AI assisted diagnosing: Predictive models for images

An introduction to when and how to apply deep learning

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Machine Learning Engineer
LEO Innovation Lab

LEO Innovation Lab

Practicalities

WiFi: leoilab-guest
Password: *********

Workshop ends 14:15 - *more AI on program later*

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Overview

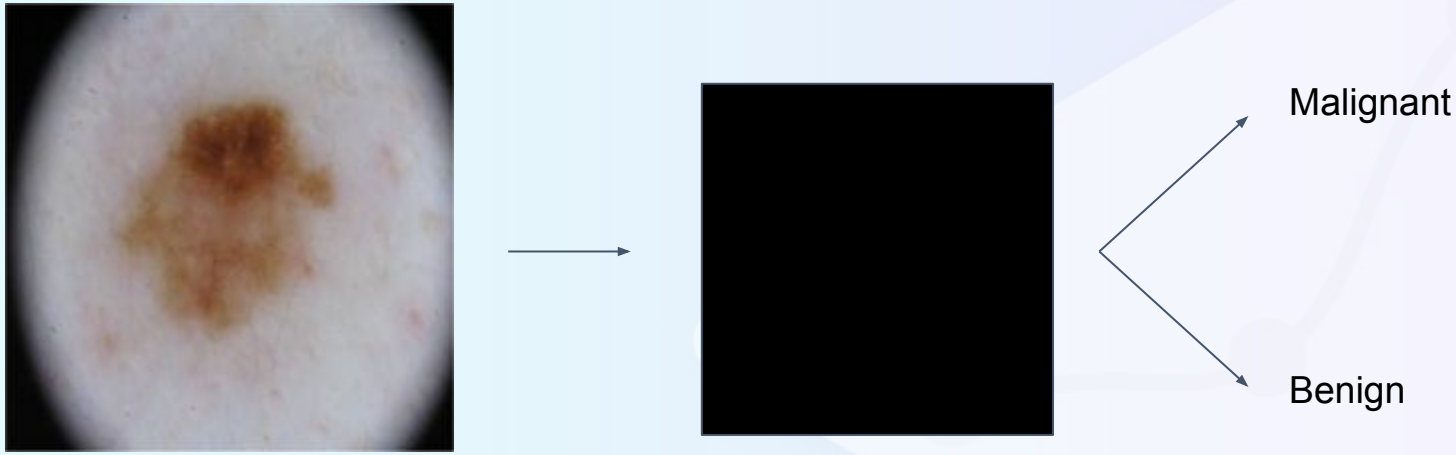
- Convolutional neural networks
- When are conditions right
- Transfer learning
- Work on examples

