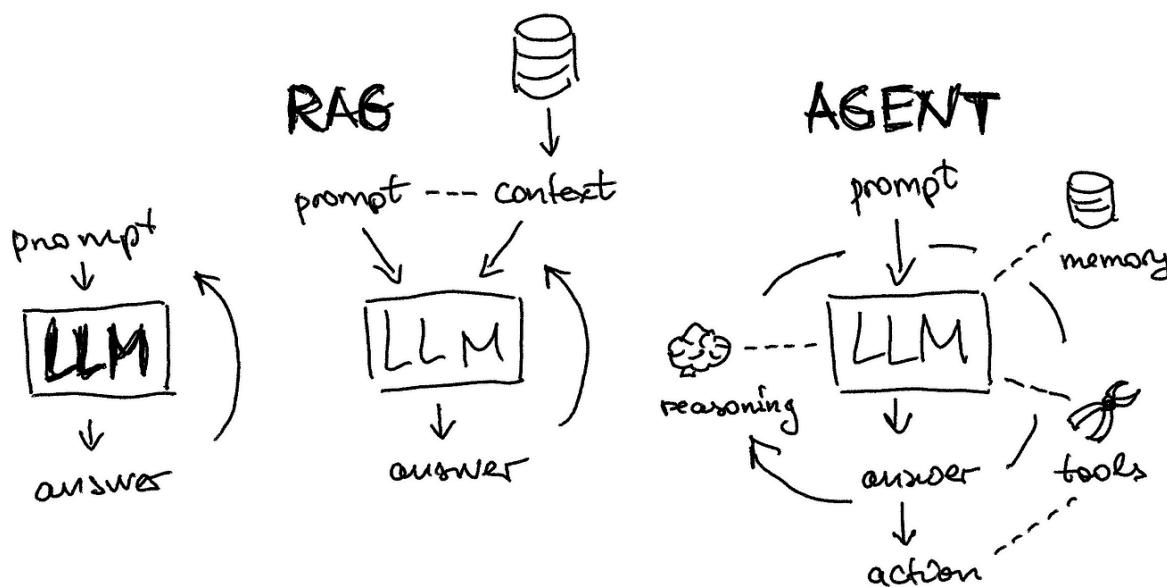


Modern AI Pro

Modern AI Pro Essentials: 100-day Study Plan

September 22, 2025



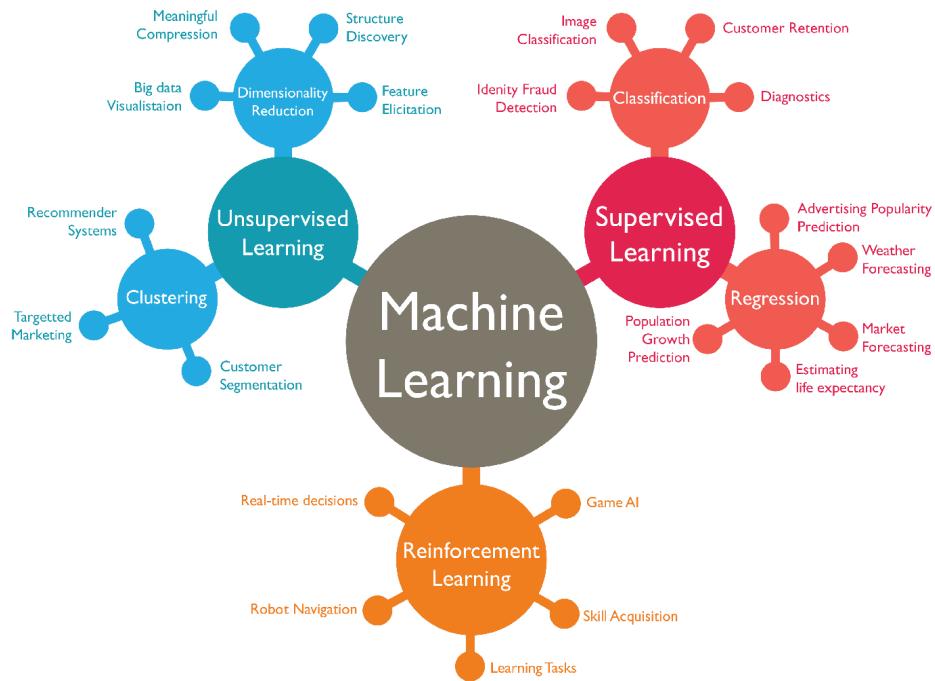
Goal: 100 day challenge

Congratulations on finishing the Modern AI Pro course. This is the starting point for your journey in AI. Now, commit to yourself a 100 day plan where you dedicate 2-3 hours per day in mastering the craft. Here is the plan.

