Representation of Images

Recap

What is AI ?

Discriminative AI vs Generative AI.

What is prompt engineering?

Language model & vision model.

What is image generation model?

Unconditional vs Conditional image generation.

List of vision model.

Generative AI Workflow.

Agenda

Why study images?

Basic of pixels.

Basics of RGB.

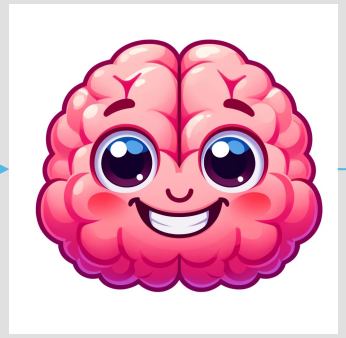
Basics of channels.

What is noise?

Image representation in Python: pillow

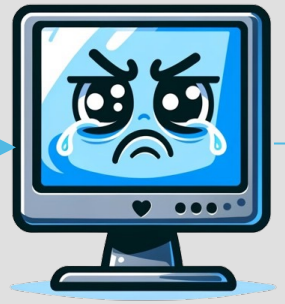
Python libraries for Images

1. Why study images?



This is cat image.

1. Why study images?



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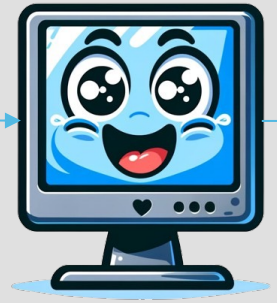
$$\begin{bmatrix} a_{00} & a_{01} & a_{02} & a_{03} & a_{04} & a_{05} & a_{06} & a_{07} \\ a_{10} & a_{11} & a_{12} & a_{13} & a_{14} & a_{15} & a_{16} & a_{17} \\ a_{20} & a_{21} & a_{22} & a_{23} & a_{24} & a_{25} & a_{26} & a_{27} \\ a_{30} & a_{31} & a_{32} & a_{33} & a_{34} & a_{35} & a_{36} & a_{37} \\ a_{40} & a_{41} & a_{42} & a_{43} & a_{44} & a_{45} & a_{46} & a_{47} \\ a_{50} & a_{51} & a_{52} & a_{53} & a_{54} & a_{55} & a_{56} & a_{57} \\ a_{60} & a_{61} & a_{62} & a_{63} & a_{64} & a_{65} & a_{66} & a_{67} \\ a_{70} & a_{71} & a_{72} & a_{73} & a_{74} & a_{75} & a_{76} & a_{77} \\ a_{80} & a_{81} & a_{82} & a_{83} & a_{84} & a_{85} & a_{86} & a_{87} \\ a_{90} & a_{91} & a_{92} & a_{93} & a_{94} & a_{95} & a_{96} & a_{97} \end{bmatrix}$$

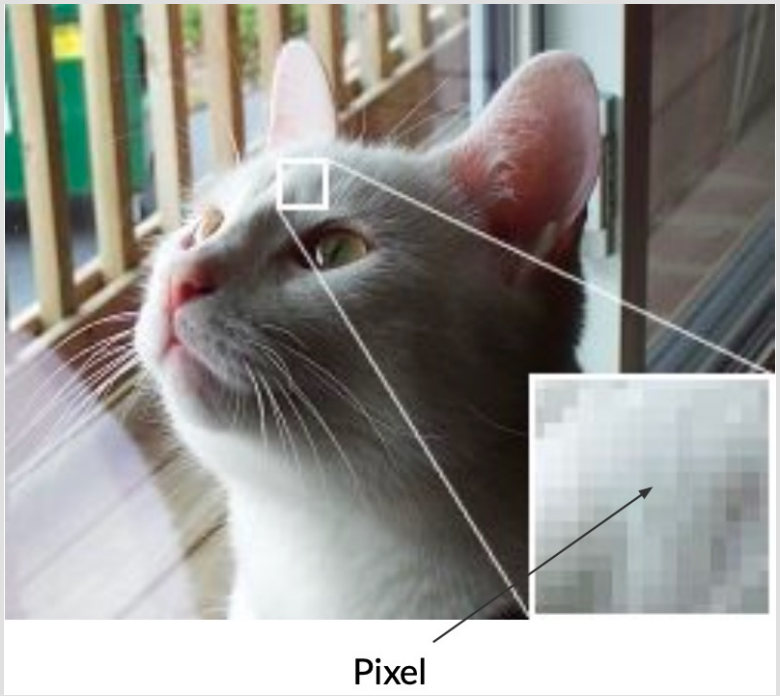


This is cat image.

