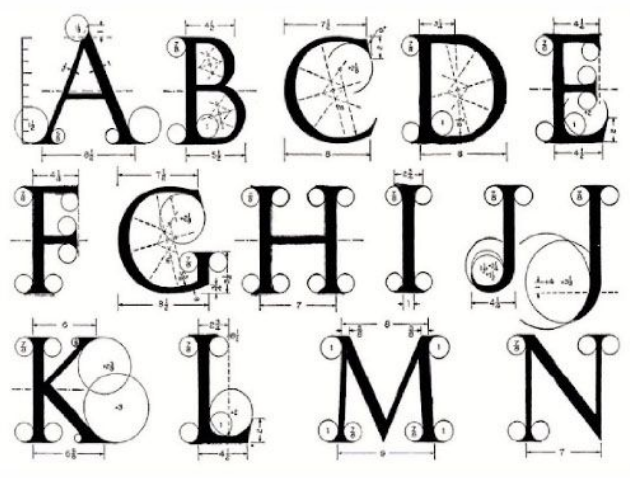
Font CLIP

Task

For a given font, search a dataset of freely available fonts for a similar one.

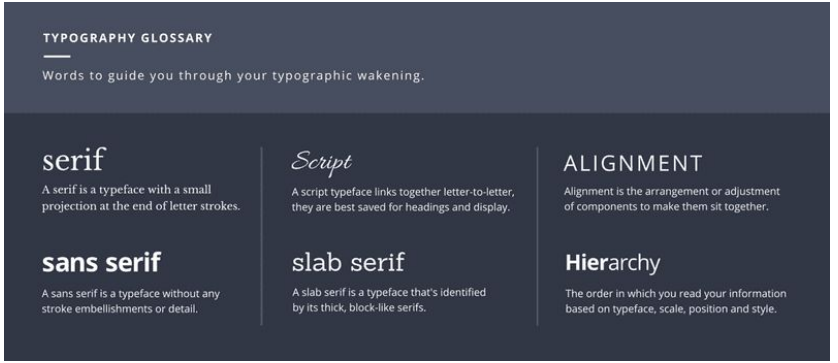


Anatomy of a Typography

Typographies are complex objects, the results of dozens of design decisions compounded to create something incredibly unique. Capturing all of this complexity manually is essentially impossible.

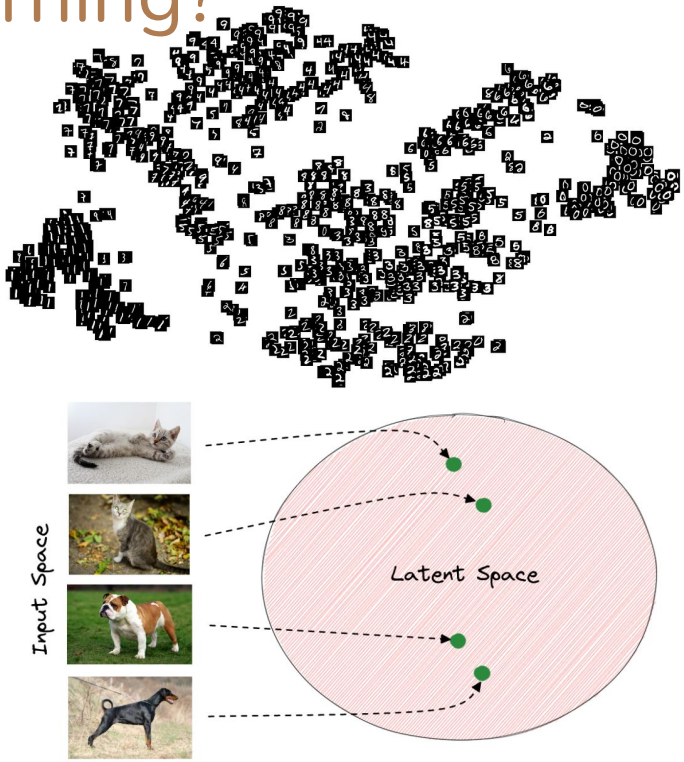
- What makes two fonts “similar”?
- When can one font replace another without being too jarring?

Luckily, we don’t have to answer these questions



What is Representation Learning?