Good Luck!

by [Balaji Viswanathan](#)

Week 1: Understanding Machine Learning



- [!\[\]\(95b42f0077faf7439a26242a54e021ec_img.jpg\) Modern AI pro -- intro class](#)
- [2 hours brushing up on MIT's CS foundations](#)
- [Understand theory of Machine Learning](#)
- [Practice Basic Linear Regression](#)
- [Get a basic familiarity with Colab notebook and other tools](#)
- [Model math basic spreadsheet](#)
- [Practice Visualizations with Matplotlib](#)
- [ML Metrics and Performance](#)
- [Regularization: Underfitting vs Overfitting](#)
- [Decision trees and Random forests](#)

- [Analyzing Wine quality](#)
- [Mini Project: Predicting Home Prices](#)
- [Modern AI Pro \(Arvind\) - Module 1.pdf](#)
- [Session 3: Home Prices Prediction](#)

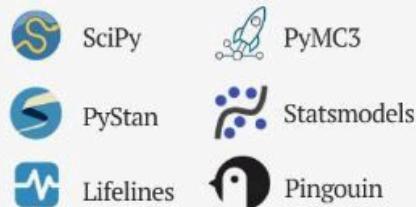
Data Manipulation



Data Visualization



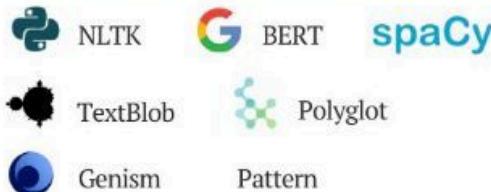
Statistical Analysis



Machine Learning



Natural Language Processing



Database Operations



Time Series Analysis



Web Scraping



Week 2: Understanding Data Science

Data Science Deconstructed



SKILLS REQUIRED



AJGoldstein.com

- [Revisit ML for 30 min](#)
- [Data Metrics hands-on](#)
- [Understand Data Science](#)
- [Explore Kaggle datasets for 2 hours](#)
- [Pandas Deepdive](#)

-
- [Numpy Deepdive](#)
 - [Visualization deepdive with Matplotlib and Seaborn](#)
 - [Mini Project 1: Classification with Responsible AI](#)
 - [When to use One Hot Encoding](#)
 - [Top 6 Classification algorithms](#)
 - [Biases in Machine Learning](#)
 - [!\[\]\(83eb2aa26b610eb6a9dca7cf4702d681_img.jpg\) Modern AI Pro \(Arvind\) - Module 2.pdf](#)

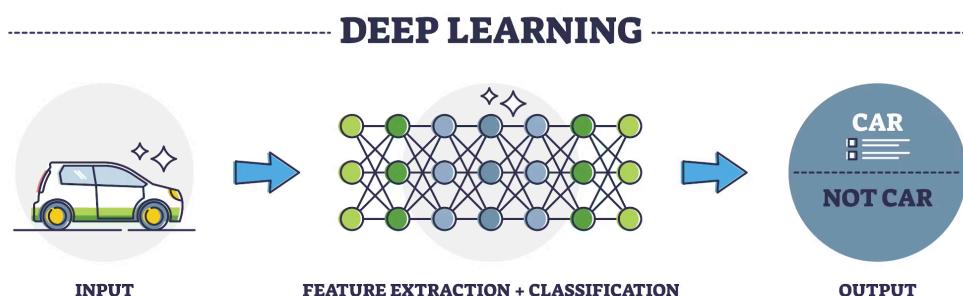
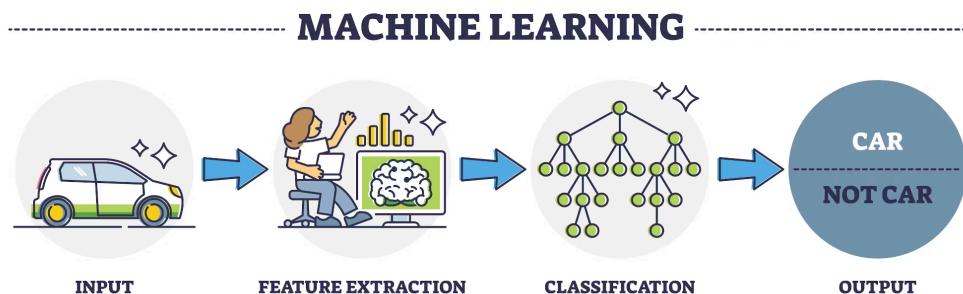
9 Top Applications of Machine Learning

- 01** Identification of Spam 
- 02** Recommending Products 
- 03** Customer Segmentation 
- 04** Image and Video Recognition 
- 05** Fraudulent Transactions 
- 06** Demand Forecasting 
- 07** Virtual Personal Assistant 
- 08** Sentiment Analysis 
- 09** Customer Service Automation 

