Module 1: A Beginner’s Guide to Computer Vision

Video 2: Pixel Perfect - Decoding Images

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In Air

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Digital Images

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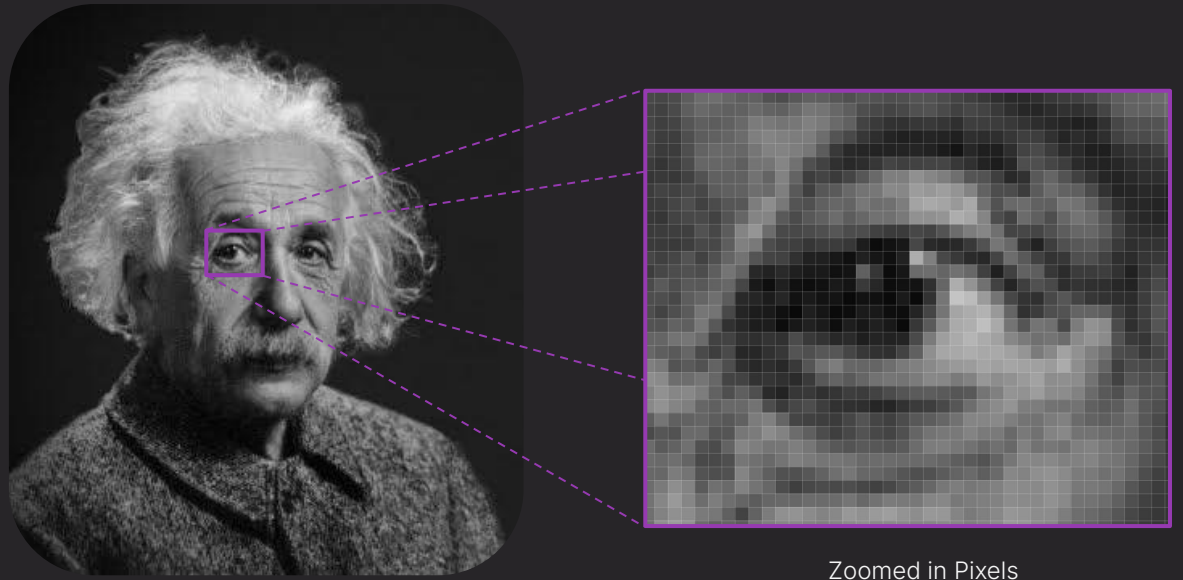
Digital Images

Digital Images are composed of tiny squares called “**Pixels**”.



Sample of a Digital Image

Zoomed in Pixels

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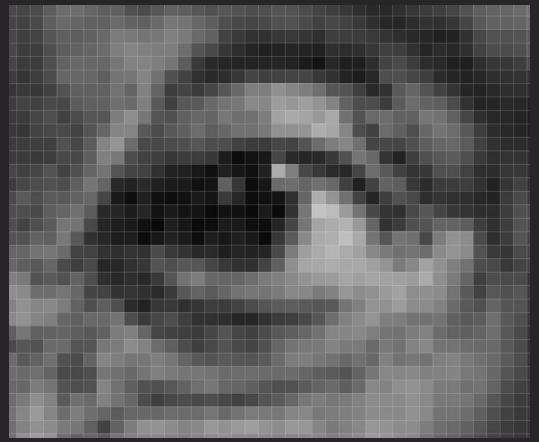
Digital Images

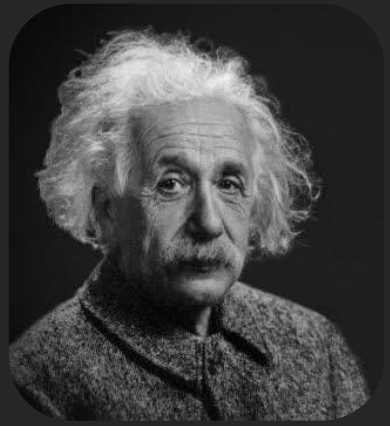
Each pixel is assigned a number between **0 and 255**.



