EE P 5OO D: LLMs and ChatGPT || Course Recap

Dr. Karthik Mohan

Univ. of Washington, Seattle

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Today

1. Course Recap
2. Course Evaluation
3. Mini-Project Demo and Presentations
4. Office Hours

Course Recap

LLMs

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2. **Large Language Models (LLM)** - Trained for trillions of tokens - Equivalent of 50 Million Books
3. **Foundation Models:** Refers to large AI models that can then be fine-tuned on downstream tasks.
4. **Pre-Trained Models:** Typically refer to foundation models that have been trained on massive amounts of data. Includes LLMs such as BERT, GPT and also Large Vision Models

Course Recap

Models and APIs

1. **LLM API vs Foundation Model:** Foundation Models are the back-bone of an LLM API such as ChatGPT. LLM or Vision API typically has much more fine-tuning than a Foundation Model

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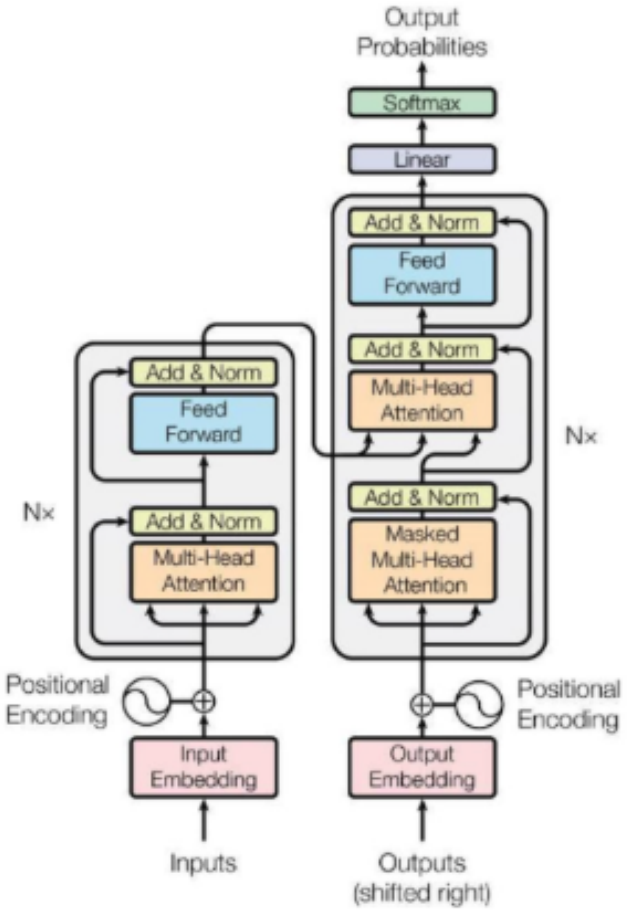
2. **Example:** GPT-2 and GPT-3 are foundation models but GPT3.5 and GPT4 are APIs that include Reinforcement Learning for Human Feedback on top of GPT-3
3. **Example:** Stable-Diffusion is a **open-source** Large Vision Model that can generate Images from Text. But **Mid-Journey** and **Dall-e-3** are APIs that take Stable-Diffusion outputs, refine them and produce high-quality images.

Course Recap



Course Recap

Transformers

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5. **AI revolution:** Was paved by the advent and advance of transformers by many researchers and also OpenAI. Not to mention better compute resources.

