

EE P 500 D: LLMs and ChatGPT || Text2Image, Image2Text, Segmentation and more!!

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Last Time

① Prompt Engineering for LLMs

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- ① Prompt Engineering for LLMs
- ② Fine-Tuning LLMs

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- ① Prompt Engineering for LLMs
- ② Fine-Tuning LLMs
- ③ In-class coding exercise on keyword extraction and search using prompting

Today

Focus

Given that there's been a request to focus on Images in addition to Text - We will focus a lot on the interactions between text and images in the lecture today and the associated Foundation models and APIs You will also get to play around with these in the In-class coding exercise today!

Today

- ① **Image2Text API for generation Text from Image**

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- ① **Image2Text** API for generation Text from Image
- ② **Text2Image** API for generating an Image from Text

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- ③ **Stable Diffusion** Pre-Trained Model for **Text2Image**

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- ④ **Segmenting Images** and tagging them

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- ⑤ Image Embeddings and Image-Image search

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- ⑤ Image Embeddings and Image-Image search
- ⑥ Foundation Models for Images - **CNNs and ViTransformers**

Foundation Models for Images

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CNNs (e.g. Inception, AlexNet, etc) and Visual Transformers or ViTransformer

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Building Blocks

Like legos can be used to build a whole factory - Foundation models can be put together across modes (multi-modal) to create interesting and beautiful applications. Text2Image is one such example that combines multiple foundation models - Transformers, ViTransformers, CNNs and also AutoEncoders.

Foundation Models for Images

Types

CNNs (e.g. Inception, AlexNet, etc) and Visual Transformers or ViTransformer

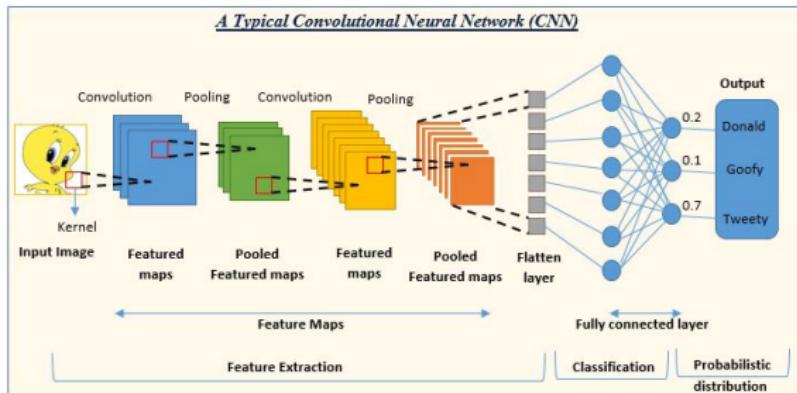
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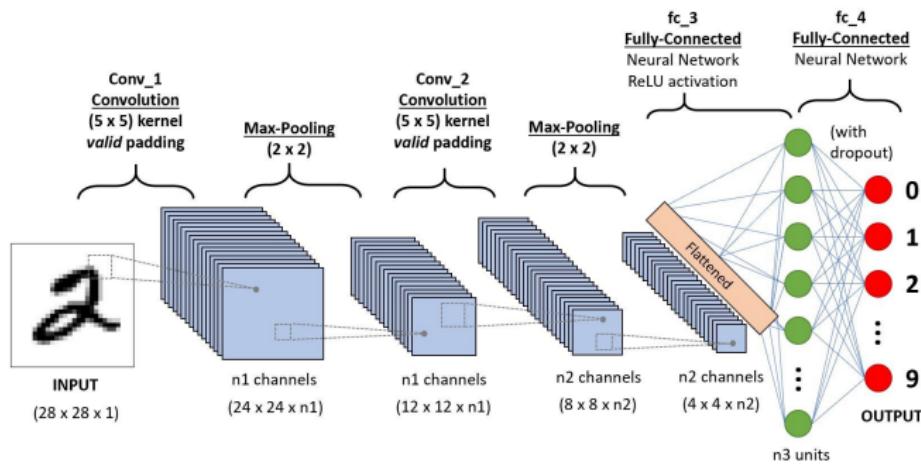
Applications