- If our goal is to compute the “semantic” similarity between two images, we can’t rely on the input space (pixel values) directly
- The goal of representation learning is to train a neural network capable of converting an input image into a “latent” vector of values which encodes the necessary information for a downstream task
    - Note that this encoding doesn’t need to be understood by a human



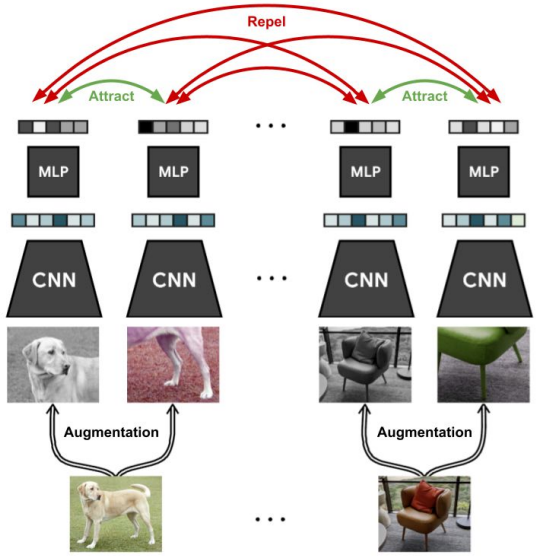
Contrastive Learning

- A deep learning model is trained to translate inputs into “queries” and “keys”
- Queries and keys are vectors belonging to a shared latent space
- The model is trained such that a given query matches as close as possible to the corresponding key while matching alternative keys as little as possible

$$\mathcal{L}(Q, K) = \frac{1}{n} \sum_{i=1}^{n} -\log \frac{\exp(Q_i \cdot K_i / \tau)}{\sum_{j=1}^{n} \exp(Q_i \cdot K_j / \tau)}$$

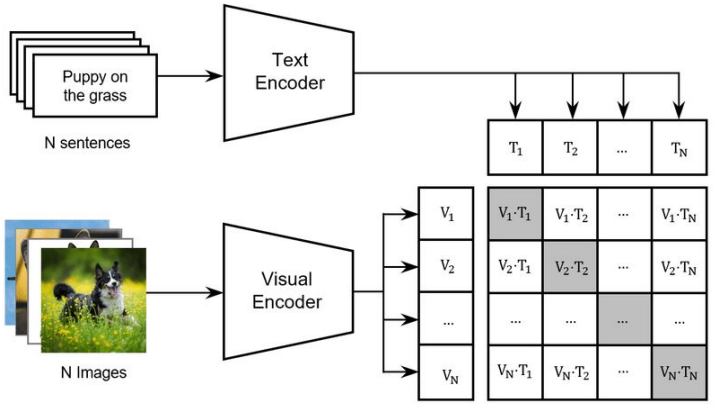
Sim-CLR (Simple Contrastive Learning)

- A powerful general purpose image representation learning technique
- Given a batch of images, apply a randomised set of transformations twice to each image
- We now have two sets of images where image i in set A “matches” image i in set B
- Contrastive learning is used to train a convolutional neural network (CNN) which learns a representative vector space invariant of these transforms
- Applying this technique to font images was useful as a learning exercise but the results weren’t quite acceptable



Contrastive Language-Image Pretraining (CLIP)

- Developed by OpenAI in 2021
- Rather than rely wholly on image data, queries and keys come from images and text sources respectively
- Compared to Sim-CLR, human created text data can be much more domain/problem specific and can capture much higher fidelity “weakly defined” information than randomised transformations



Google Fonts CLIP

- Each font in the google fonts set includes a description provided by the original font's designer
  - These include things such as …
- For each font, 100 images are produced of random text at different sizes, weights etc.
- The model begins training from OpenAI's pretrained checkpoint
  - Trained on over 100 million image-text pairs
  - To prevent overfitting, the text encoder's token embeddings are frozen