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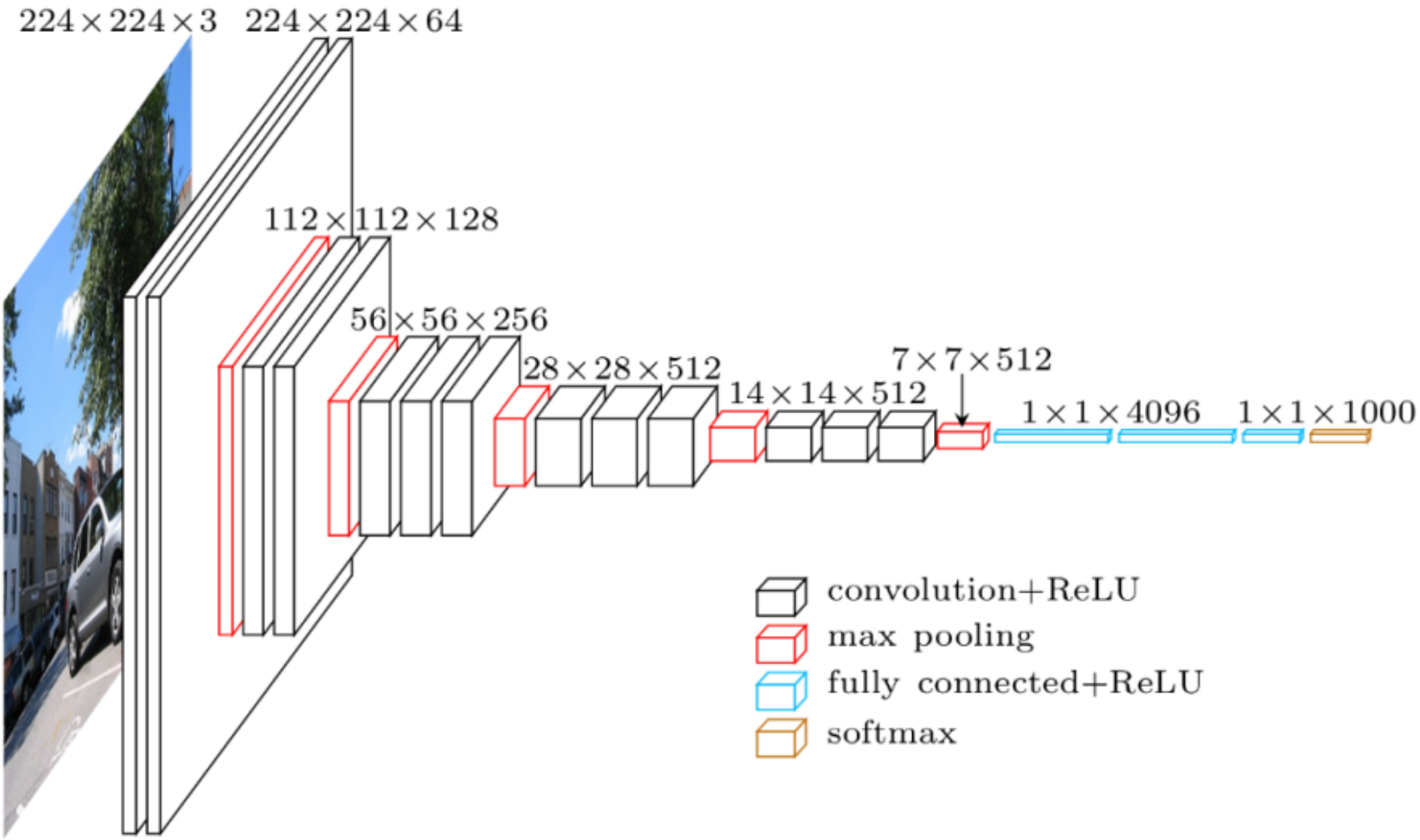

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4. **Visual Transformers:** Are an extension of Transformer Architecture from Language Processing to Vision. The initial conversion of images into tokens for the transformer does involve convolutions