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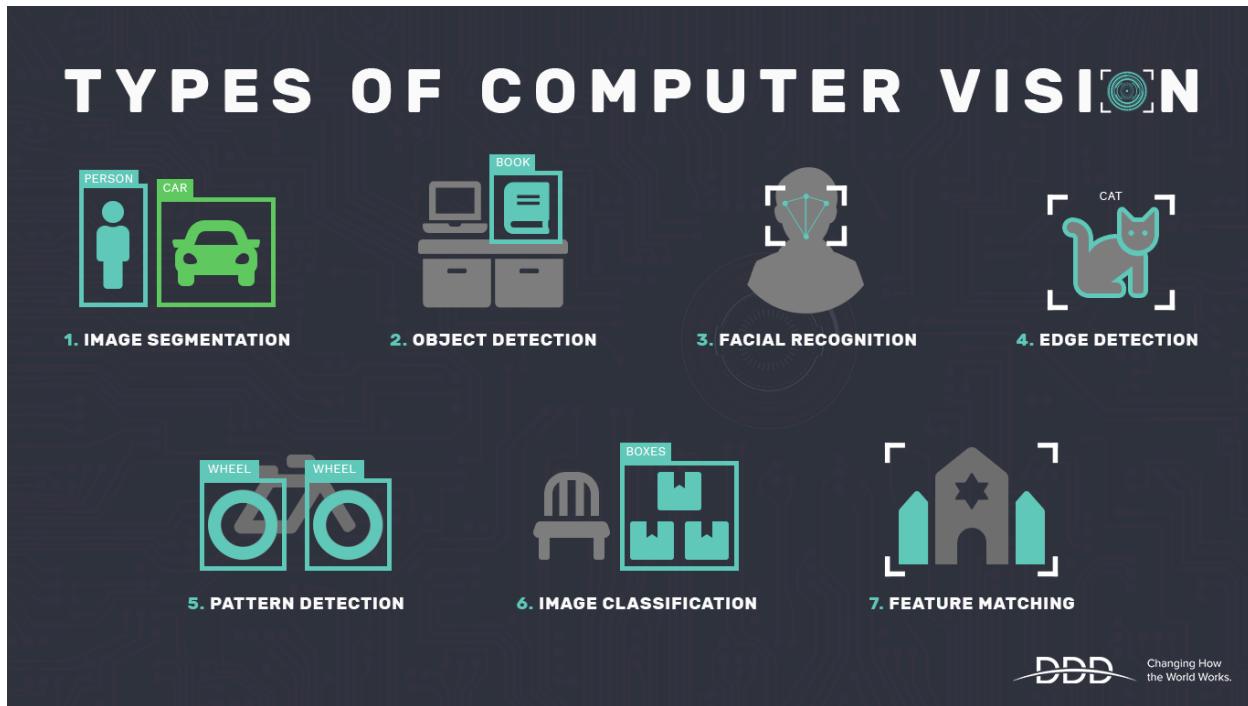


Week 3: Understanding Deep Learning



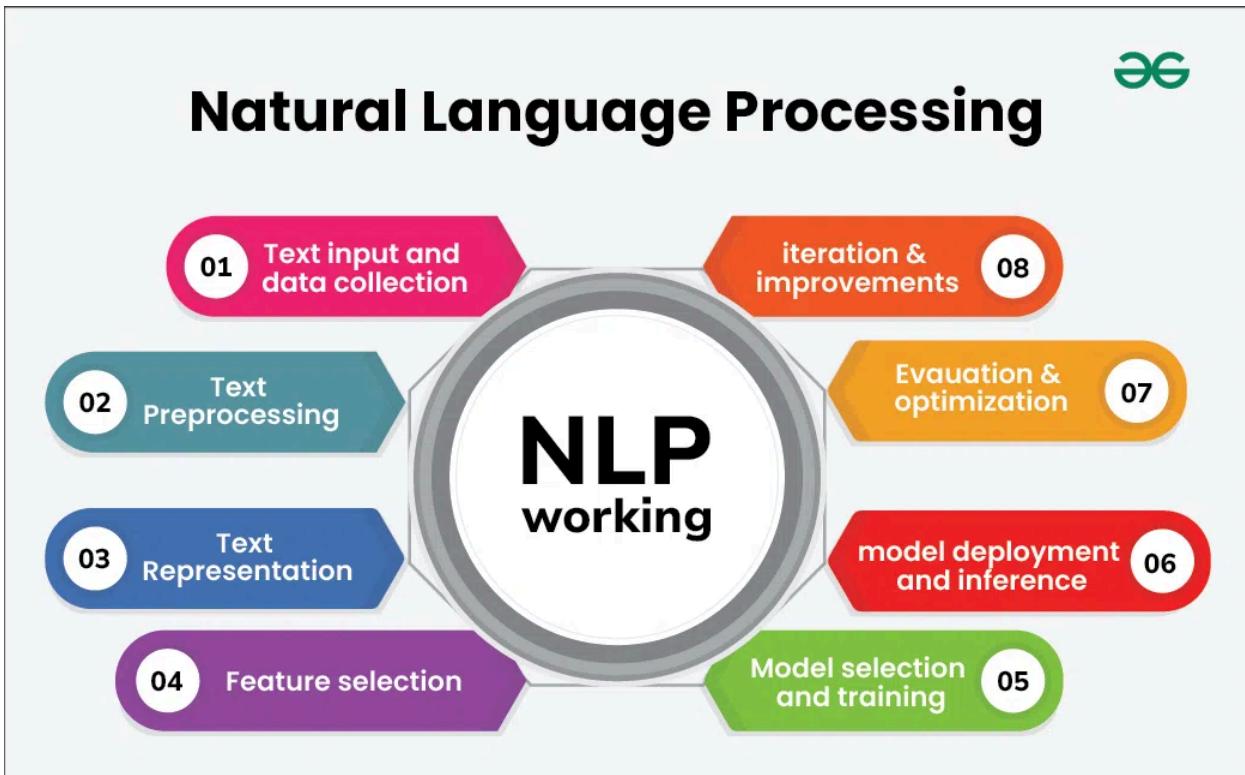
- [Logistic regression from scratch](#)
- [Intro to Logistic Regression](#)
- [Understand Deep learning foundations](#)
- [Intro to Pytorch](#)
- [Keras DNN recap with dropout example](#)
- [Numpy Vectors vs PyTorch Tensors - GPU Computing](#)
- [Income class prediction with Neural Networks](#)
- [Advanced Home prices prediction](#)
- [Parameters tuning in Neural Nets](#)
- [Enroll in 1 active Kaggle competition](#)
- [!\[\]\(756219e9389f679d57027482aa5cf5fc_img.jpg\) Modern AI Pro \(Arvind\) - Module 3.pdf](#)