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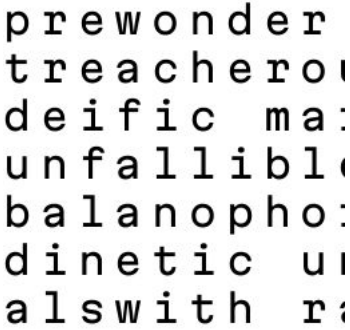
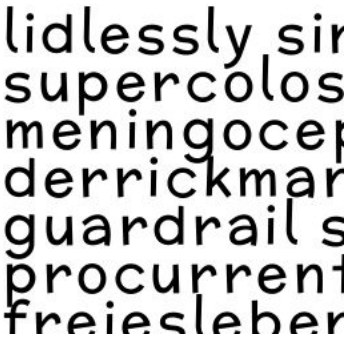


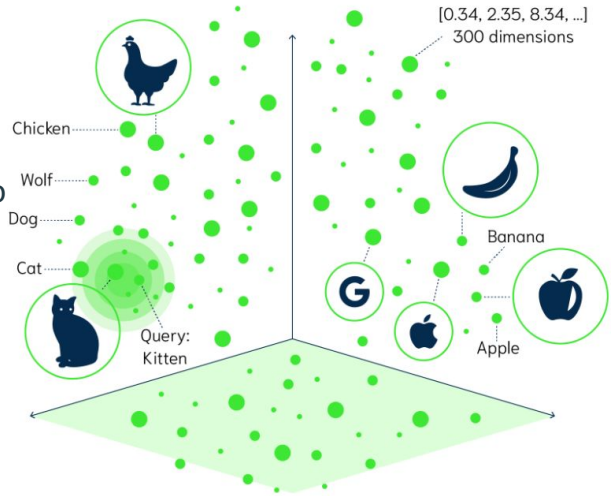
Martian Mono is a monospaced version of the Martian Grotesk font for code style design. It inherits Grotesk's brutal and eye-catching aesthetics as well as all of its benefits-metrics equilibrium, readability and intelligibility, and convenience for web developers and designers who believe in a systematic approach to design.



The McLaren typeface was created to act as a generic go-to comic style lettering. It has simple clean letterforms with a mild bounce and offbeat quality to it without going too far.

Vector Search

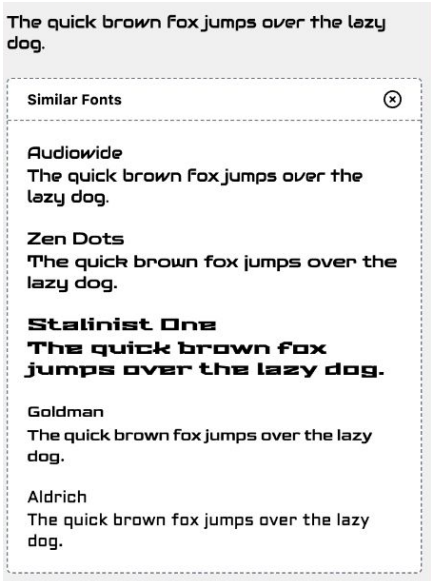
- Once the model is trained a dataset of vectors can be created, one fo each font in the google fonts set
- Given an arbitrary input font, its latent vector can be computed by the model and the dataset can be search to find the most similar fonts



- This process is known as Vector Search and has wide reaching applications in RAG, image search, etc.
- AWS, google, and huggingface all offer hyper-optimised vector search services

Examples


The quick brown fox jumps over the lazy dog.
Similar Fonts
Grand Hotel
The quick brown fox jumps over the lazy dog.
Amita
The quick brown fox jumps over the lazy dog.
Cookie
The quick brown fox jumps over the lazy dog.
Lakki Reddy
The quick brown fox jumps over the lazy dog.
Sue Ellen Francisco
The quick brown fox jumps over the lazy dog.


The quick brown fox jumps over the lazy dog.
Similar Fonts
Audiowide
The quick brown fox jumps over the lazy dog.
Zen Dots
The quick brown fox jumps over the lazy dog.
Stalinist One
The quick brown fox jumps over the lazy dog.
Goldman
The quick brown fox jumps over the lazy dog.
Aldrich
The quick brown fox jumps over the lazy dog.


The quick brown fox jumps over the lazy dog.
Similar Fonts
Pacifico
The quick brown fox jumps over the lazy dog.
Yesteryear
The quick brown fox jumps over the lazy dog.
Mogra
The quick brown fox jumps over the lazy dog.
Devonshire
The quick brown fox jumps over the lazy dog.
Ma Shan Zheng
The quick brown fox jumps over the lazy dog.