

= 1 Unsupervised Pretraining

= 2 SFT

= 3 RLHF (DPO, PPO)

= LLM \Rightarrow Mutq, mistral, Jurassic, Droptkick

huggingface

LM \Rightarrow BERT

\uparrow

Pretrain

Finetuning \Rightarrow NER, text classification, summarization

SFT

Pretrain

GPT-4 \Rightarrow 2 trillion

very large Billion
LLM \leftarrow Pretrain

SFT
PEFT \Rightarrow parameter efficient fine tuning (math in next class)

Subset of trainable Parameter

Transformer

Attention (W_a, K, V) } trainable parameter
NN ($W_L b$) } trainable parameter

FP \rightarrow loss
BP \leftarrow

LORA

Low rank Adaptation

Training LLM model

= 1 unsupervised PT

SFT

3 RLHF/DPO/PPO

plus in LLM
(Adapter)

LLM

PEFT

(generic word) $\uparrow \nwarrow$ Subset of trainable Parameter

LORA

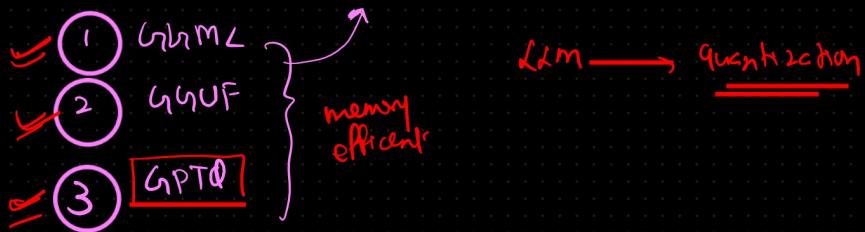
Quantization + LoRA \Rightarrow (qLORA)

Reduce the precision
of trainable parameter
(wfp)

ANLLM

(Mathematical Research)

Quantization \Rightarrow LM \Rightarrow Quantization



= generic code \rightarrow LM \Rightarrow fine tune trial

= (mathematics)

= RNN, DPO

- GPT-3 big turbo

RAH

W = 1 bit

quantization

= int \Rightarrow 8 bit

less memory

= float \Rightarrow 32 bit

more memory

Precision

1 bit LM

int(W) \Rightarrow less memory

Loss of info

len efficient

W = 0.32

float no.

= Finance \Rightarrow Software

= (Custom chatbot)

= (LM)

Answers

QnA

Final knowledge

their platform

Final QnA

= legal document summarization

QnA LM

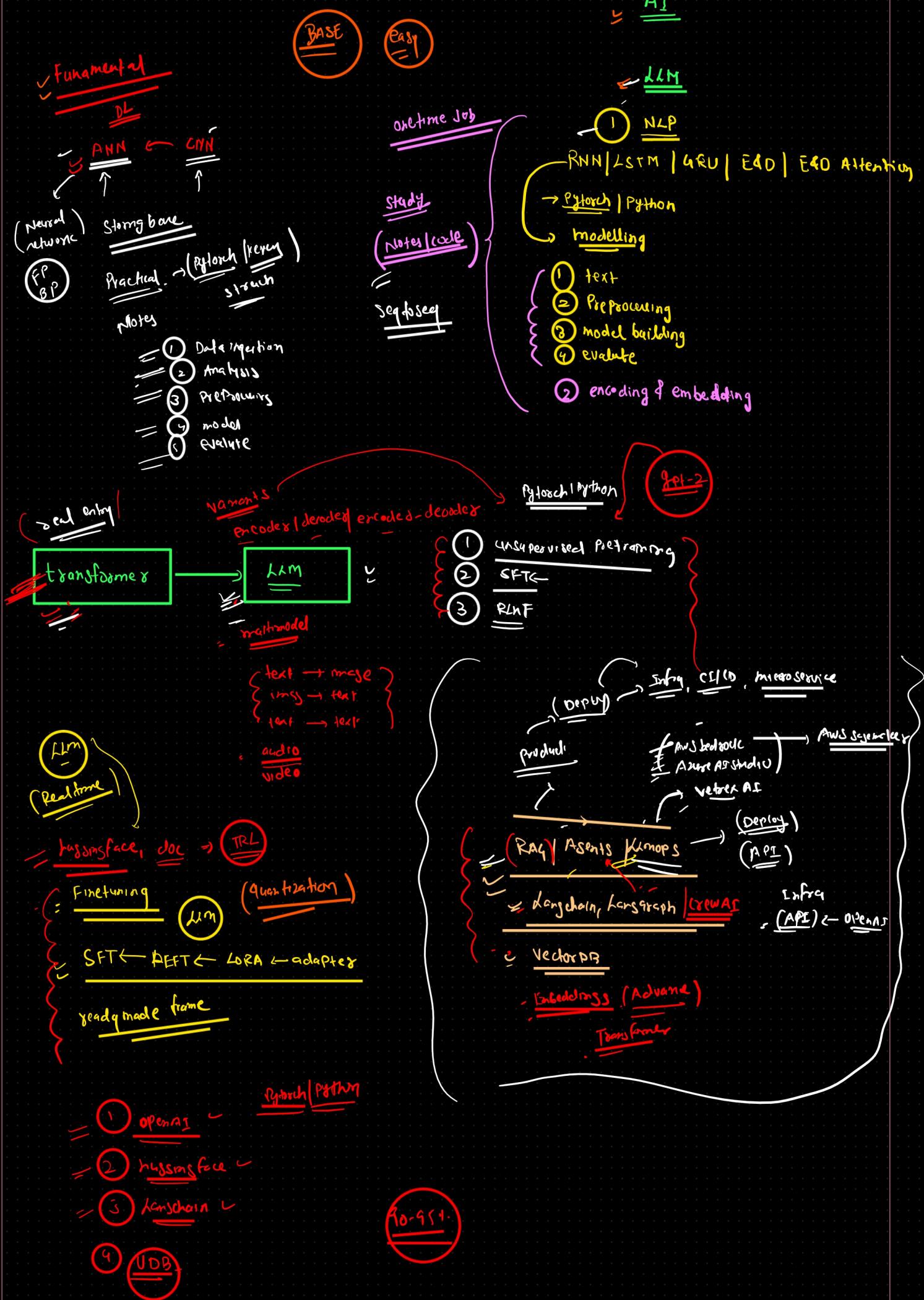
= (Medical diagnosis Assistant)