Week 4: Computer Vision foundation



- [Understand Computer Vision foundations](#)
- [Intro to OpenCV](#)
- [Face detection with OpenCV](#)
- [Intro to CNN with Keras](#)
- [CNN for large image classification - dog breeds](#)
- [CNN example with data augmentation](#)
- [Demonstration of Mediapipe to do body movement detection](#)
- [Image classification with BLIP](#)
- [Mini Project: Recognize object in images](#)
- [Mini Project: Recognize land usage with Satellite Imagery](#)
- [Modern AI Pro \(Arvind\) - Module 4.pdf](#)

Week 5: Natural Language Processing



- [Understand NLP foundations](#)
- [Tokenizing and Vectorising](#)
- [Document analysis and summarizing with NLP](#)
- [Deeper document analysis and summarizing with NLP](#)
- [Mini Project: Fake news classifier](#)
- [Categories of NLP Problems](#)
- [Practice Similarity search with Vector DB](#)
- [Advanced NLP operations](#)
- [Modern AI Pro \(Arvind\) - Module 5.pdf](#)

Week 6: Generative AI Foundations

- [Intro to Generative AI](#)
- [Running LLMs](#)
- [Visit Ollama and Practice prompt engineering \[from below\] locally](#)
- [Beginner's guide to Ollama](#)
- [Mini Project: First LLM app](#)
- [Mini Project: First Chatbot](#)
- [Mini Project: LLM with memory](#)
- [Run through these 1,2,5](#)
- [!\[\]\(443c9fc9e5d024b2fe4fcd35d048eb03_img.jpg\) Modern AI Pro\(Arvind\) - Module 6.pdf](#)

12 Elements of Prompt engineering

Elements of Prompt	Examples
Character	You are a top product management consultant.
Instruction	Generate a short summary of a product description.
Context	Our startup makes robots and AI tools. Here is ...
Constraints	At most 50 words.
Input Data Delimiter	<code><tag> Mitra Robot </tag></code>
Output Format	JSON
Tone and Style	Use a formal tone suitable for a business proposal.
Examples	Example: "The Mitra Robot is an advanced AI tool designed to..."
Variables and Placeholders	Use <code><product_name></code> as a placeholder for the product name.
Temperature and Sampling	Set temperature to 0.7 for balanced creativity.
Role-specific Instructions	As a financial advisor, provide an analysis of the quarterly...
Output Structure	Output should be in bullet points: Key feature 1, Key feature 2.

Week 7: Upgrade to RAG

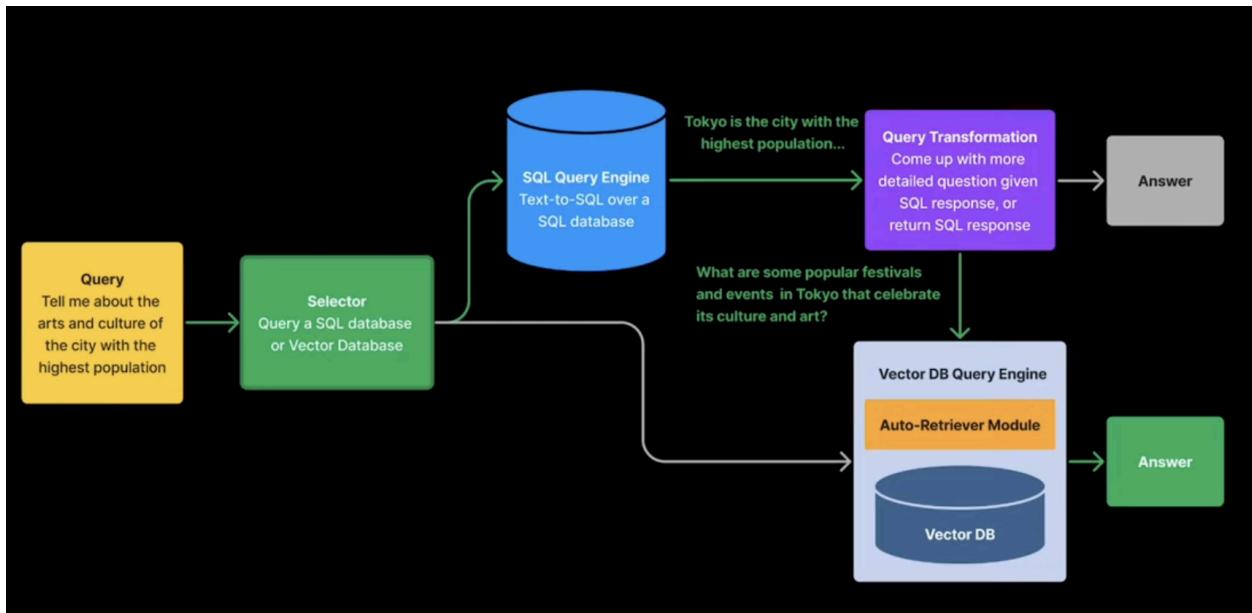
- [What is a RAG?](#)
- [LLM with real time data](#)
- [My first RAG application](#)
- [Practice 2, 4, 5 from this folder](#)
- [Q&A over large documents](#)
- [Local LLM with HuggingFace](#)
- [Intro to Gradio](#)
- Think through the Gen AI Impact framework in detail and research the new developments on this.