Basic introduction to CNNs

What are they

How do they learn

How convolutional neural networks work



How convolutional neural networks work

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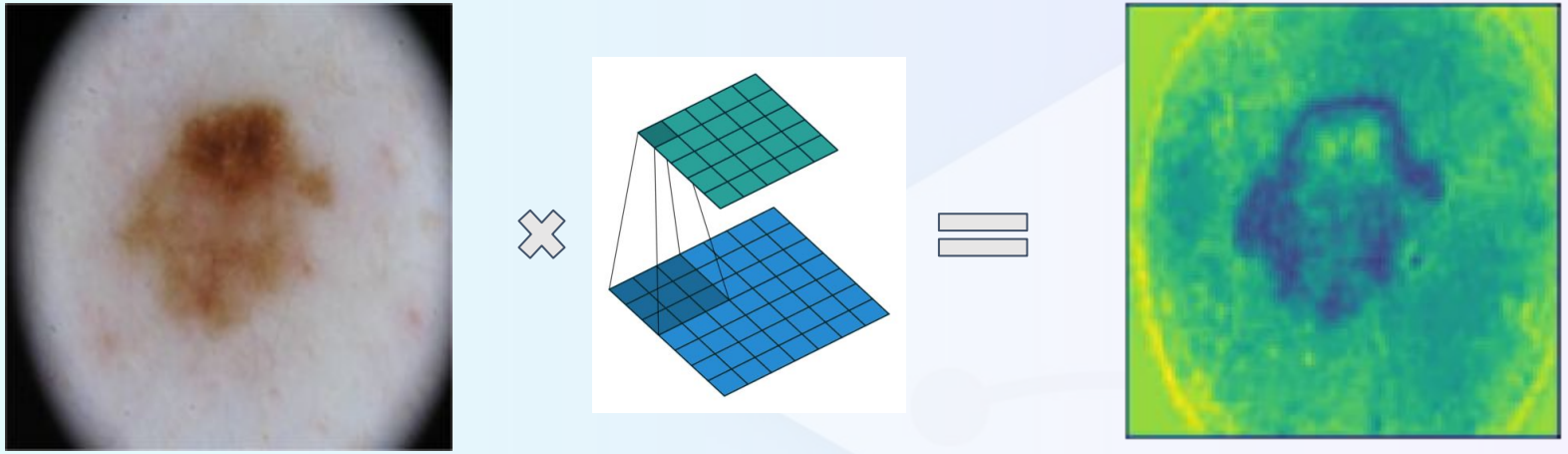
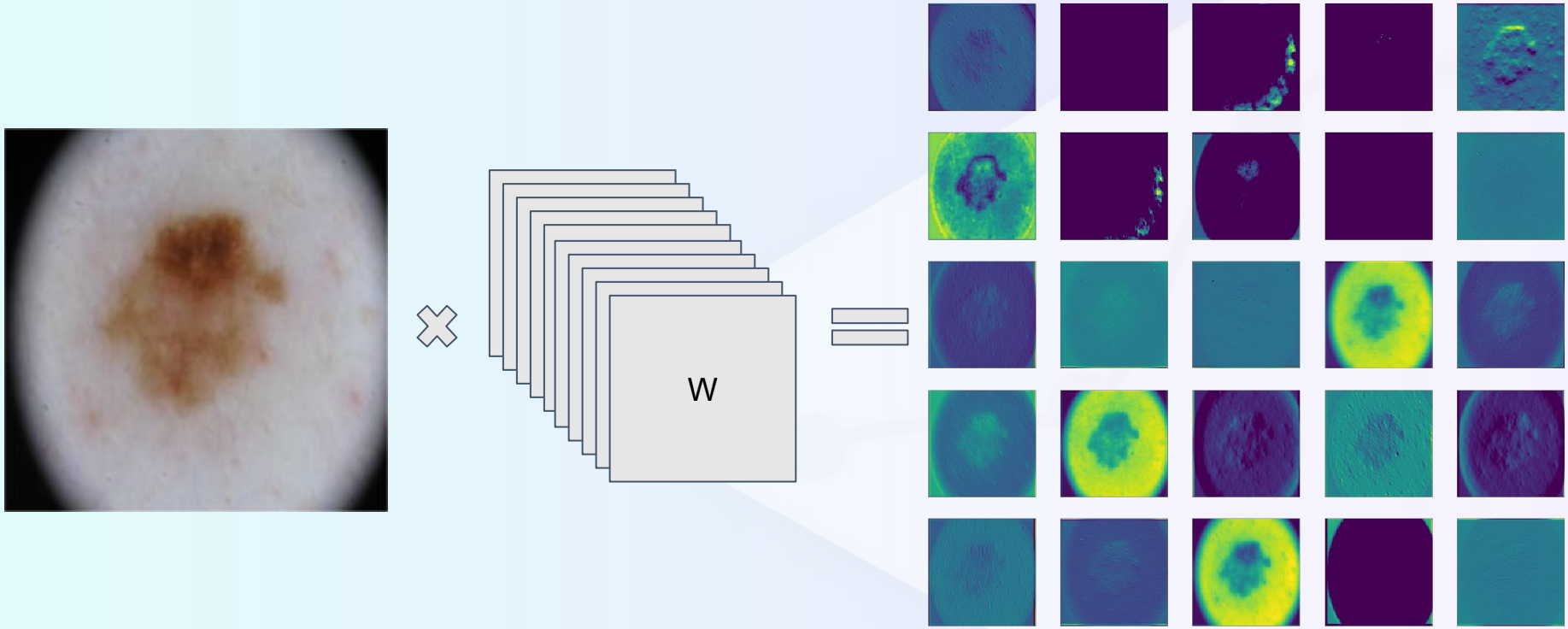
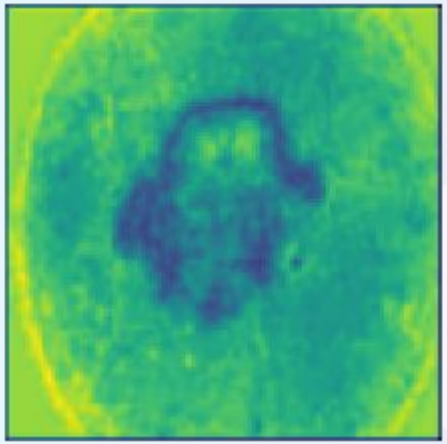
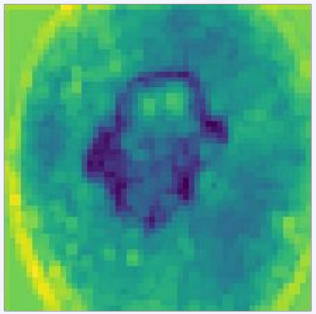