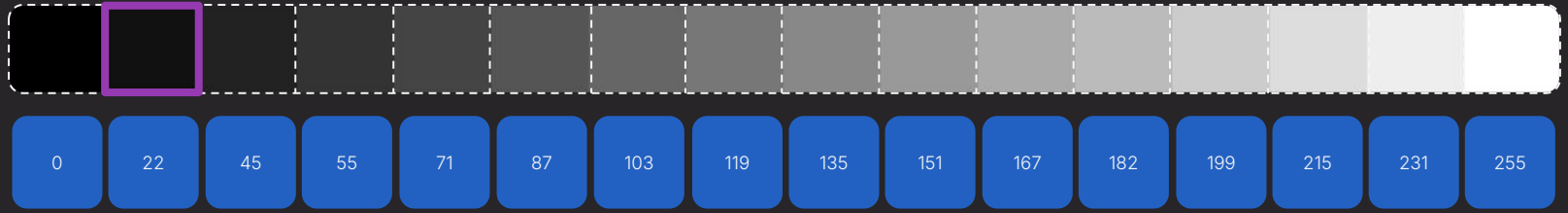
Zoomed in Pixels

- **0:** Absence of light OR pure black
- **255:** Maximum light OR pure white.

Digital Images



Sample of a Digital Image



Digital Images

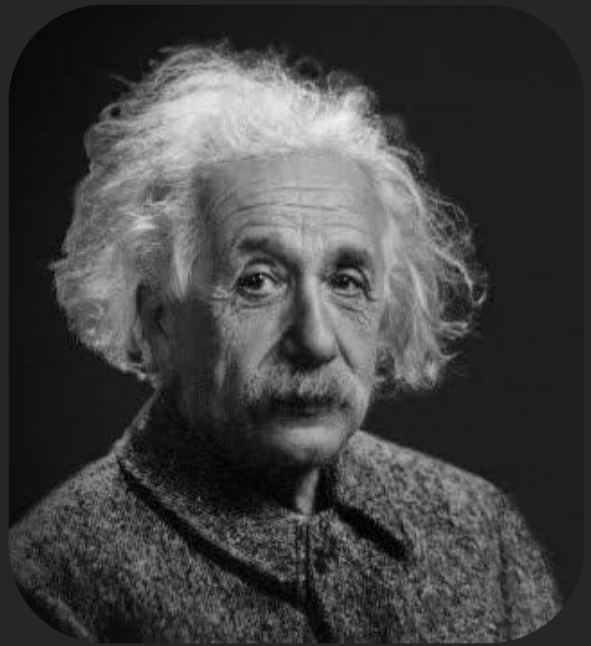


Image Size: 356 × 356 px

Total no. of features =

356 × 356 = **1,26,736 features**

Digital Images

- RGB is the most common color model for digital images.
- It stands for **R**ed, **G**reen and **B**lue.

Digital Images

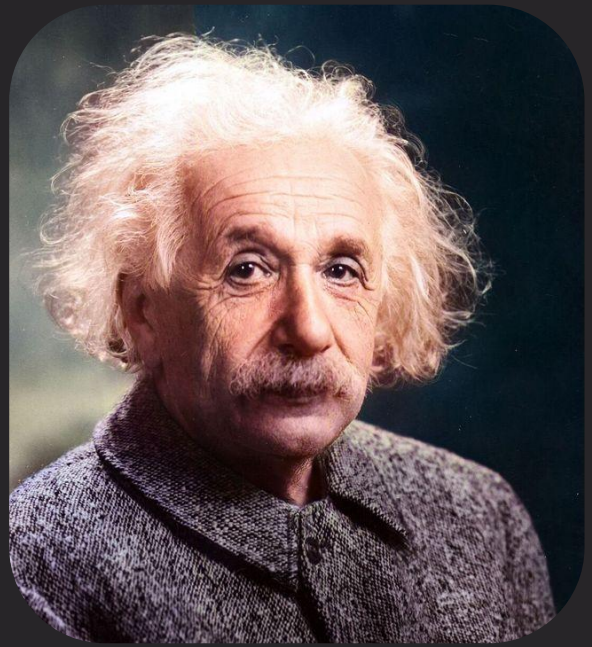
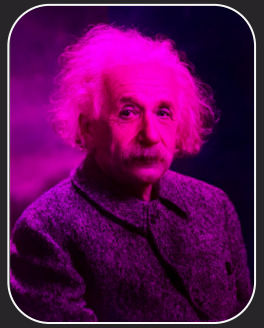