1. Why study images?

Can we convert cat images into matrix?

2. Basics of pixels



2. Basics of pixels

Images are represented by a grid/array of pixels.

Each pixel store colour information.

The number of pixels define the resolution of the image.

3. Basics of RGB [Color Representation]

RGB is a colour model used to represent and display images through the combination of red, green, and blue light.

3. Basics of RGB [Additive Color Mixing]

The RGB model creates colours by adding varying intensities of red, green, and blue light, producing white light when combined at full intensity.

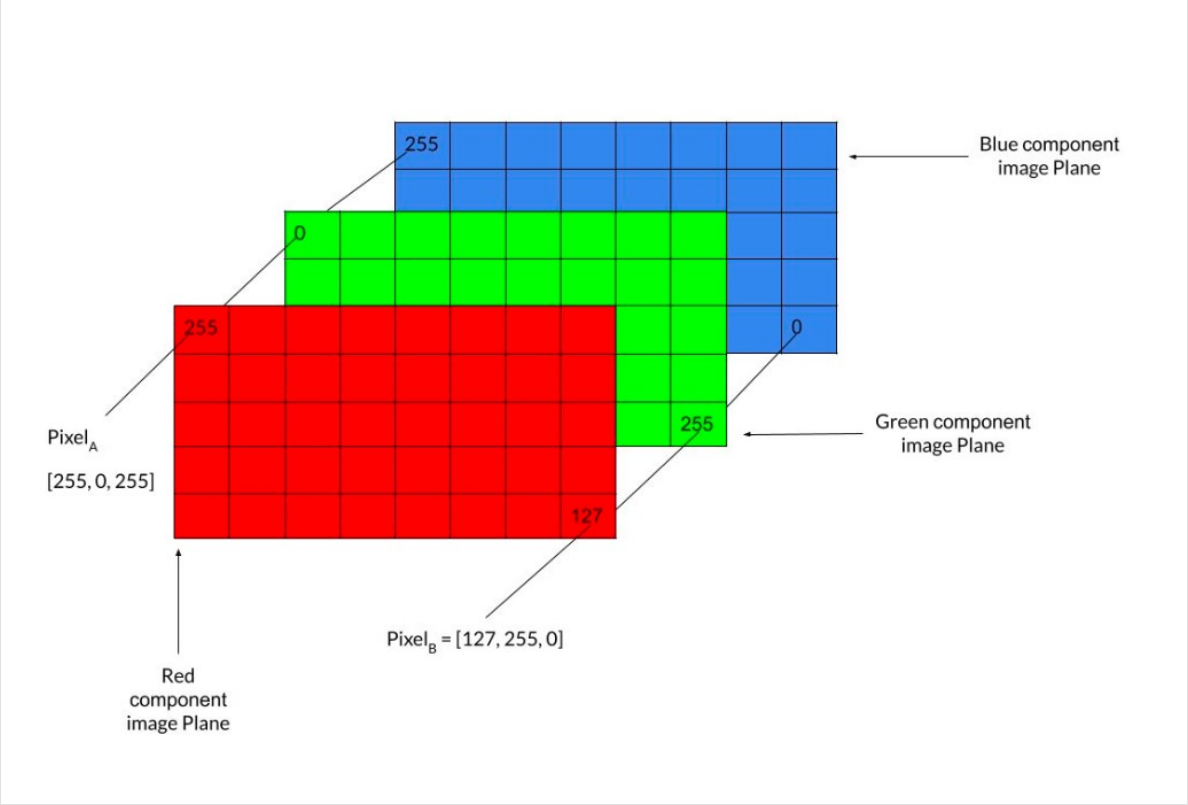
3. Basics of RGB [Pixel Composition]

Digital images represent each pixel with three values for red, green, and blue intensities, allowing for millions of colour combinations.

