Introduction to Generative AI and LLM Models
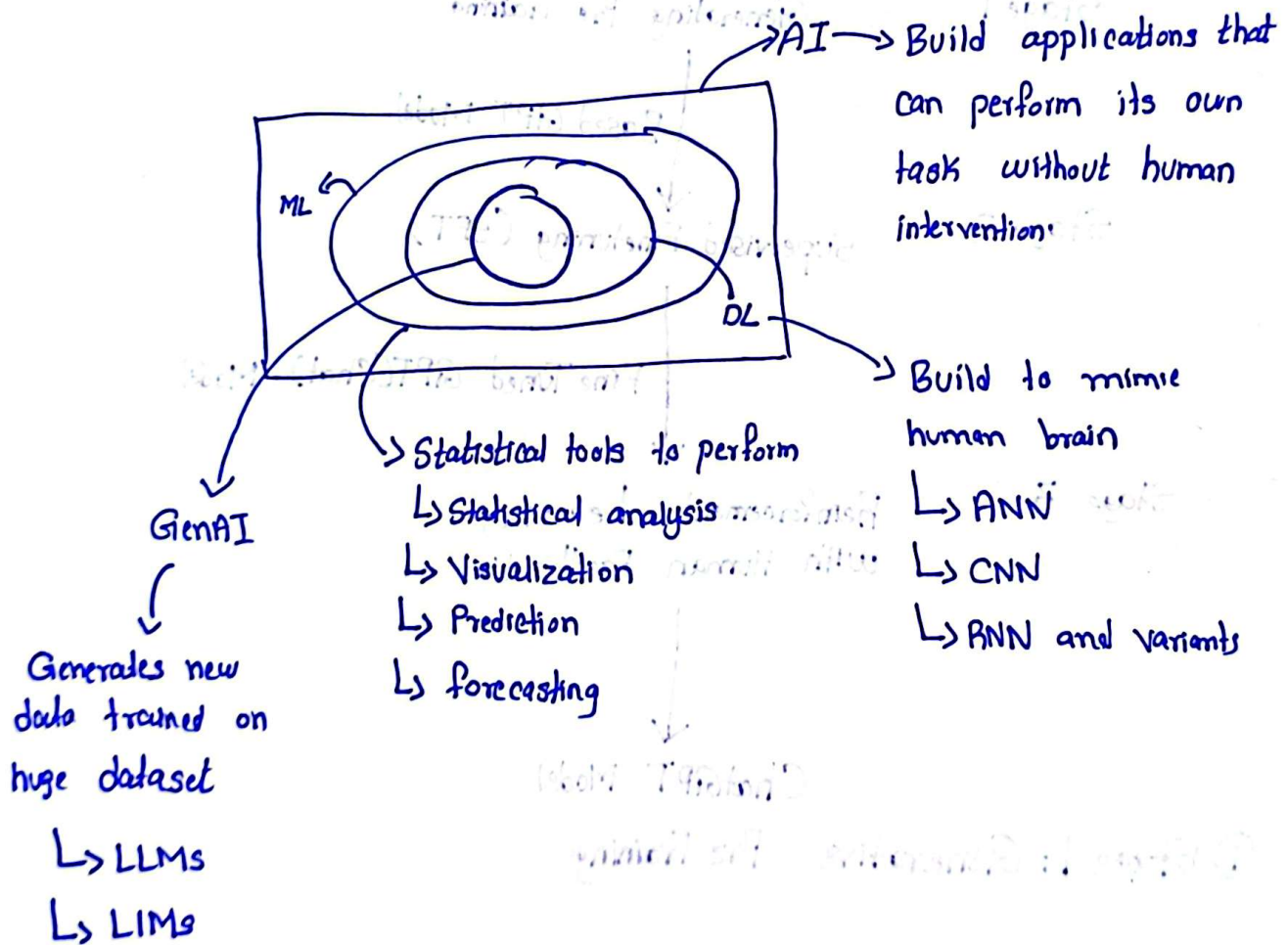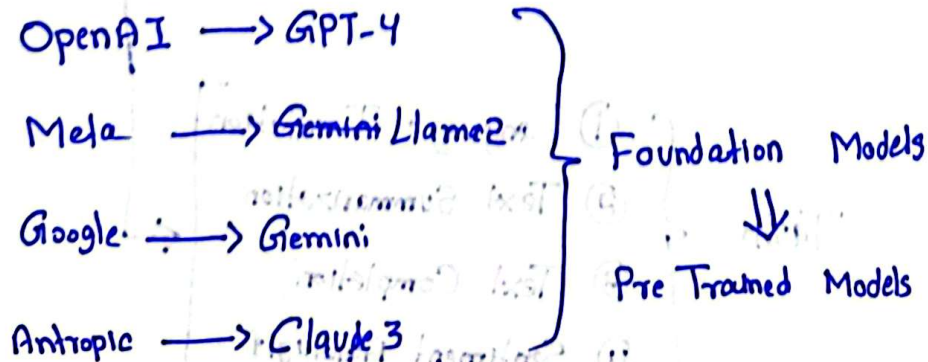
→ What is Generative AI, AI vs ML vs DL vs GenAI