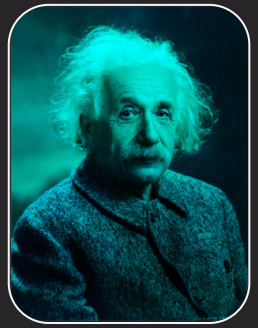
Image Size: 356 × 356 px

Total Features: 1,26,736 × 3

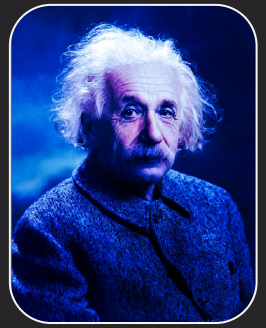
Red



Green



Blue



Digital Images

Image Size: 1920 × 1080 px (Full-HD)

Total no. of features = 62,20,800 (1920 × 1080 × 3)

Red

Green

Blue

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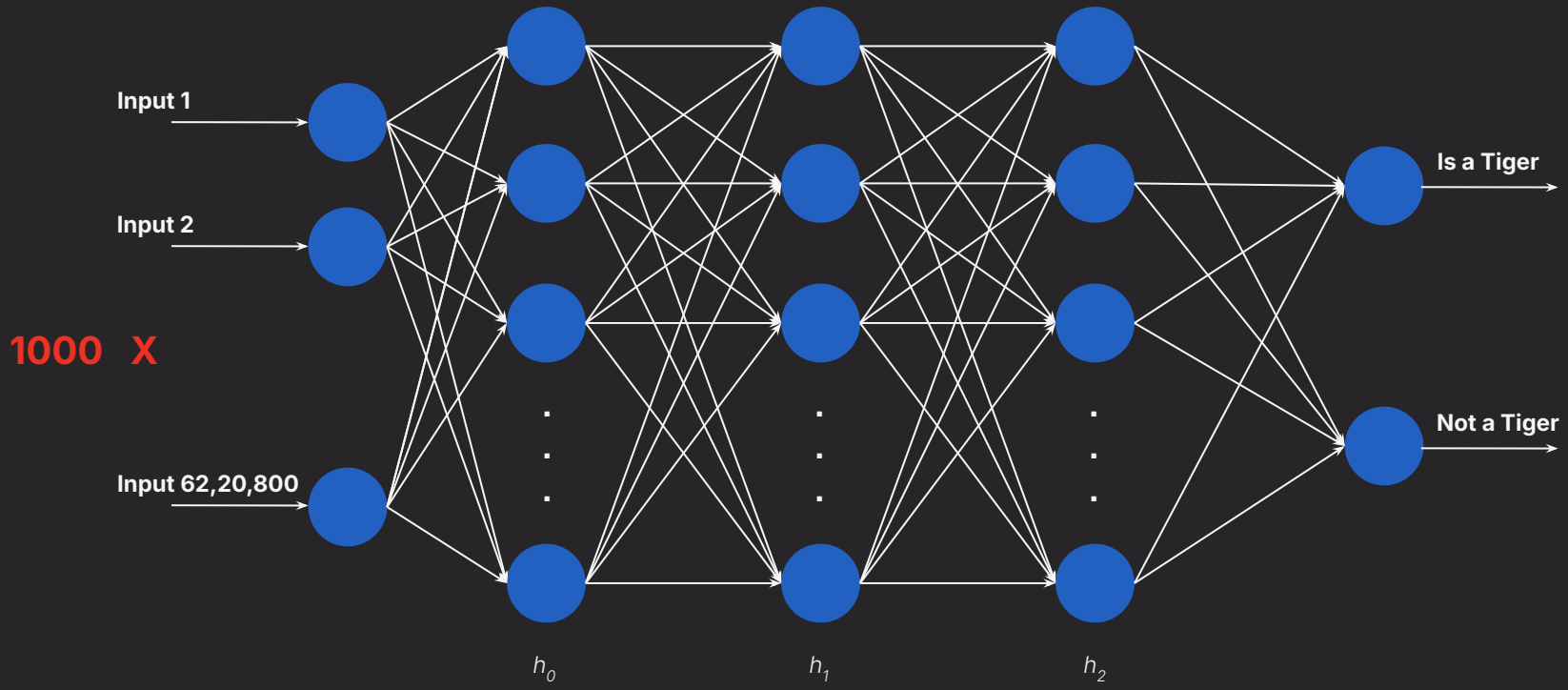
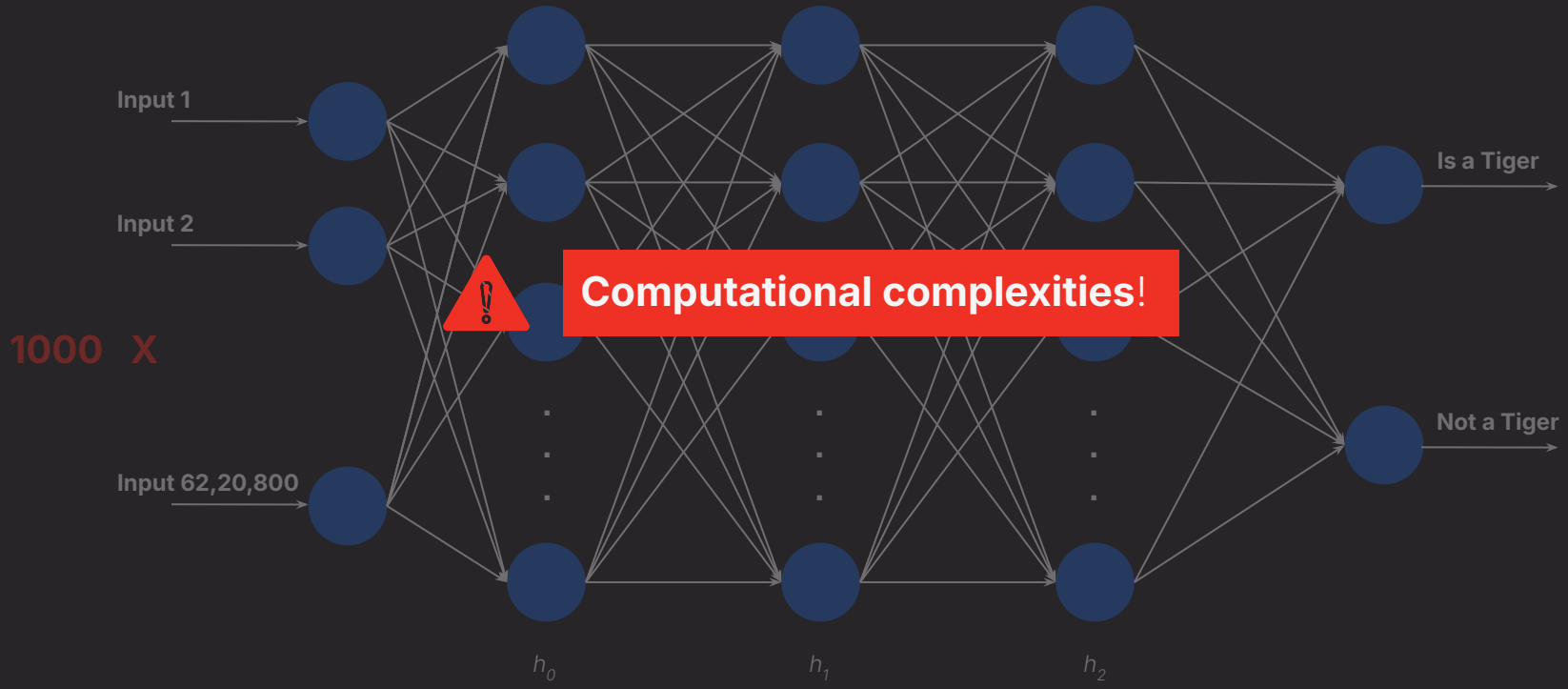
ANNs for Image Recognition



ANNs for Image Recognition



ANNs are not suitable for Image Recognition

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The Challenge of Spatial Relationships

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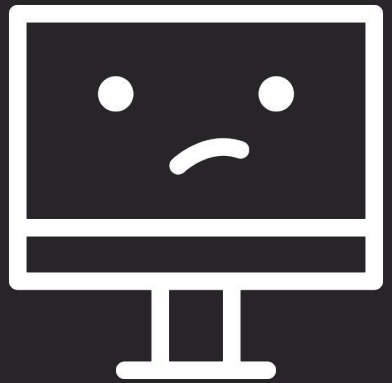
The Challenge of Spatial Relationships

- ANNs **cannot recognize** how **shapes and texture** form structures together.
- They treat all input data as **flat arrays**.



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The Challenge of Spatial Relationships

Image perceived by humans

Image perceived by ANN

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The Challenge of Spatial Relationships

Image perceived by humans

Image perceived by ANN

To truly understand an image, neural network must:

- Leverage spatial relationships to detect patterns and identify objects.
- Understand the content within an image.

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In Air