Classification (cat or dog?), Image2Text, Text2Image, Image Embeddings, Object Detection, Image Segmentation, etc

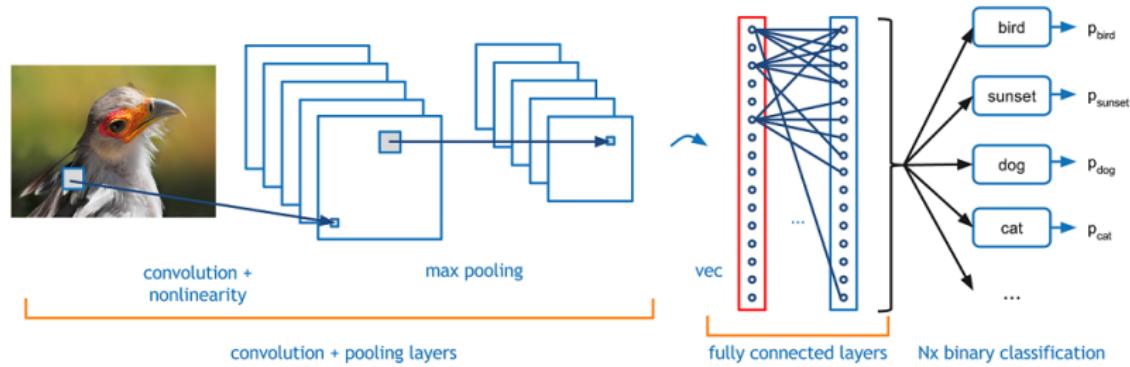
Foundation Model - CNN (Convolutional Neural Network)



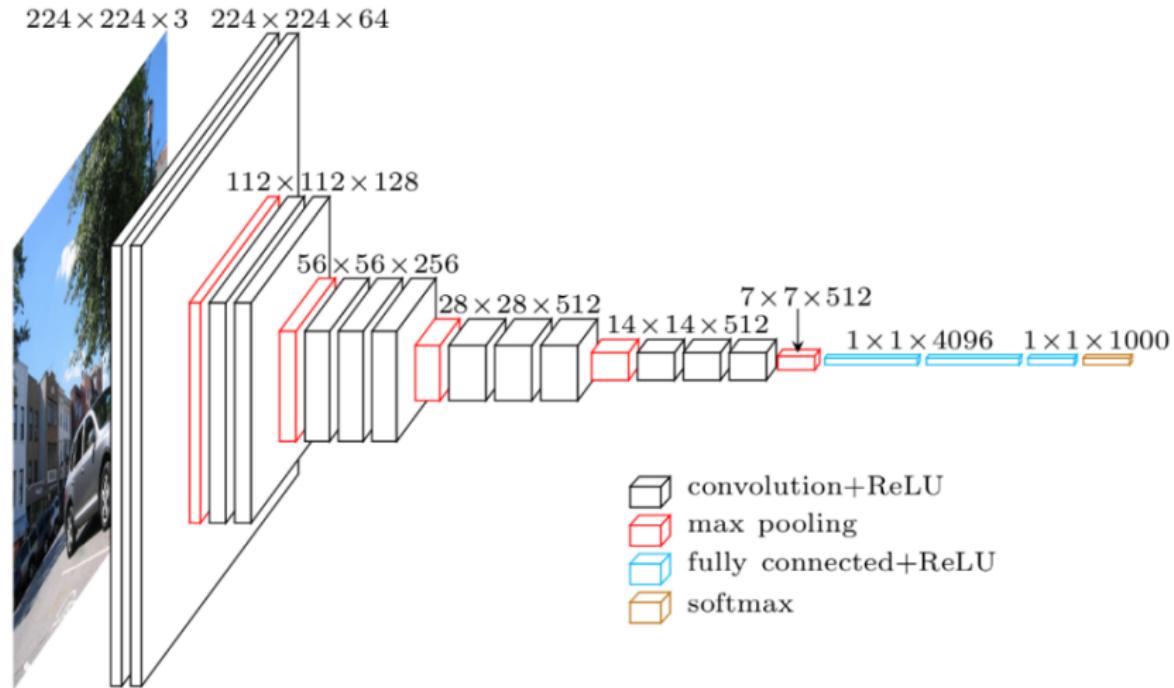
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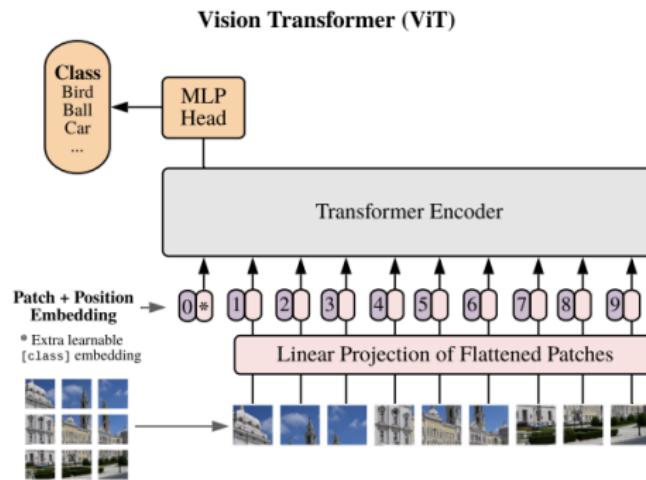
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Foundation Model - Visual Transformers (ViT)