Gen AI Impact Framework

The concentration of power goes down the levels.

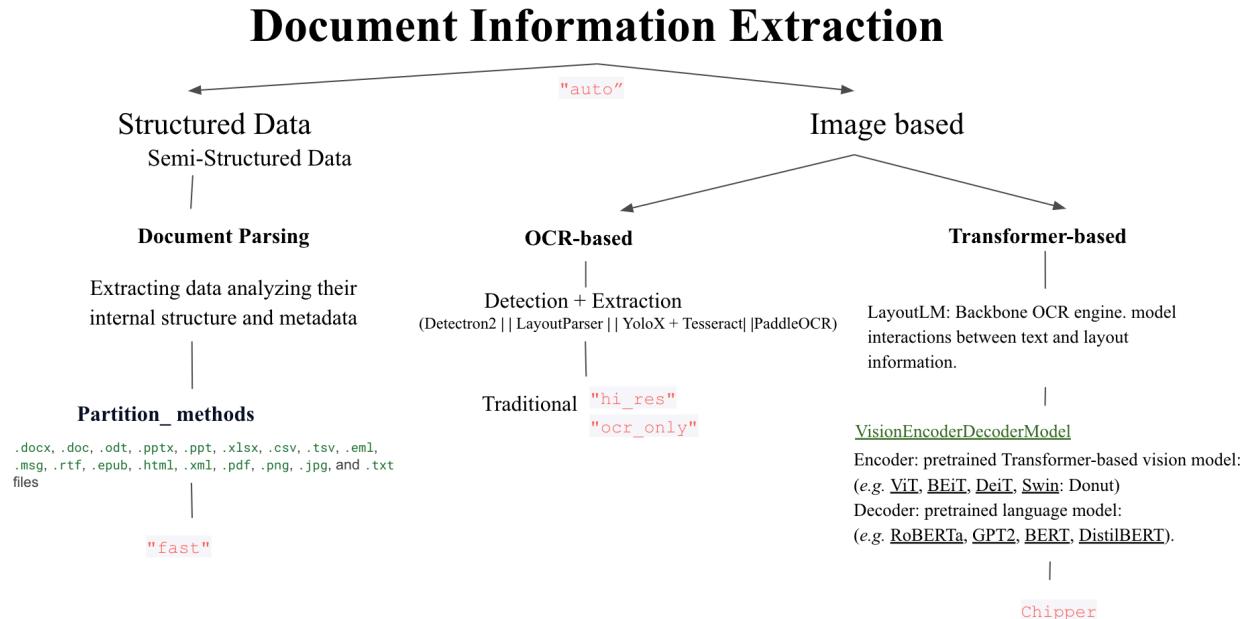
Level	Description	Driver	Unique Aspect	Examples
Innovators	Companies like OpenAI and Meta that develop the foundational LLM technologies.	R&D driven	Pioneering Algorithms	OpenAI, Meta, Google, Anthropic, Mistral
Builders	Companies building specific applications on top of LLMs, such as Salesforce and other software developers.	UX and workflow driven	User Experience Design	Salesforce, Grammarly, Jasper
Enablers	Providers of cloud services, orchestration tools, training data, vector databases, and other essential infrastructure.	Integration and performance driven	Scalability Solutions	AWS, Azure, Databricks, Snowflake, Hugging Face
Customizers	Consultants and firms offering tailored LLM solutions and integrations, like Accenture and Deloitte.	Business value driven	Domain Expertise	Accenture, Deloitte, Capgemini
Utilizers	Enterprises that implement LLM applications internally to drive efficiency and enhance operations.	Optimization and productivity driven	Operational Efficiency	JPMorgan Chase, Walmart, Procter & Gamble
Guardians	Entities focused on education, ethical guidelines, security measures, and regulatory policies.	Safety driven	Ethical Oversight	Parity, Fiddler, Arthur, EthicsGrade, Relyance, Credo AI