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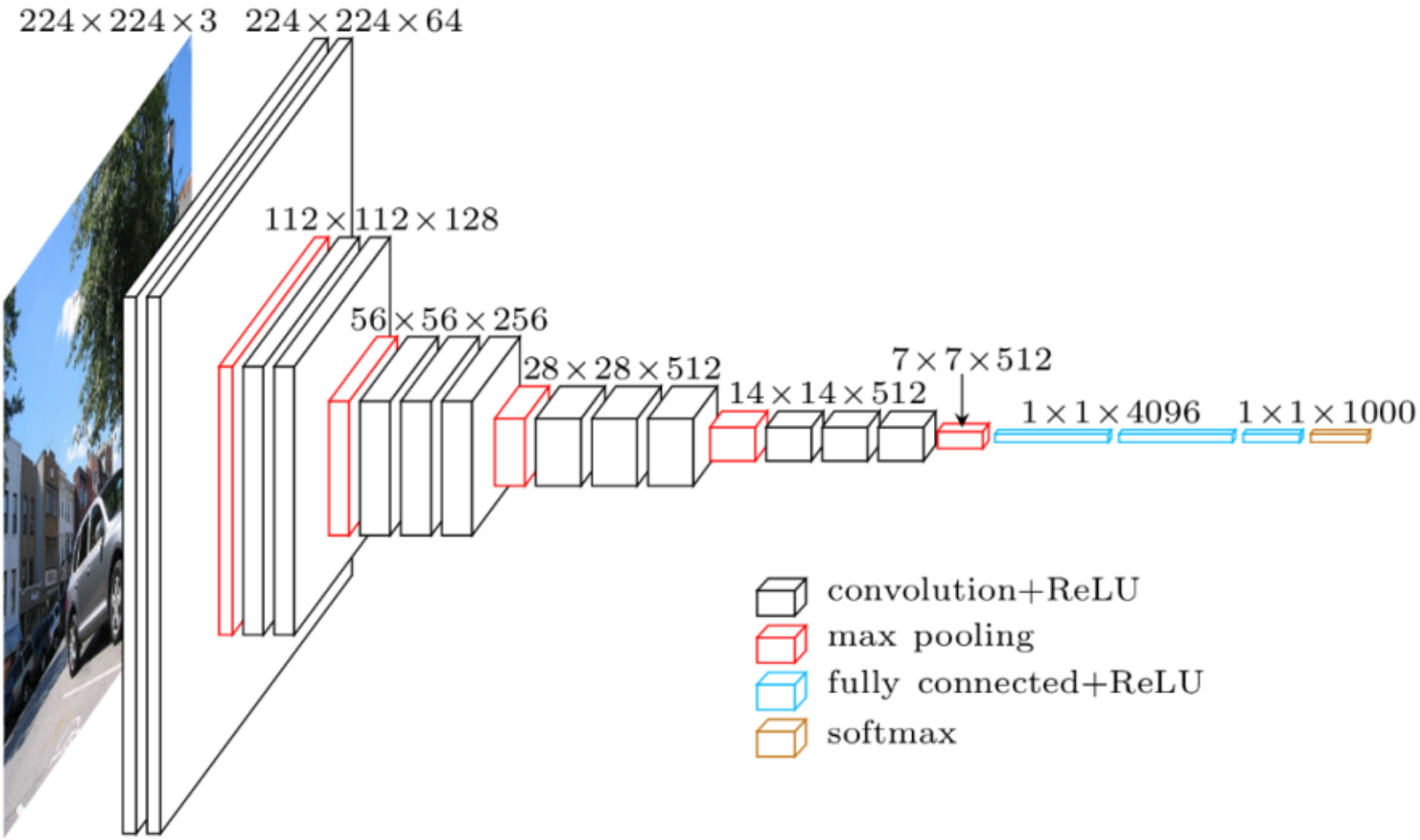