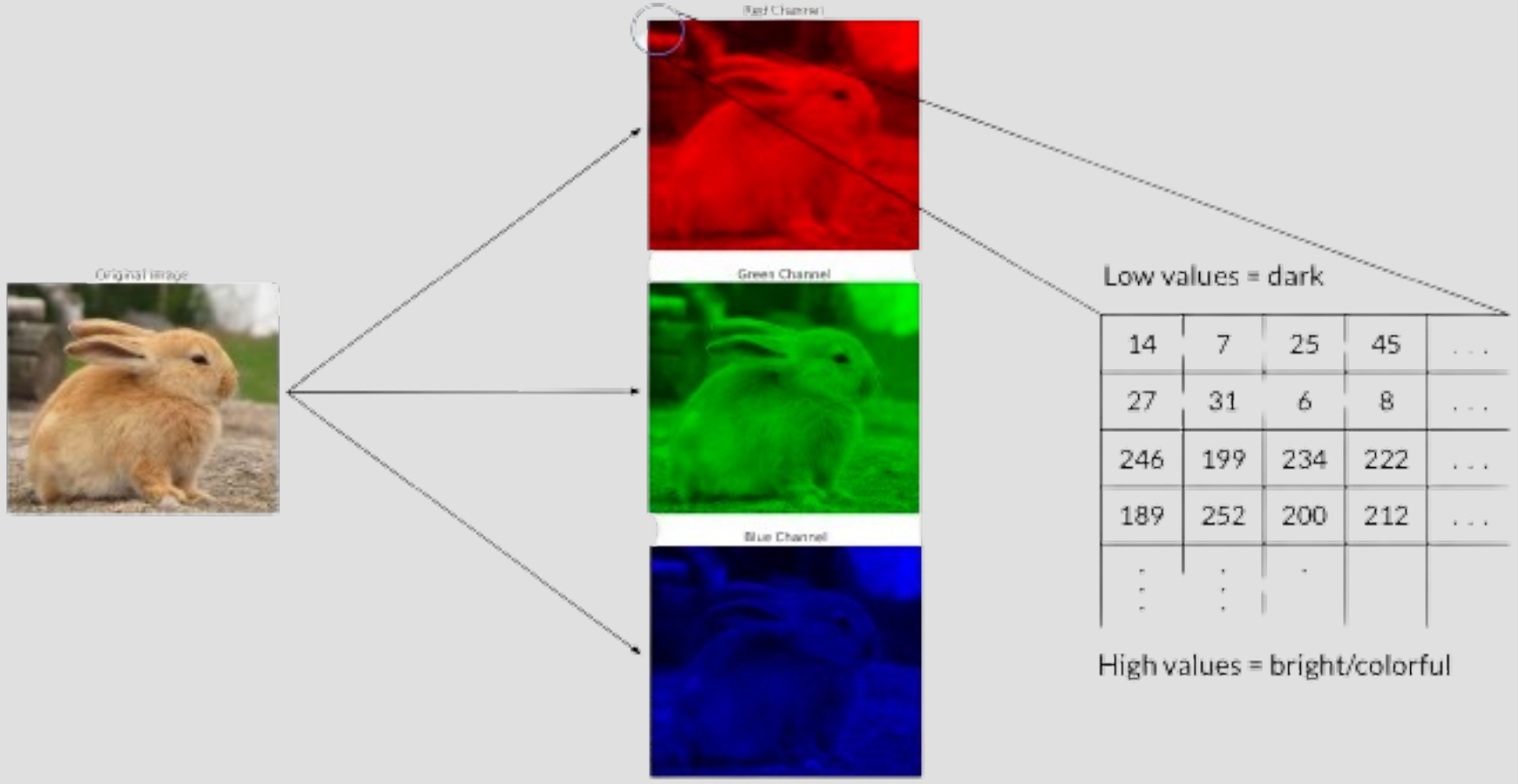
3. Basics of RGB [Image File Formats]

Common image file formats like JPEG, PNG, and BMP use RGB values to encode and reproduce colours accurately.

3. Basics of RGB



4. Basics of Channels



5. What is noise image?

A noise image is an image where each pixel's colour value is randomly generated, resulting in a visual pattern of random variations.

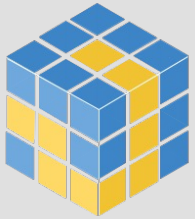
6.Image Representation in Python: Pillow

A Python library for opening, manipulating, and saving various image file formats

Easy-to-use functions for opening images, resizing, cropping, adding text, and more

7. Python Libraries for Images

cv2, matplotlib, NumPy



NumPy

Thank You !