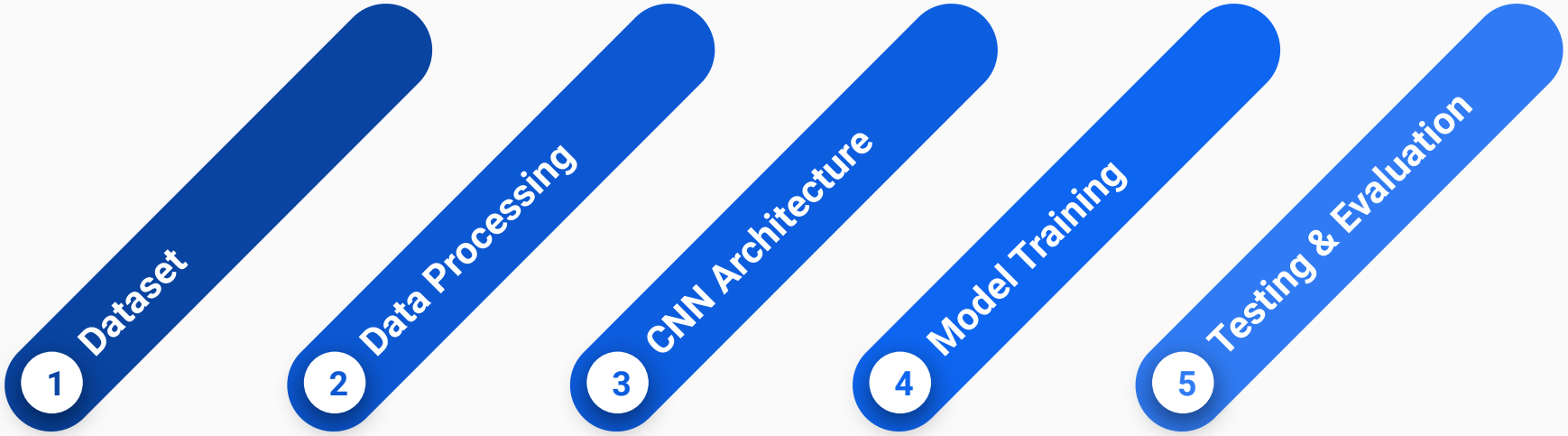
Flower Classification using CNN

UTMIST ML Study Group

Real-World Application - Plant Identification Apps

Steps to Solve this Problem

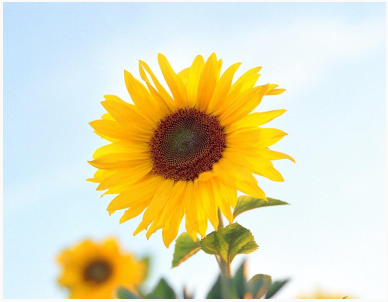