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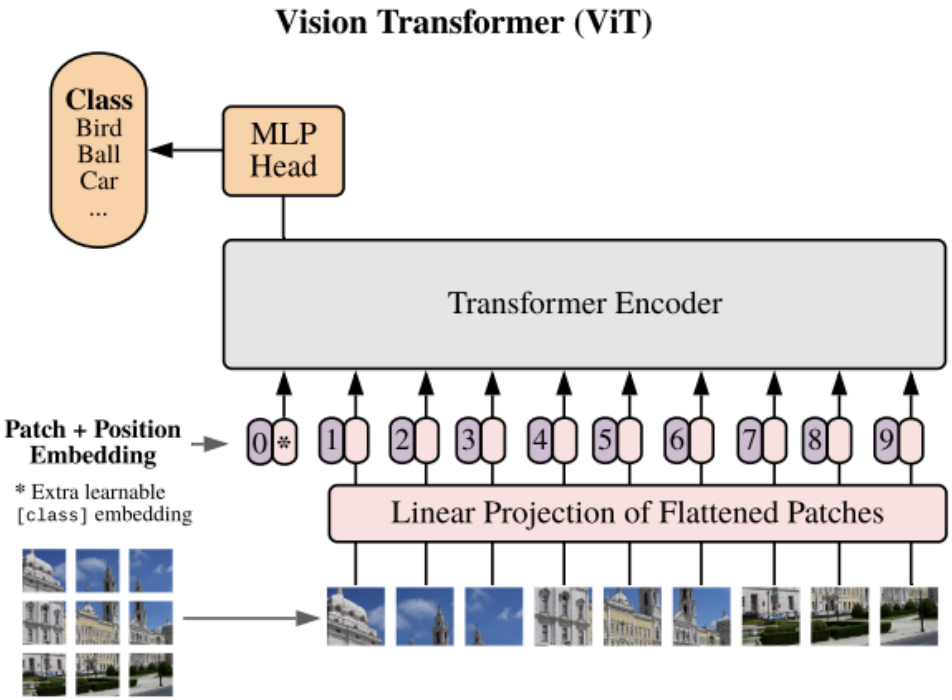

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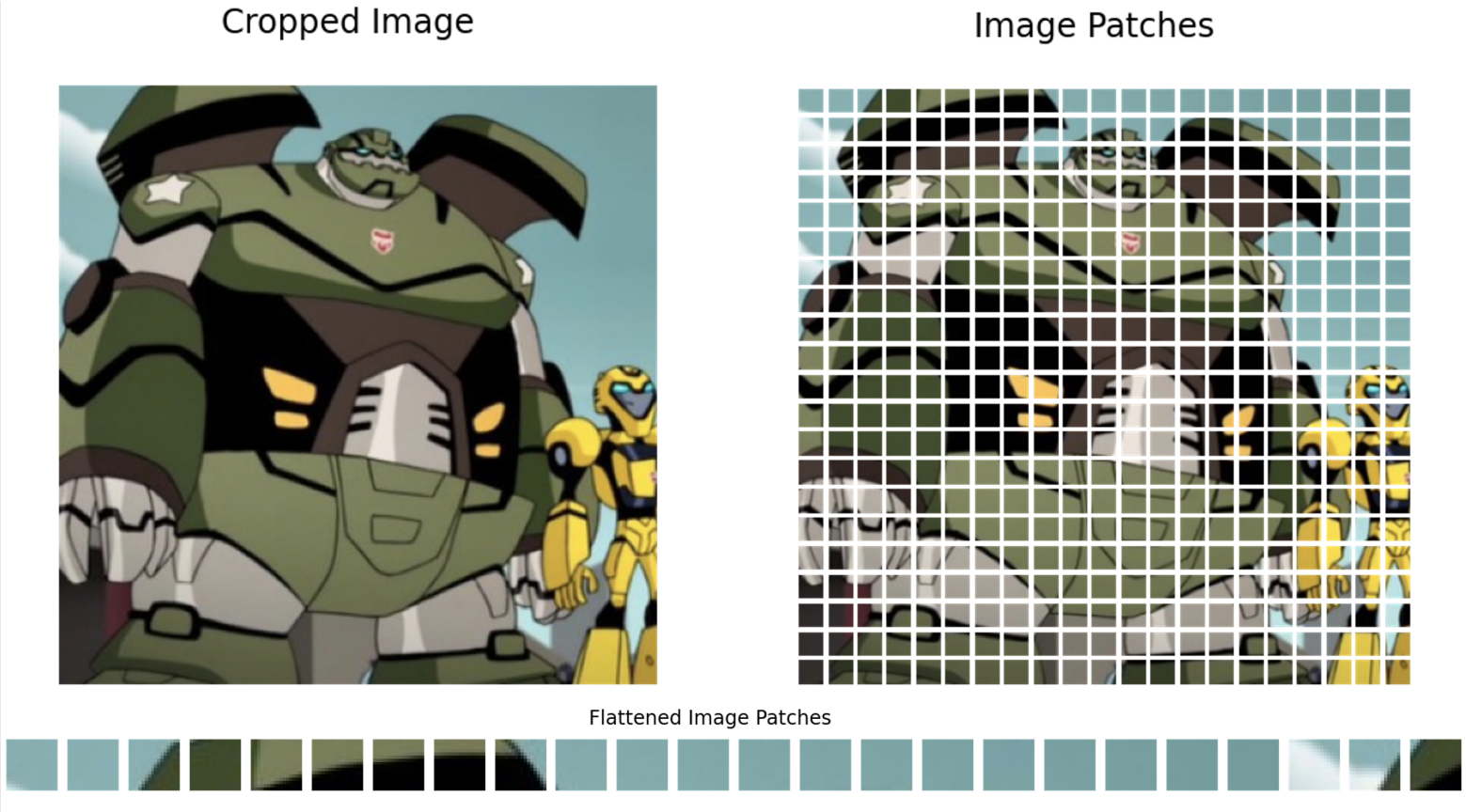