Week 8: Learning to work with SQL + LLM



- [Bringing SQL and Vectors together](#)
- [SQL + Vector RAG](#)
- [Smart SQL + Vector for an ecommerce DB](#)
- [RAG with authorization levels](#)
- [Understanding the nuts and bolts of Gen AI](#)
- [PDF Modern AI Pro\(Arvind\) - Module 8.pdf](#)
- Ponder how you will connect SQL with your LLMs

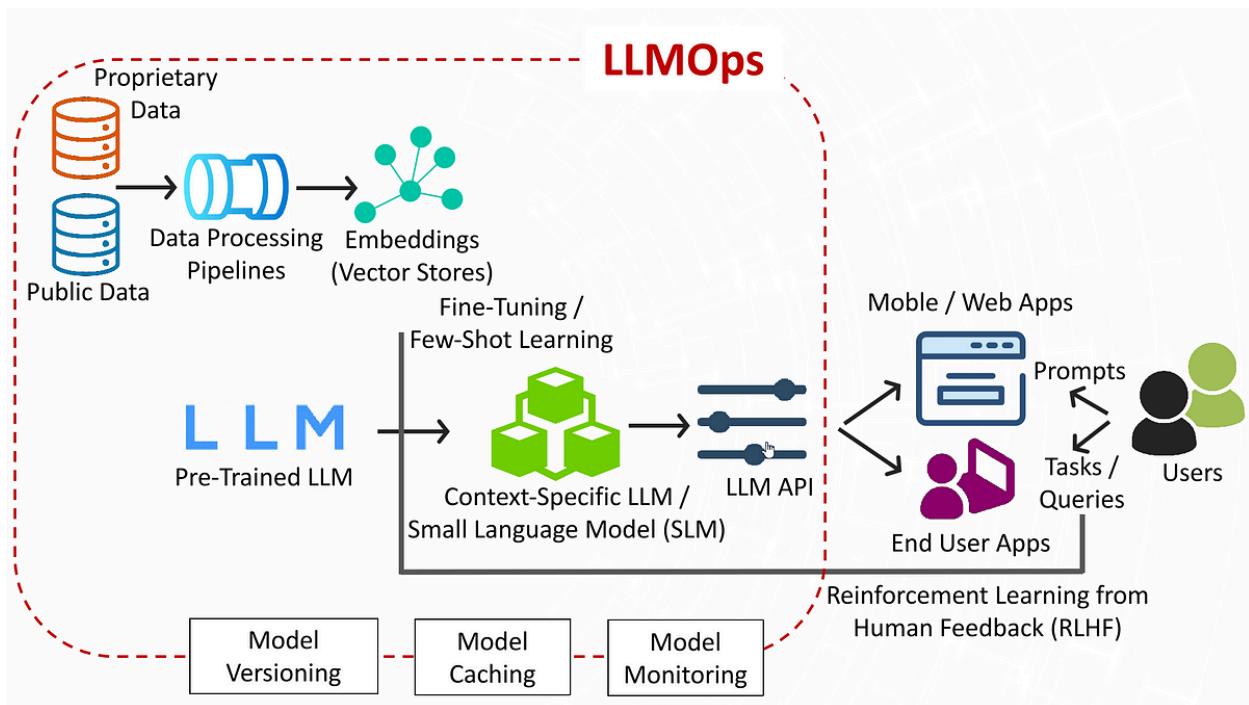
Week 9: Document Analysis and Multimodal AI



- [K-means Clustering](#)
- [Document summarization & analysis](#)
- [OCR with Tesseract](#)
- [Multimodal AI](#)
- [Multimodal Chat](#)
- [Table Analysis with Unstructured library](#)
- [Explore and practice BrahmaSumm in detail](#)
- [Explore llmaparse](#)
- [Multimodal advanced table and image analysis \(you need anthropic for this\)](#)
- [PDF Modern AI Pro\(Arvind\) - Module 9_10.pdf](#)

Week 10: Practice Deployments

- Get a free VM on AWS and set it up with Linux & Nginx
- [Deploy Gradio in Nginx on the server](#)
- [Run through 1, 2 in this repo](#)
- [Intro to Langserve](#)
- [Deploy Langserve on Google Cloud](#)
- [Explore NotebookLM](#)