How convolutional neural networks work



How convolutional neural networks work

max() = 

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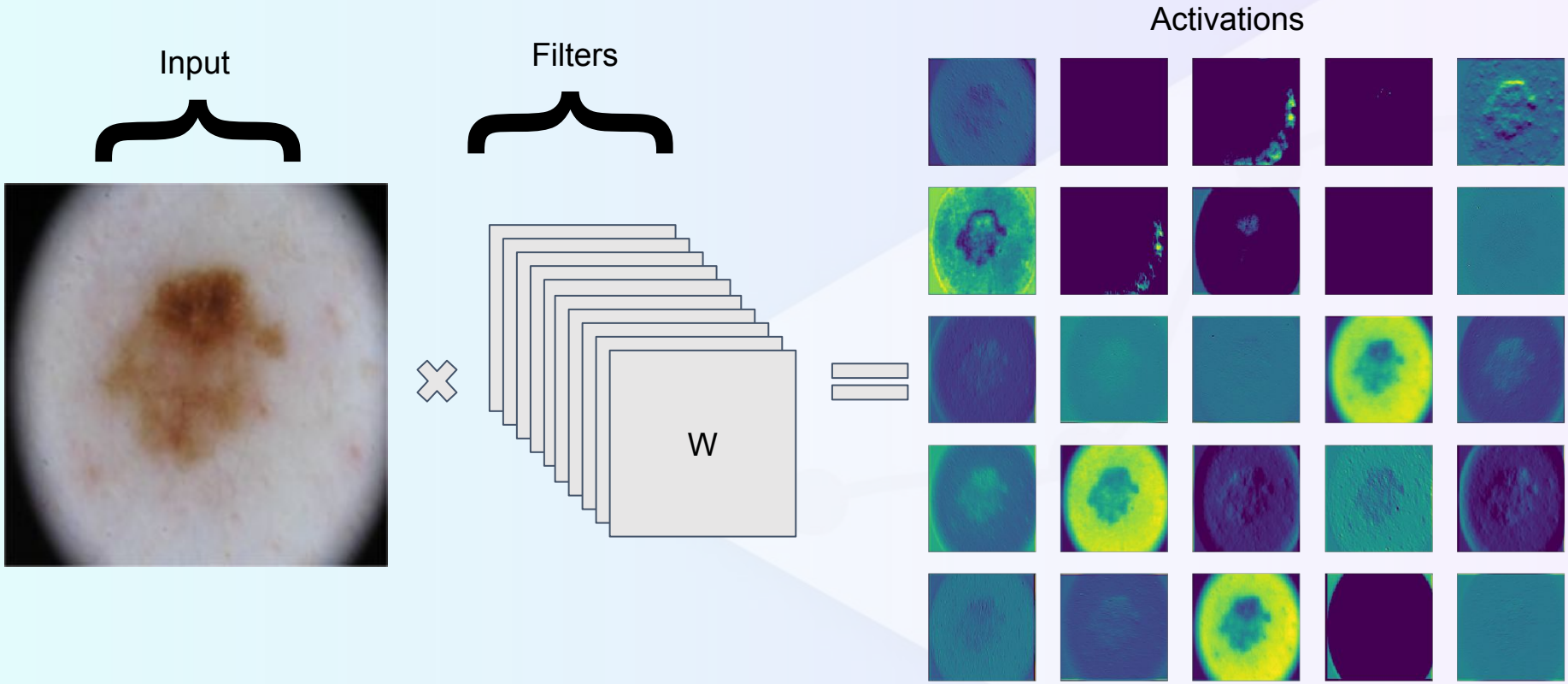