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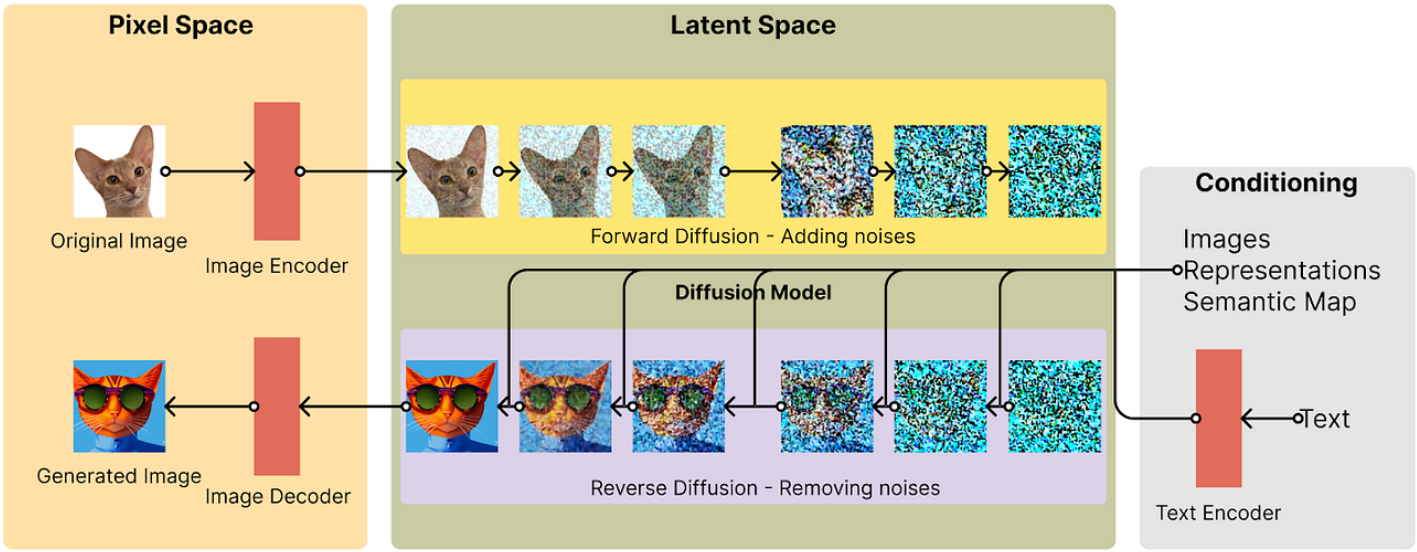
3. **Text2Image:** Advances in Stable Diffusion and its refinements with DALL-E-3 and MidJourney have also played a role in making AI very popular