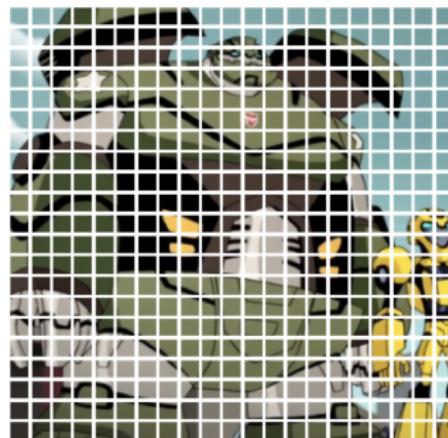


Foundation Model - Visual Transformers (ViT)

Cropped Image



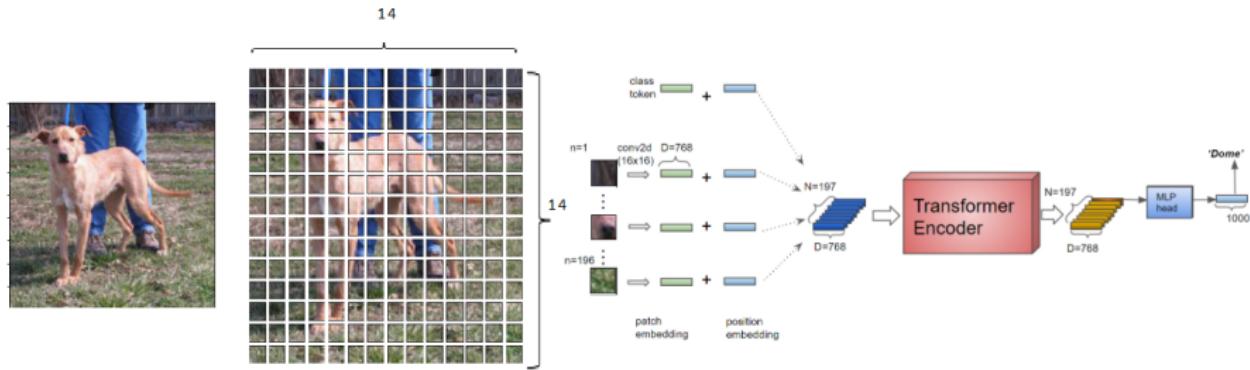
Image Patches



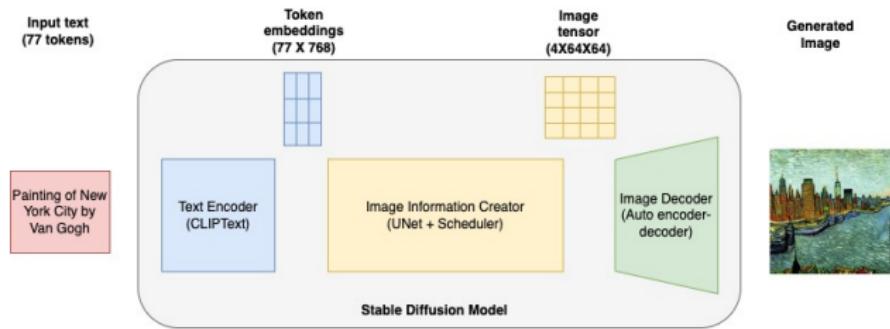
Flattened Image Patches



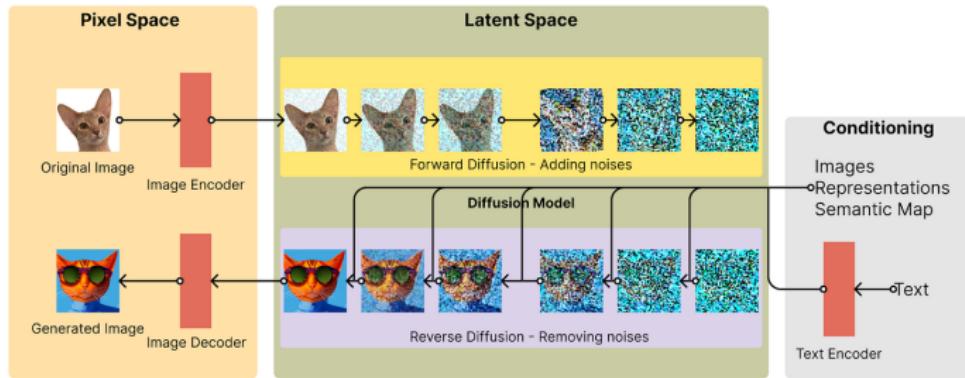