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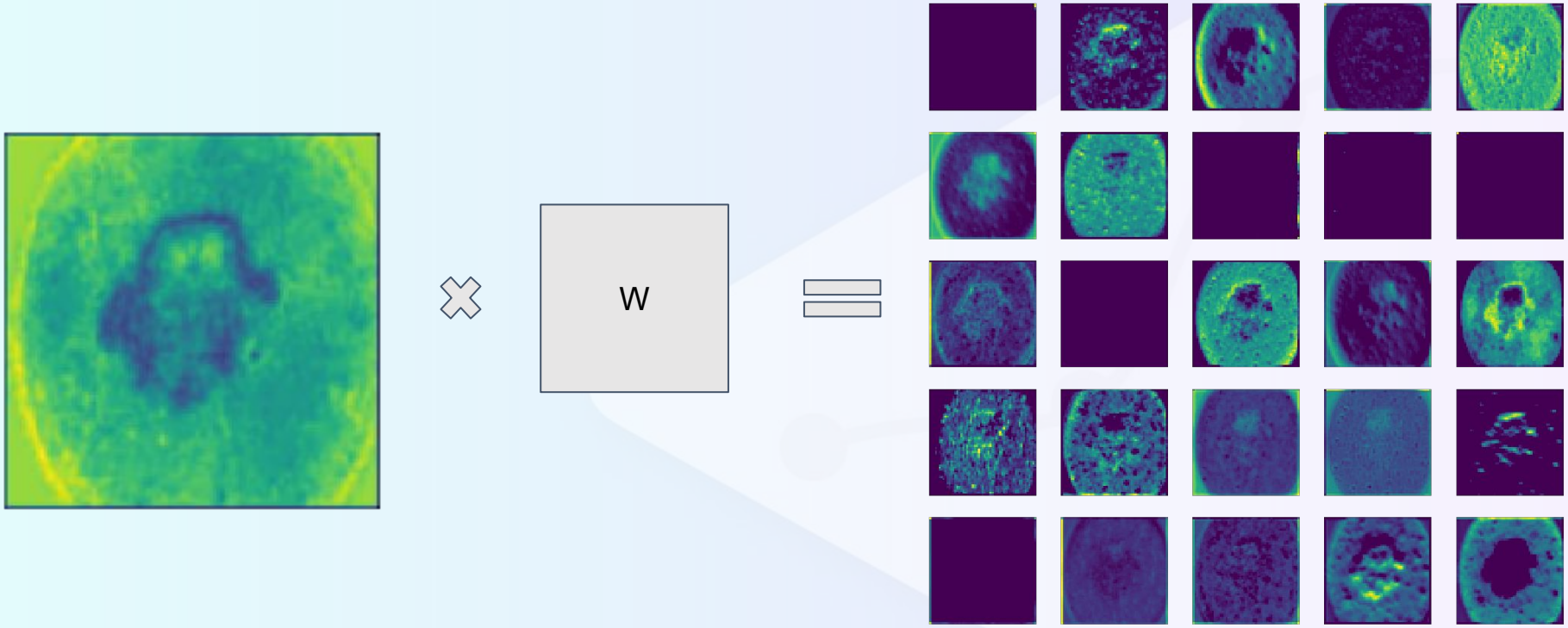
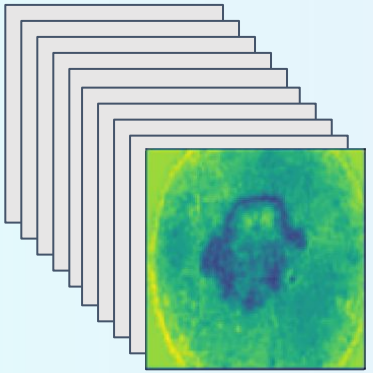


How convolutional neural networks work



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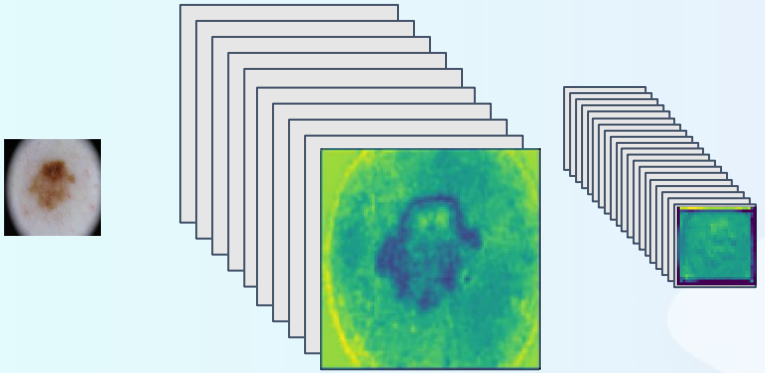