Foundation Model - Stable Diffusion (Text2Image)



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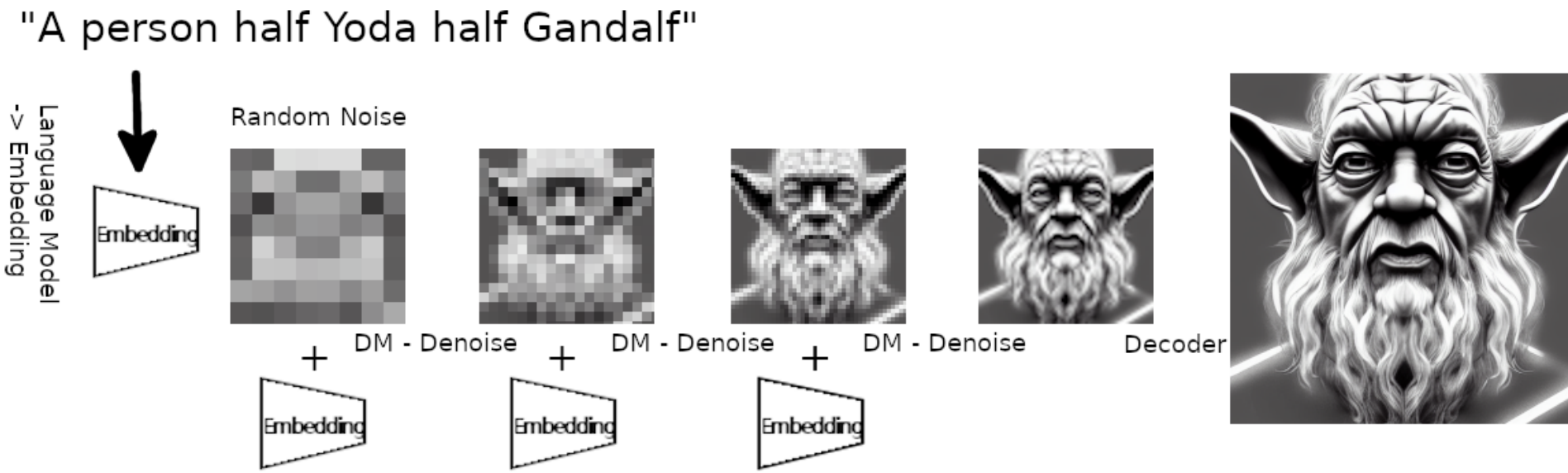

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Pre-Training vs Fine-Tuning

1. **Foundation Models:** For foundation models, sometimes out of the box predictions aren't as good as a fine-tuned model. We saw an example yesterday with "Pokemon" image

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2. **APIs:** LLM and Vision APIs also need better prompting for good responses. There are many prompting tools that can be used to generate better prompts for a desired outcome