> AI vs ML vs DL vs GenAI
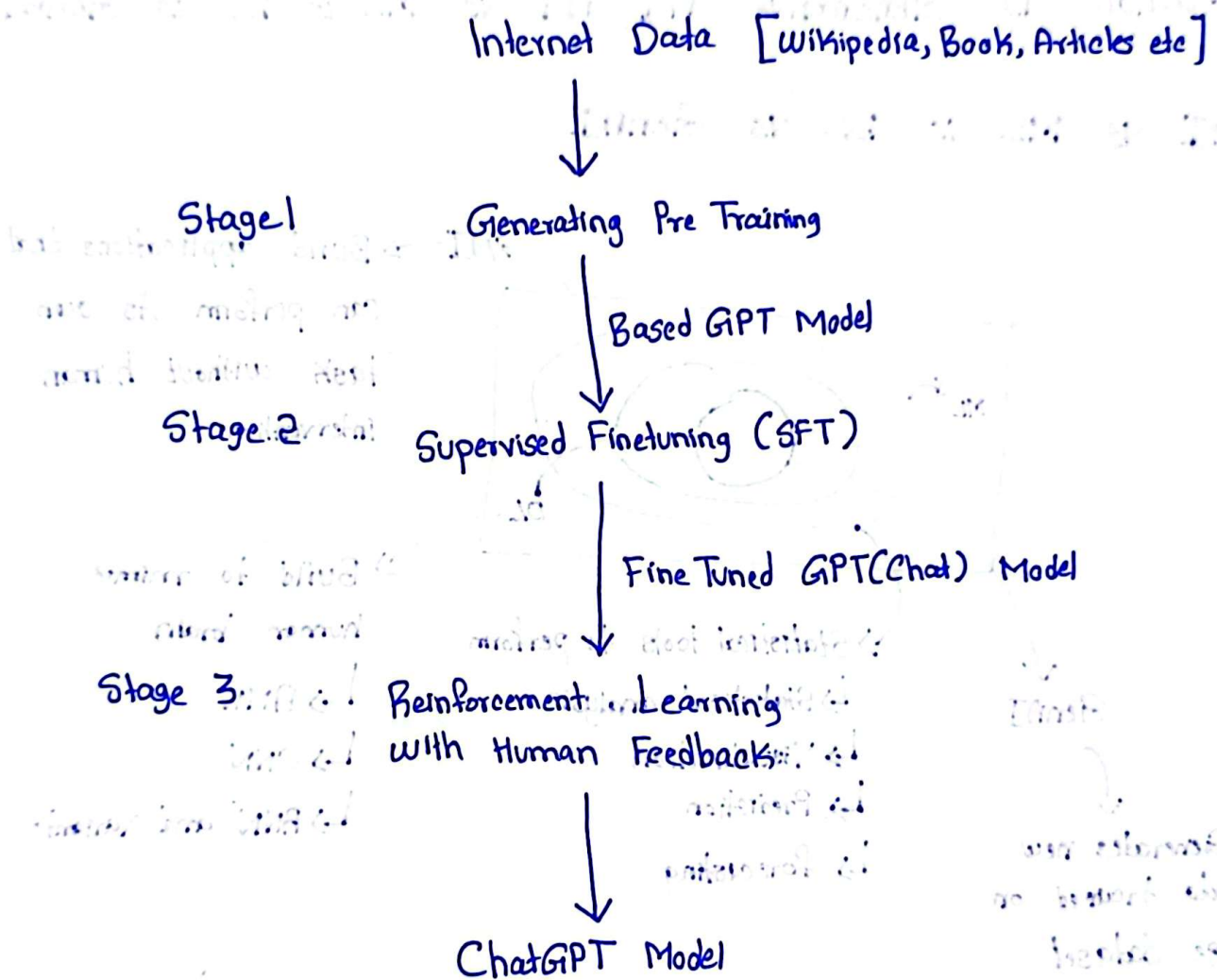
→ AI → Build applications that can perform its own task without human intervention.