Week 11: Building Agents

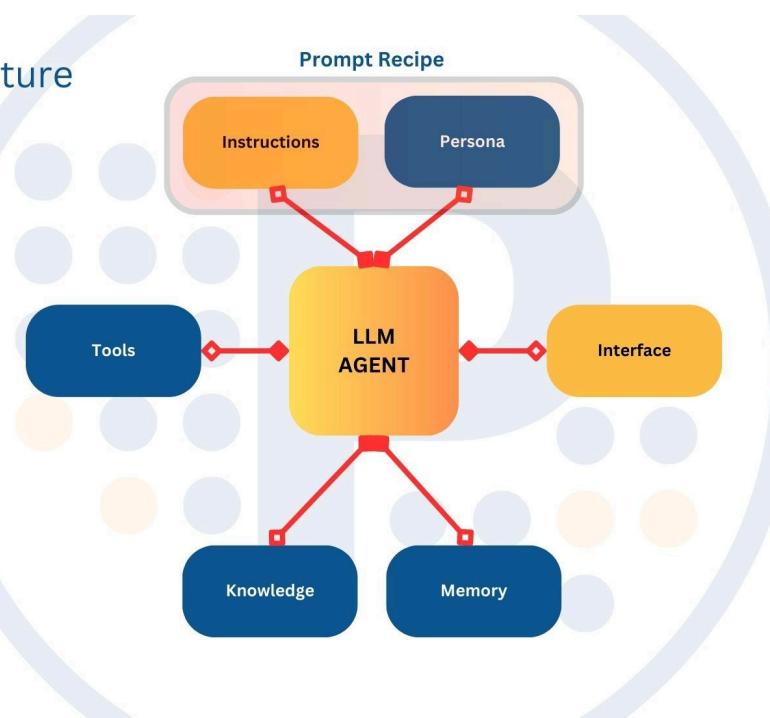
Typical LLM Agent Structure

- Mandatory Component
- Optional Component

- Prompt Recipe guides how the agent will proceed with the task and how to process the output
- Agent must generally interface with a Human, another agent or an API
- Agent can generate "memories" as well has access to specific domain knowledge and tools

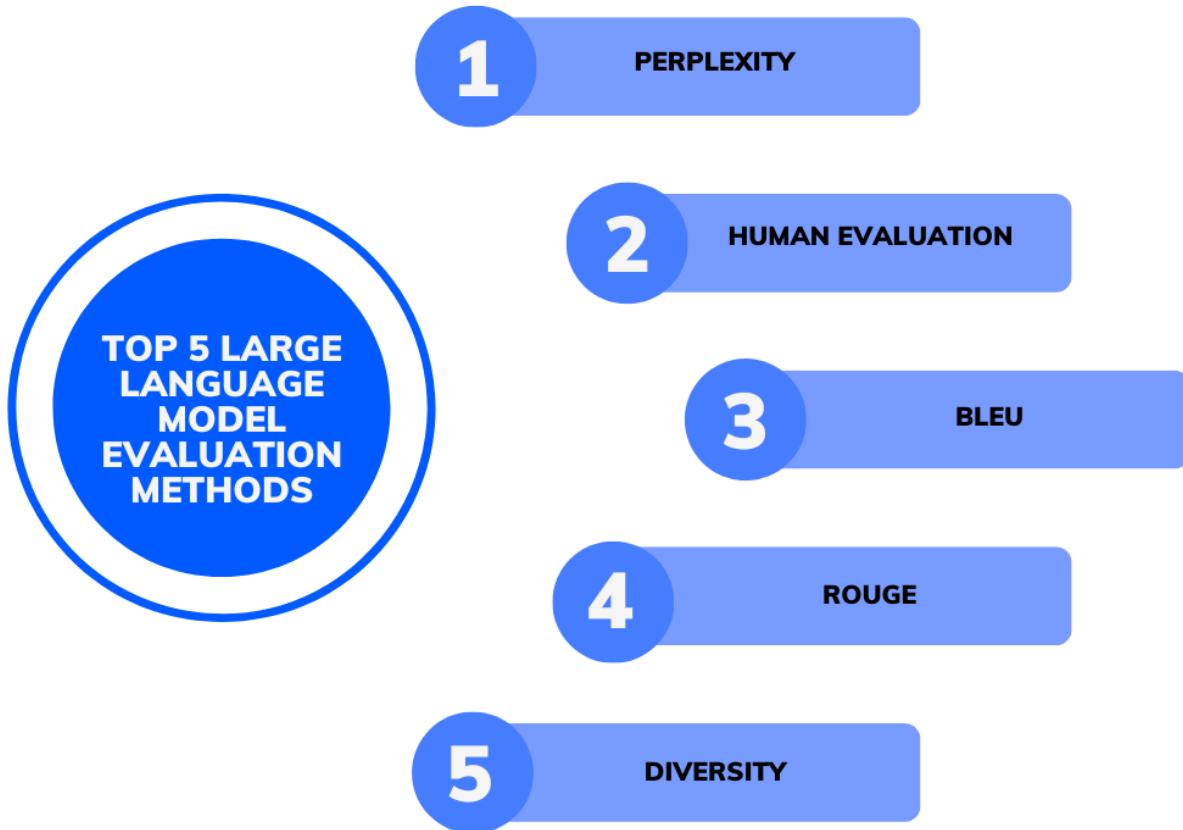


PromptEngineering.org



- [LLM with tools](#)
- [Tool usage with Groq](#)
- [Types of Memory in LLMs with Langchain](#)
- [Building Agents \(Theory\)](#)
- [First agent with the ReAct Framework](#)
- [Agent with CrewAI](#)
- [Agents with Langgraph](#)
- [Advanced agents use case](#)
- [Agents with Autogen](#)