Foundation Model - Visual Transformers (ViT)



Foundation Model - Stable Diffusion (Text2Image)

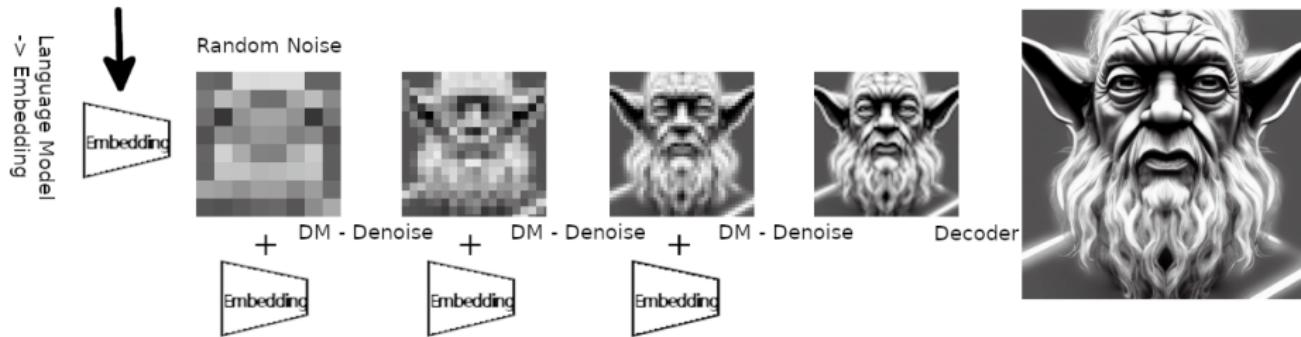


Foundation Model - Stable Diffusion (Text2Image)



Foundation Model - Stable Diffusion (Text2Image)

"A person half Yoda half Gandalf"



Reference