> Statistical tools to perform
  ↳ Statistical analysis
  ↳ Visualization
  ↳ Prediction
  ↳ forecasting

DL → Build to mimic human brain
  ↳ ANN
  ↳ CNN
  ↳ RNN and variants

GenAI
  ↓
Generates new data trained on huge dataset
  ↳ LLMs
  ↳ LIMs

> LLM Models

OpenAI ——→ GPT-4
Meta ——→ Gemini Llame2
Google ——→ Gemini
Antropic ——→ Claude 3

Foundation Models
⇓
Pre Trained Models

→ How LLM Models are Trained

> How GPT is Trained

Internet Data [Wikipedia, Book, Articles etc]
↓

Stage 1   Generating Pre Training
↓ Based GPT Model

Stage 2   Supervised Finetuning (SFT)
↓ Fine Tuned GPT(Chat) Model

Stage 3   Reinforcement Learning
with Human Feedback
↓

ChatGPT Model

① Stage 1: Generative Pre Training

Internet Huge   → Transformers   → Based GPT Model
Input Text Data

Tasks {
① Language Translation
② Text Summarization
③ Text Completion
④ Sentiment Analysis
}

② Step 2: Supervised Finetuning (SFT)

Human

- Request 1
- Request 2
- Request 3
- Request 4

- Response
- Respone
- Respone
- Response

Human
(Acting as Chatbot)

⇓

SFT Training Data Corpus
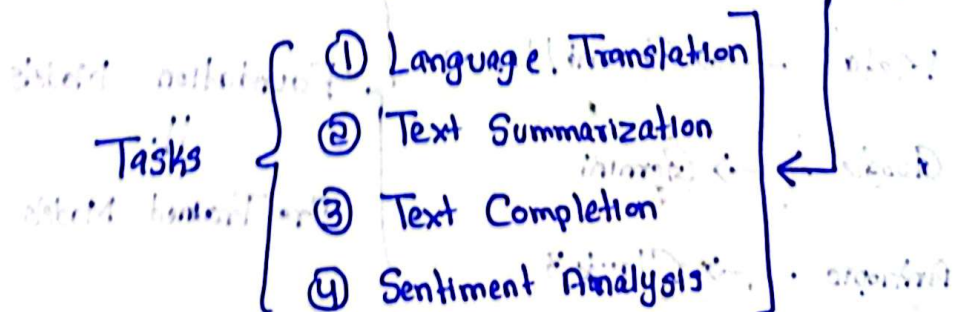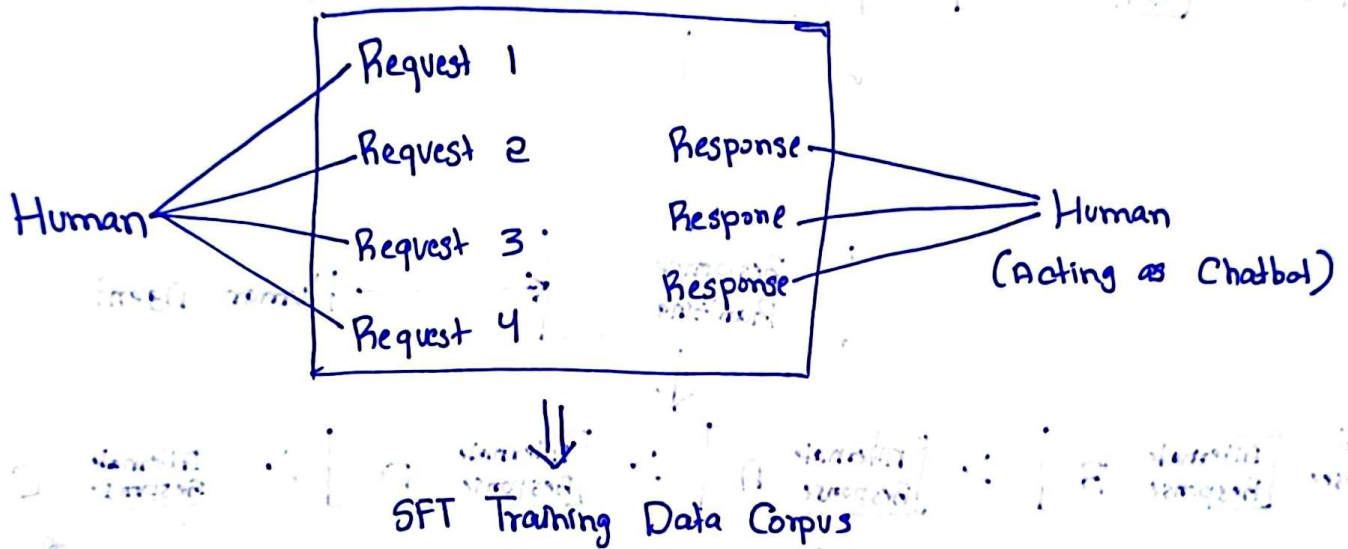
Request ⟹ Conversation history