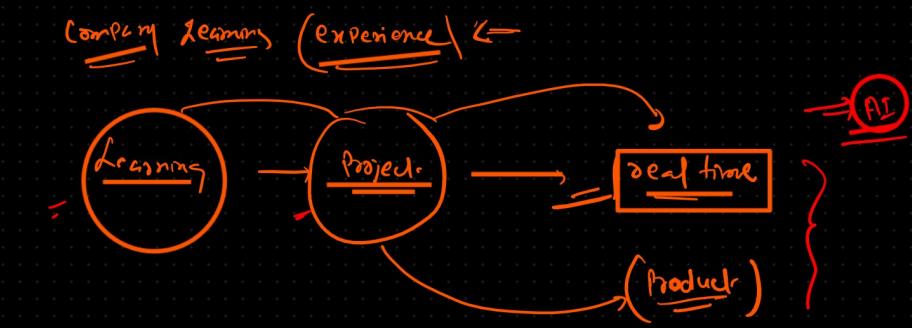
Data LM

1 statistic
2 ML \Rightarrow (SV / uns)

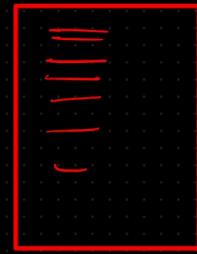
SL - SFT

10 - (2) m_L
GI - 1 SDS



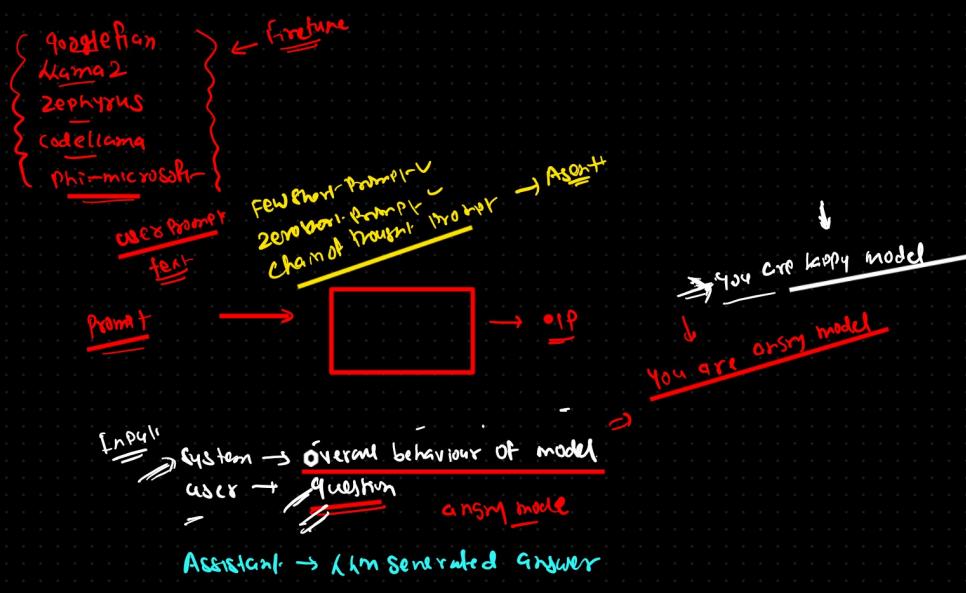
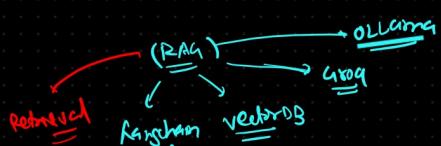


- Skript
6 minuten → 1 Project → A I



Fine Tuning

- 1 BERT \Rightarrow
 - 2 Mistral \Rightarrow dLORA, qLORA \rightarrow any LLM dLORA
 - 3 mathematical LORA, qLORA, Research papers ✓
 - 4 Finetuning of GPT model ✓ next class
 - 5 RLHF DPO of LLM ✓ SotLSum
 - 6 one code to finetune any LLM
 \Rightarrow (Put) (model)
(Parameter)



System → define a role of model
 user → question
 Assistant → LLM generated answer

eos
 \downarrow
 $\text{LM} \cdot \text{id} = 0$
 $\Leftrightarrow \text{SOS}$

$(\text{O-padding}) \text{---} \text{I-padding} \text{---} (\text{SOS})$
 \Rightarrow
 - my name is sunny
 my name is sunny → 4 tokens
 close
 matrix

	5	4	3	2	1	0
0	1	2	3	4	5	6
1	0	1	2	3	4	5
2	0	1	2	3	4	5
3	0	1	2	3	4	5
4	0	1	2	3	4	5
5	0	1	2	3	4	5
6	0	1	2	3	4	5