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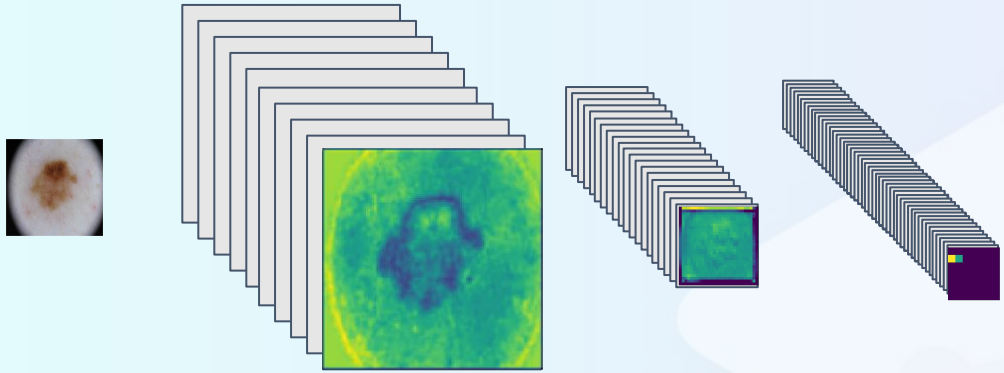

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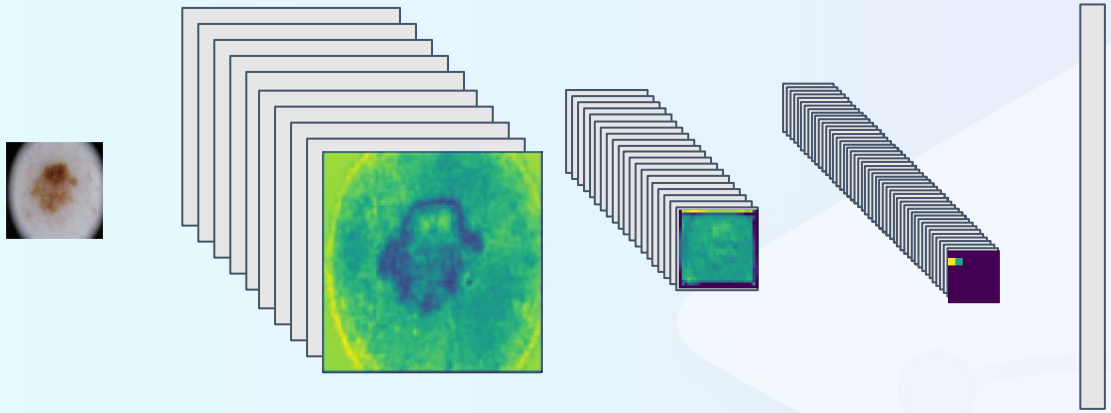

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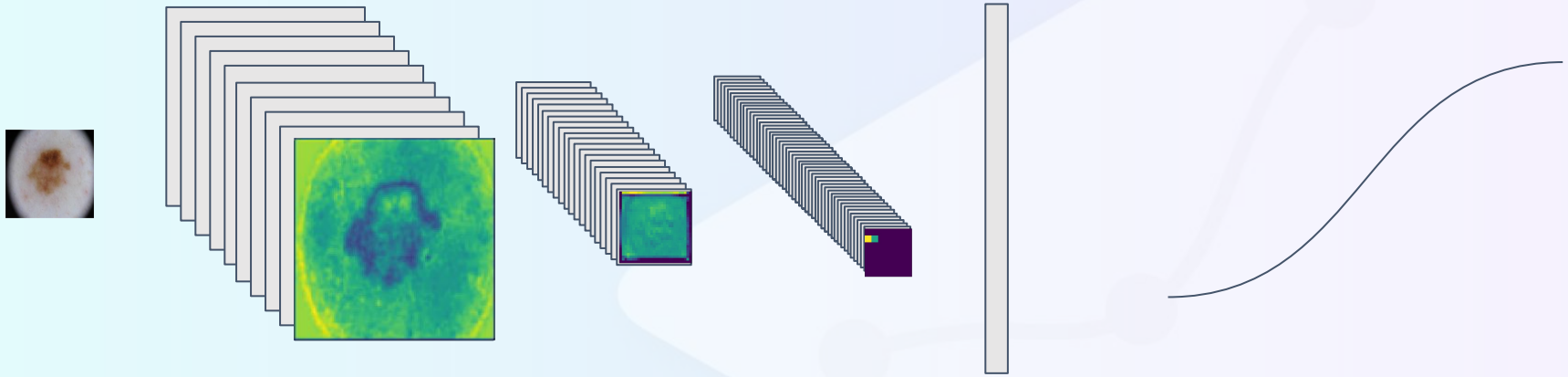