Response ⟹ Best Ideal Response

Request	Response 1
Request	Response 2
Request	Response 3

⟹

TRAINING

• Base GPT Model

⟹ SFT ChatGPT Model

⇓

• Optimizer
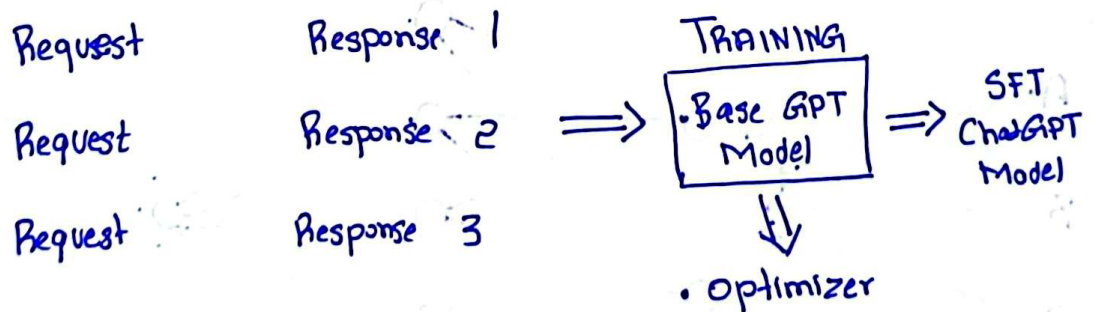
③ Step 3: Reinforcement Learning with Human Feedback (RLHF)

Request ⟵ Human Agent
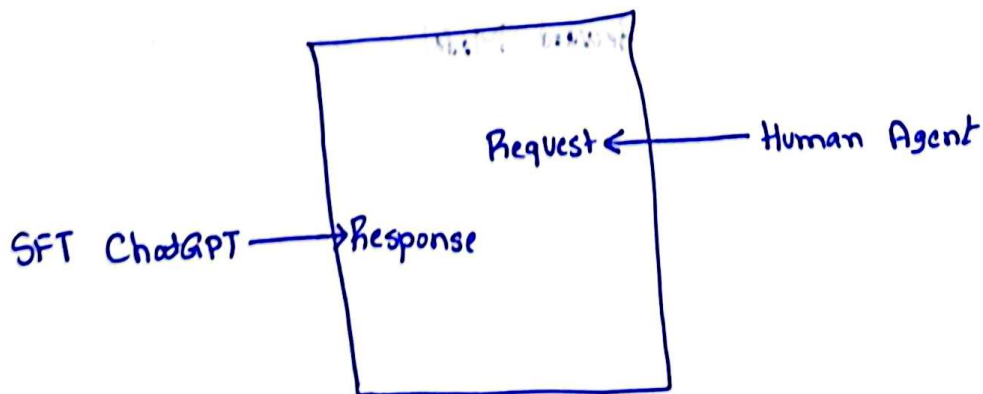
SFT ChatGPT ⟶ Response

Alternate Responses

| Alternate Response A | Alternate Response B | Alternate Response C | Alternate Response D |