Dataset - What to Learn

Daisy

Dandelion

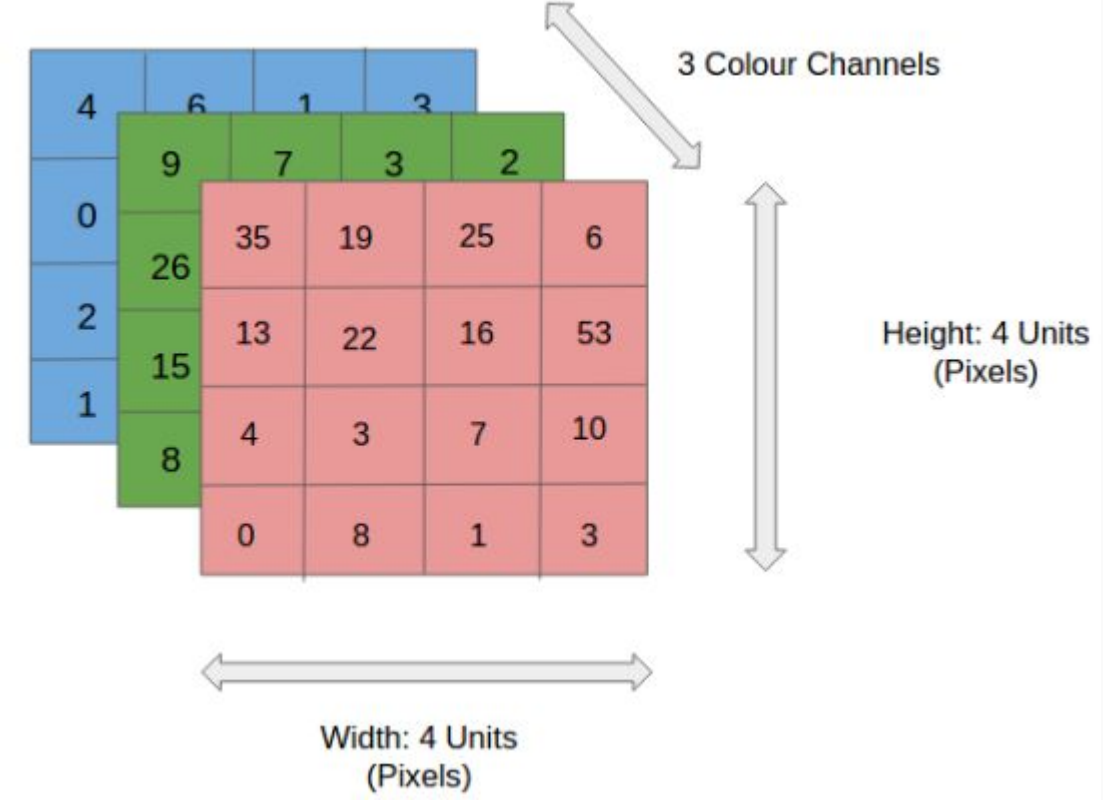
Rose



Sunflower

Tulip

Representing Images as Data



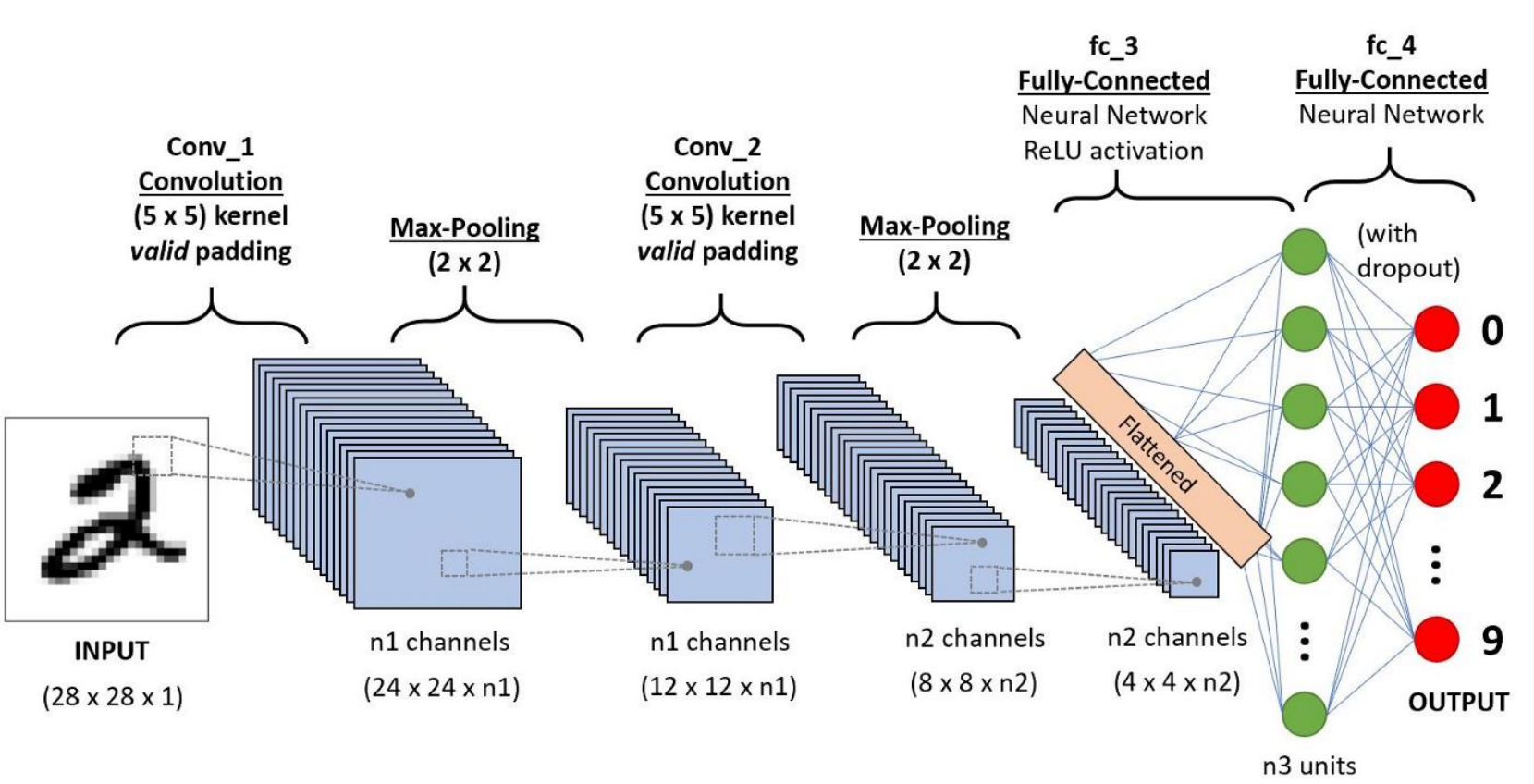
https://miro.medium.com/max/1250/1*15yDvGKV47a0nkf5qLKOOQ.png