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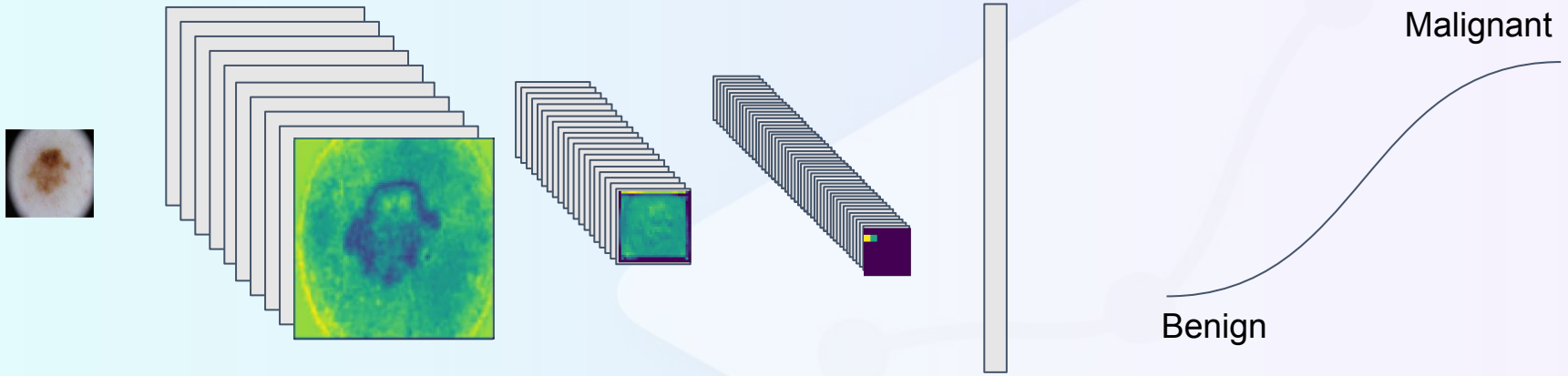
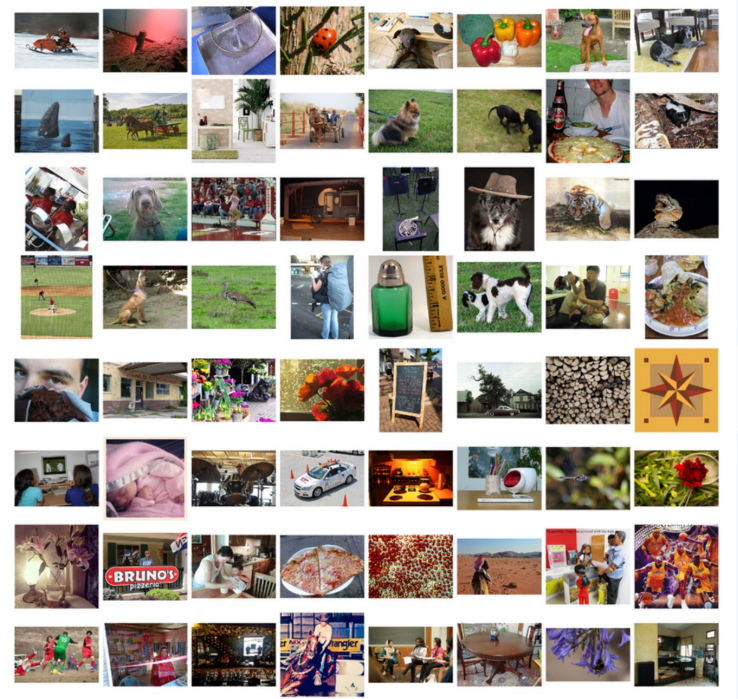


Conditions for using deep learning

Do we need huge amounts of data?

Transfer learning

ImageNet



Built from word syntax tree.