Week 12: Evaluating LLMs

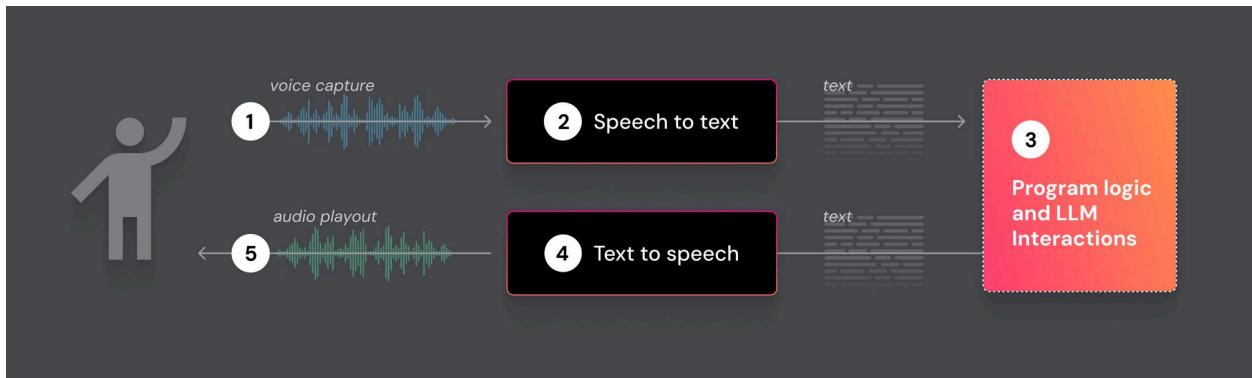


AIMultiple[↗]

- [Browse through the LLM Arena and scoring methods](#)
- [Setup Langfuse account, API keys and explore what they do](#)
- [Evaluating LLMs hands-on](#)
- [Run through 1 and 2 in this repo](#)

Week 13 (2-day short week)

Since 13 is an unlucky number we have cut short this week to just 2 days.



- [Speech Recognition](#)
- [Voice synthesis with Bark](#)
- [Summarizing a Video with Whisper API and LLM](#)

Week 14: Capstone project

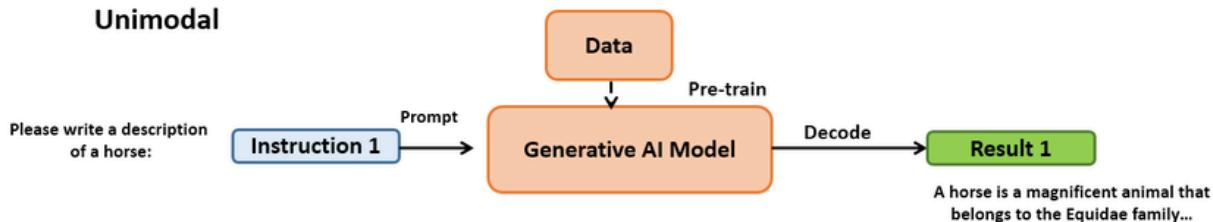
Pick a project from 1 of these and use your chatbots to ask LLMs to help you plan in detail and then build an early code version of this. Deploy on Gradio.

Consumer

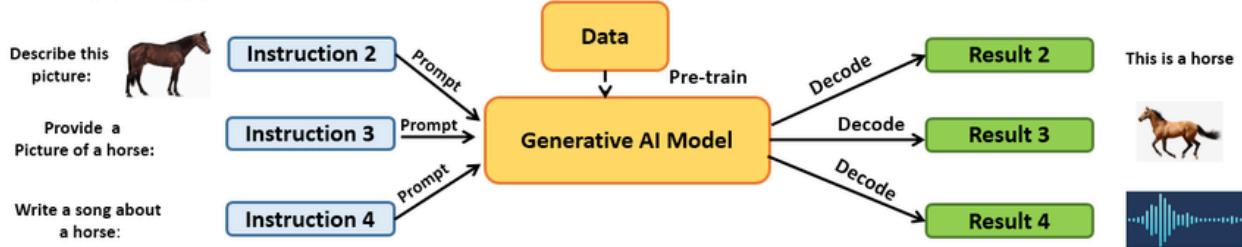
1. **Globetrotter's Guide** - An end-to-end travel planner utilizing the Amadeus API for flight, hotel, and point-of-interest data, making travel planning effortless and efficient. More information about Amadeus API: <https://developers.amadeus.com/self-service>
2. **LifeMitra** - A personal life assistant capable of organizing your calendar, setting reminders, making reservations, and providing suggestions for everyday tasks, all using natural language processing and reinforcement learning.
3. **ShopSmart** - A smart shopping assistant that uses image recognition and recommendation algorithms to assist users in making well-informed purchase decisions, including price comparisons, product recommendations, and more.

Week 15: Advanced Topics

Unimodal



Multi-modal



- [Advanced RAG for Finance Domain](#)
- [Image Classification and Captioning with CLIP](#)
- [Video Classification with CLIP](#)
- [Stable Diffusion – 1 \(not authored by Modern AI Pro\)](#)
- [Hardware behind Gen AI](#)
- [Advanced study: AI By Hand \(not by Modern AI Pro\)](#)