Preparing the Data

- Resize images
- One-hot encoded labels
- Training and validation sets

Daisy	Dandelion	Rose	Sunflower	Tulip
1 0 0 0 0	0 1 0 0 0	0 0 1 0 0	0 0 0 1 0	0 0 0 0 1

CNN Architecture Overview



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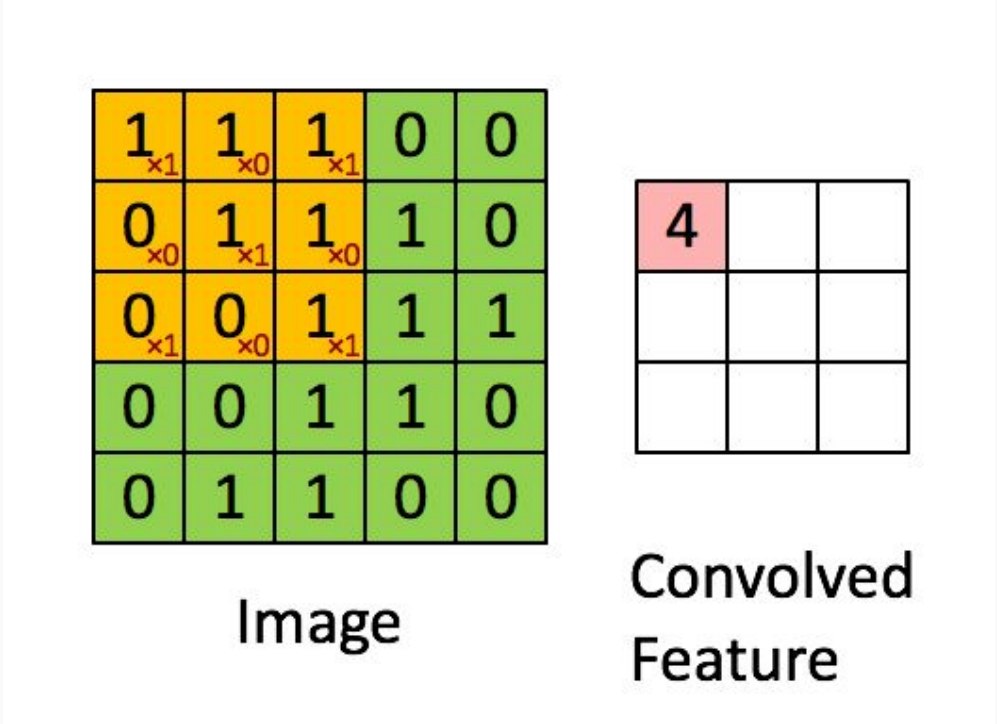
What is Convolution?