Total number of non-empty synsets: 21841

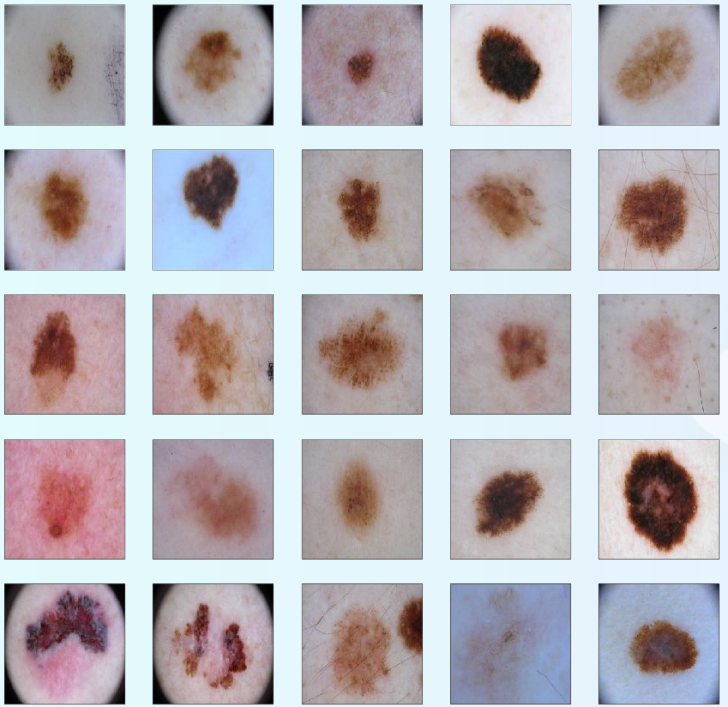
Typically split to 1000 classes

Total number of images: **14,197,122**

[ImageNet homepage]

Transfer learning

ISIC



Notoriously collected from clinical settings

Two classes:

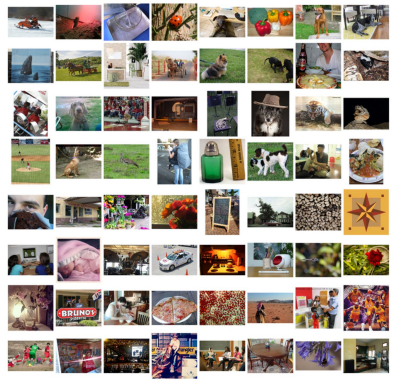
- Malignant
- Benign

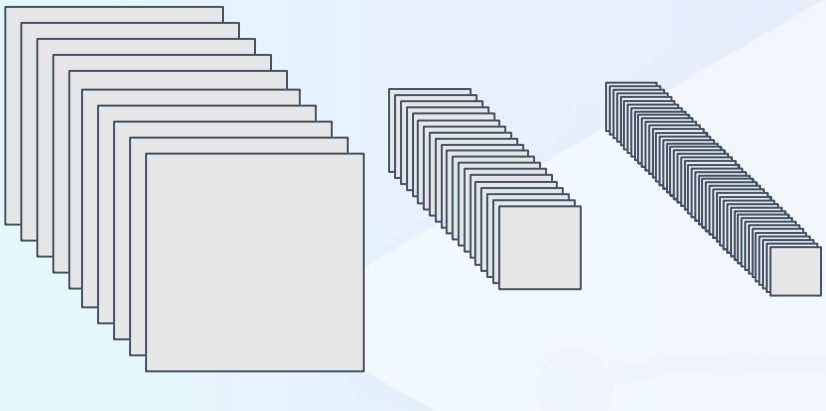
Total number of images: **23,909**

Transfer Learning

Recycling data

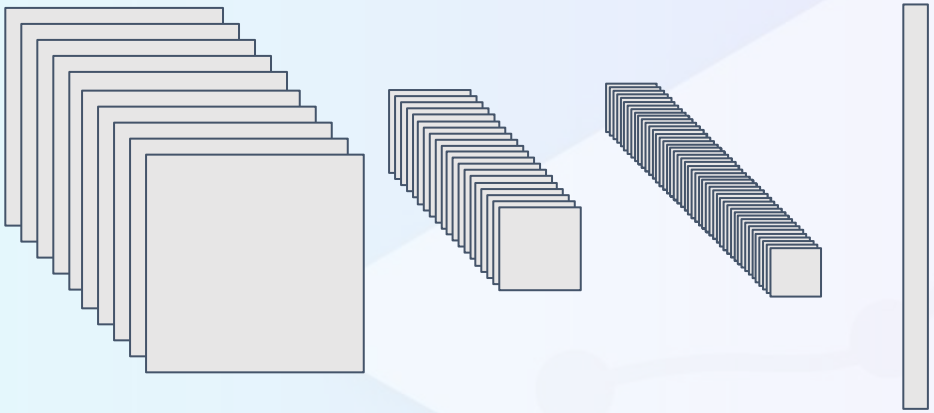
Transfer learning





Plane
Pizza
Car
Snake
Carrot
Pyjamas
Violin
...