Response Ranking ← Human Agent

Ranked Responses

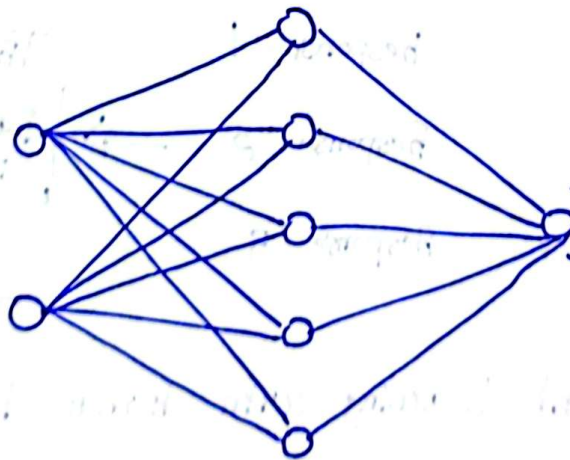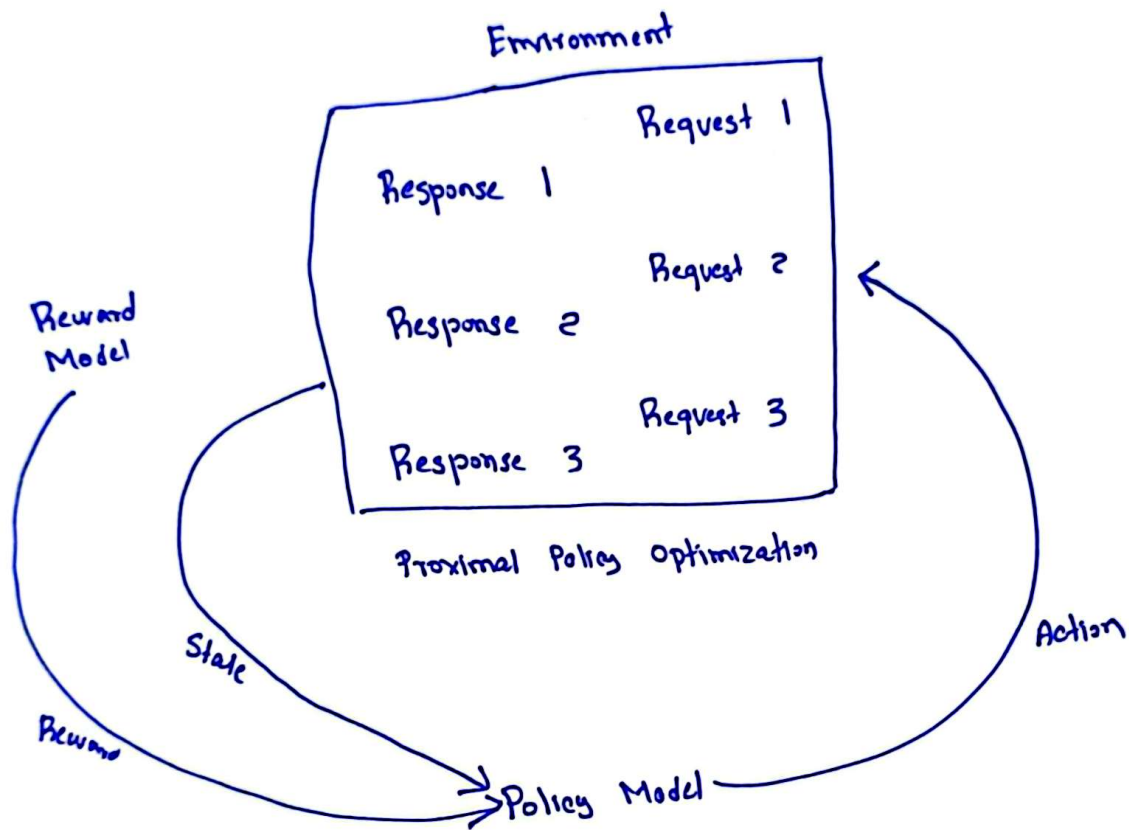| Alternate Response B | > | Alternate Response A | > | Alternate Response D | > | Alternate Response C |

Conversation History

A
B
C

Score A
Score B
Score C

Reward Model

Environment

Request 1

Response 1

Request 2

Response 2

Request 3

Response 3

Reward Model

Proximal Policy Optimization

State

Action

Reward

Policy Model

SFT ChatGPT Model → Check for KL Divergence → ChatGPT Model

→ Evolution of Large Language Models

1967 — Eliza

1970 — SHRDLU

1980 — XCALIBU

1988 — RNN

1997 — LSTM

2014 — GRU

2017 — Transformers

2018 — BERT GPT

2019 — GPT2 RoBERTa XLNet

2020 — GPT3

2021 — GPT-3.5

2022 — PALM InstructGPT ChatGPT

2023 — Llama Falcon GPT4, Dolly2 PALM2, BARD

2024 — GPT4o Gemini Pro 1.5 Llama3 Claude3