Operation
- Matrix multiplication between kernel and covered area of image
- Extract features for easier processing

Kernel/Filter
- Used in convolution operation
- Same dimension as channel size

Stride
- Step size of each shift

Padding
- Control output dimension



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Pooling

Operation

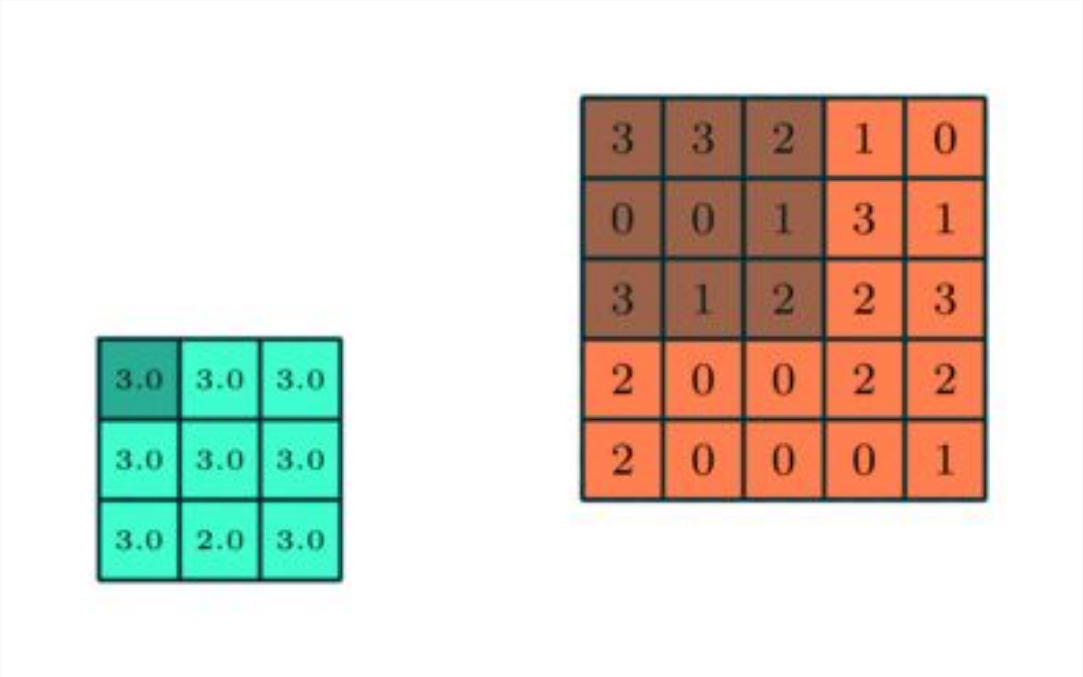
- Dependent on the type
- Get the max/average of overlapping area