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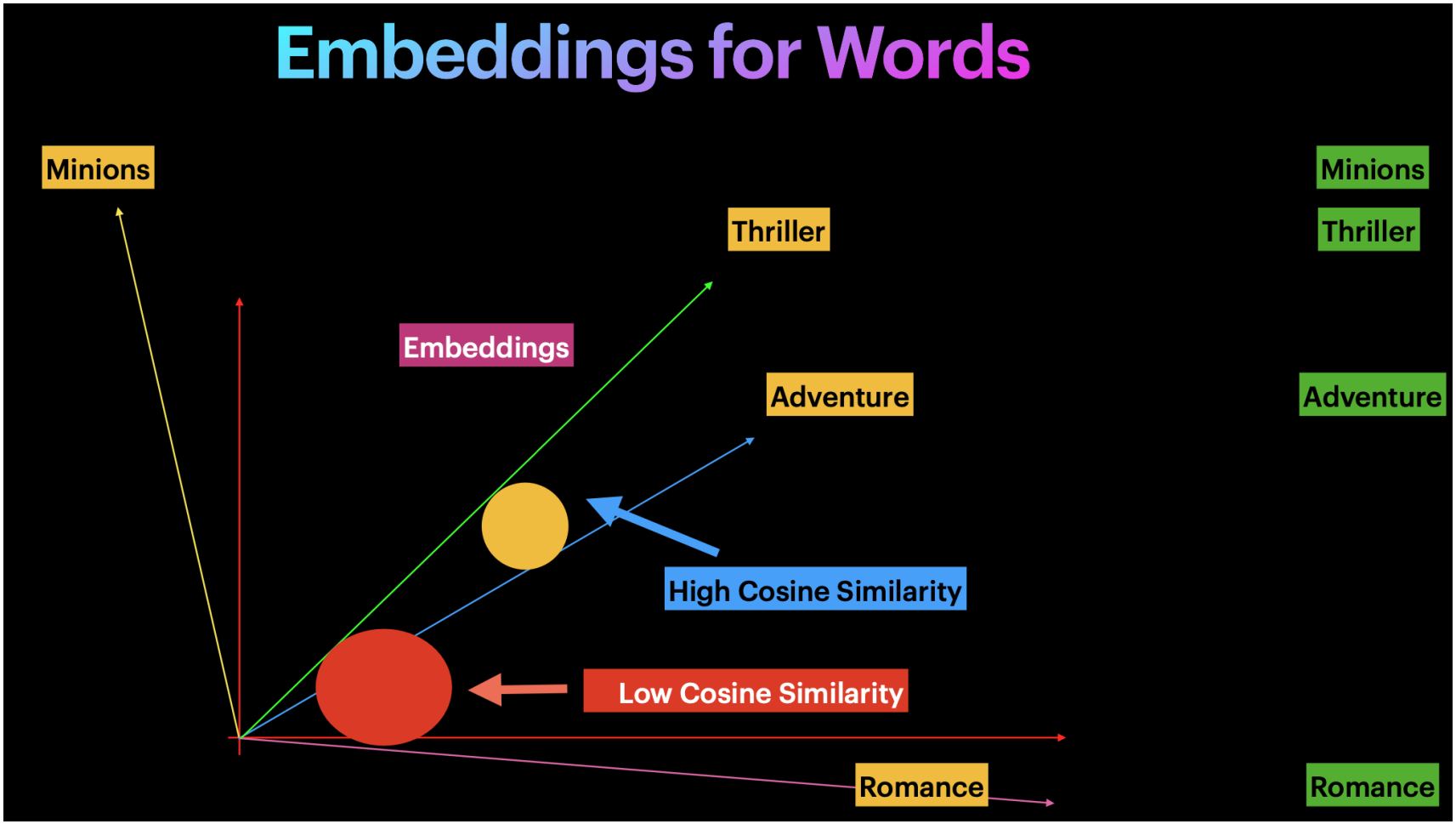

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5. **Clustering:** Embeddings can also be used to group or categorize objects that are similar. Think of product categories at companies