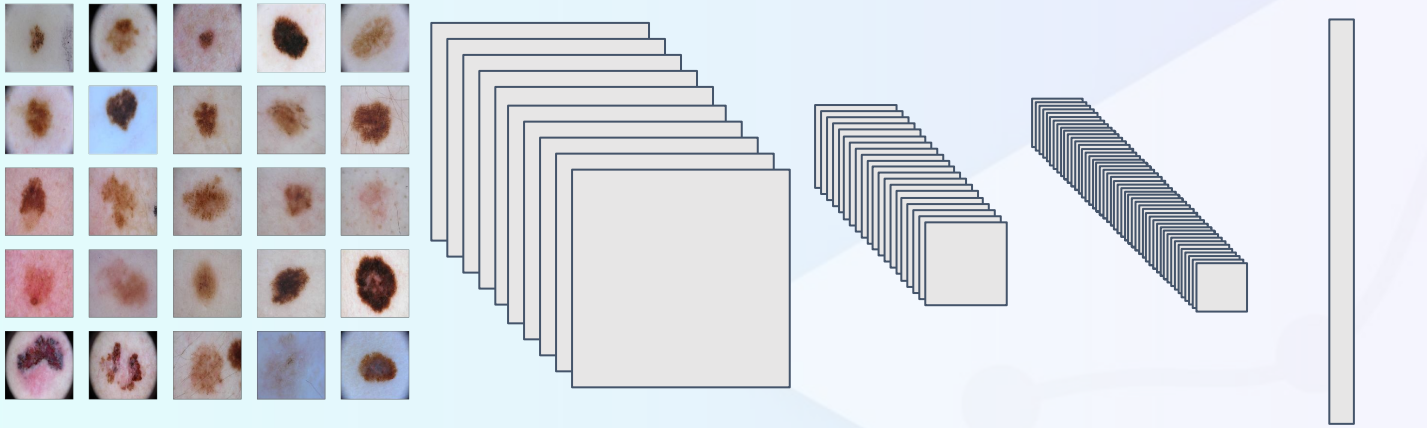
Transfer learning



Lock Layers

New layers

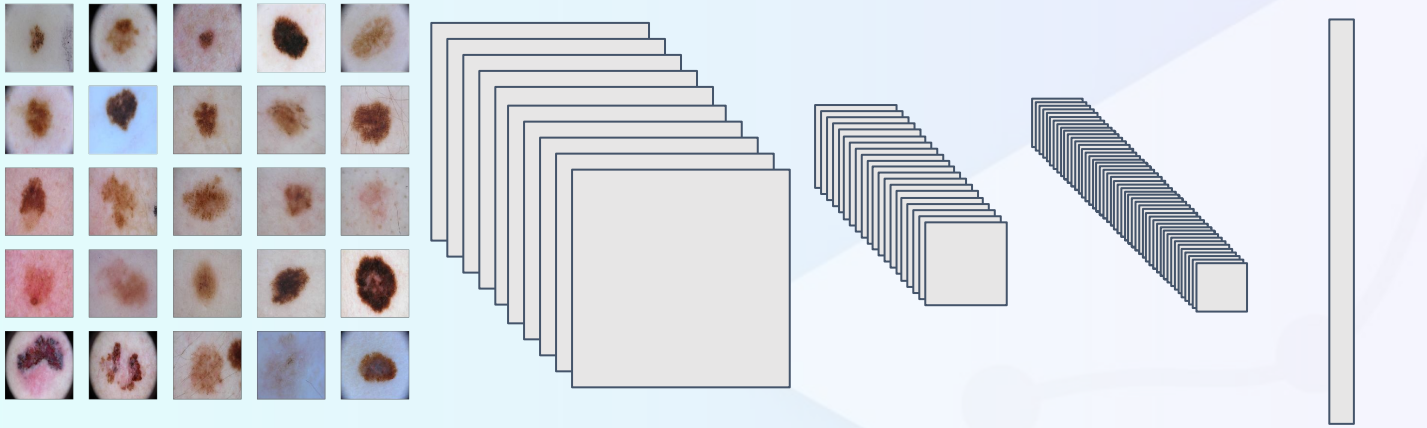
Transfer learning



Lock Layers

New layers (train)

Transfer learning



Lock Layers

New layers (train)

Go work on exercises

https://tinyurl.com/leo-workshop-#

(NB! The server behind this is taken down)

Password: ********

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Agenda:

14:45 - 15:00	Welcome from Kristian Hart and Christian Sejersen
15:00 - 15:15	Imagine Demo: An imaging platform that leverages artificial intelligence to track skin conditions
15:15 - 16:15	Panel discussion: The implications of black box models for patients: Explainability, ethics and democracy
16:20 - 16:50	Keynote Speech: How to be a doctor in 2025
17:00 - 19:00	Drinks and Networking: Beer on tap and tacos on hand