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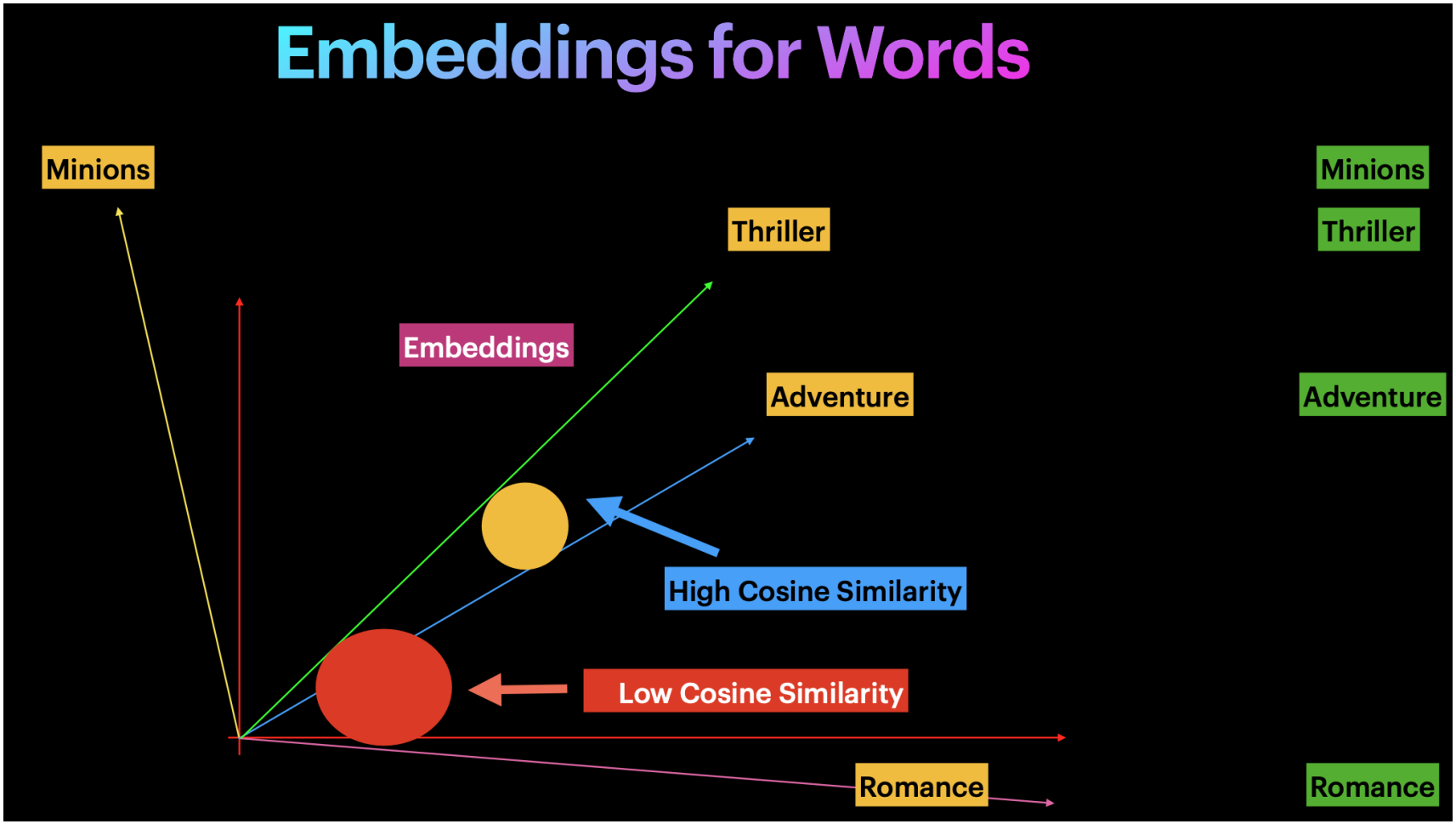

Course Recap

Applications we looked at

Keyword Search, Image Search, Image Captioning, Text2Image, Paraphrasing Sentences, Image Segmentation

Tools we covered

Google Colab (GPU computations), Streamlit (easy web app development), OpenAI APIs (for text and image), Hugging Face Libraries (for image captioning, stablediffusion, etc)