Purpose

- Reduce spatial size
- Extract dominant features
- Decrease computational power

Types

- Max
- Average



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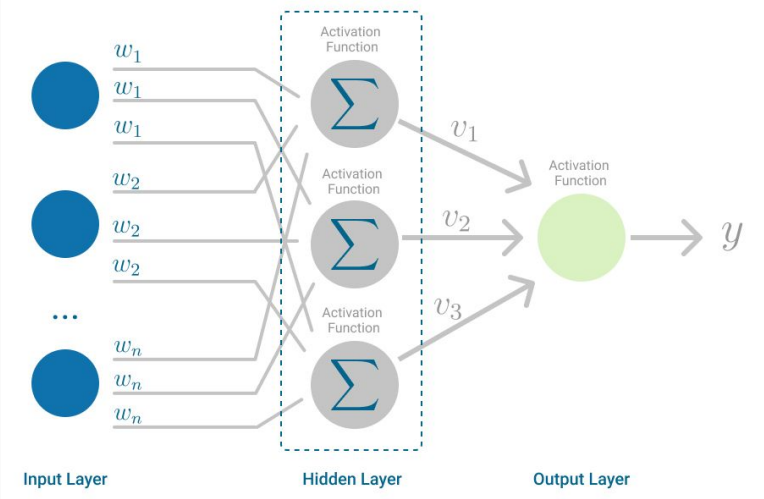
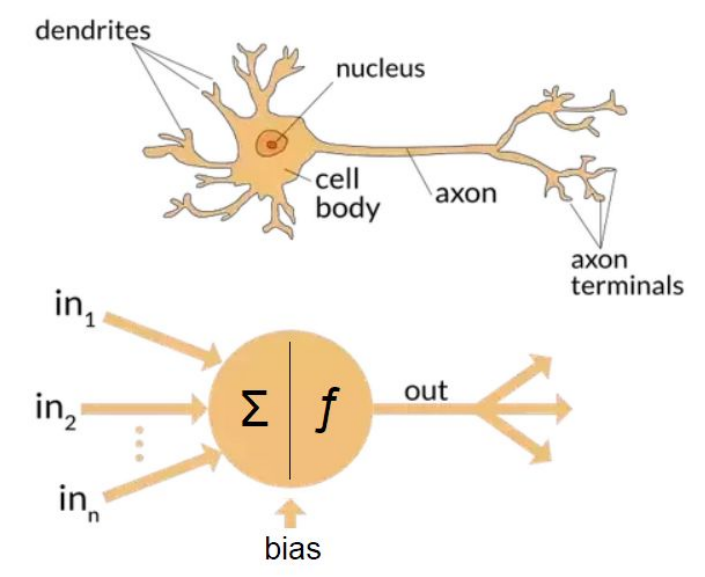
Fully Connected

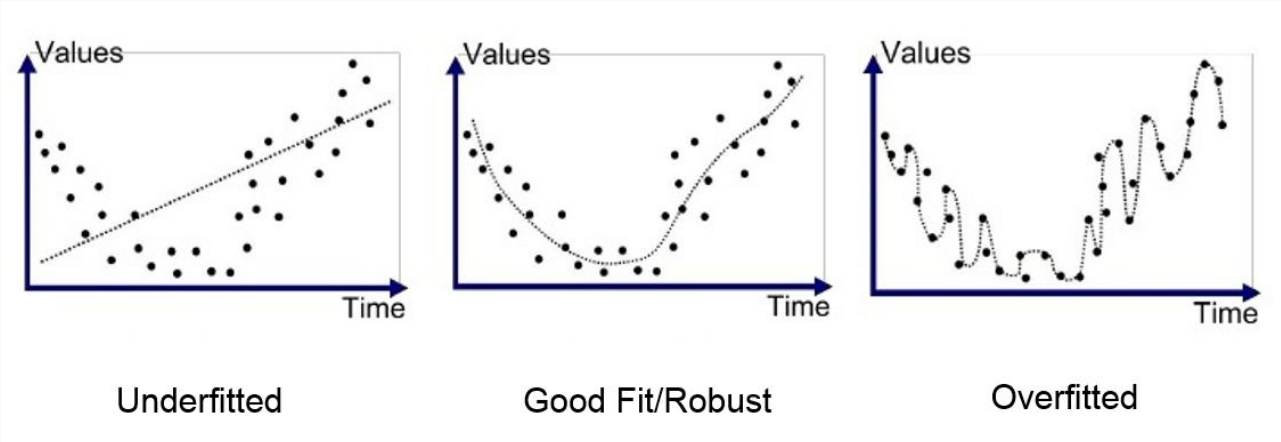
- Flattened & converted data now suitable for MLP
- Train to distinguish features





Regularization

- Discourage learning a model that’s too complex
- Avoid overfitting



https://medium.com/greyatom/what-is-underfitting-and-overfitting-in-machine-learning-and-how-to-deal-with-it-6803a989c76

Data Augmentation

- Regularization technique
- More data!

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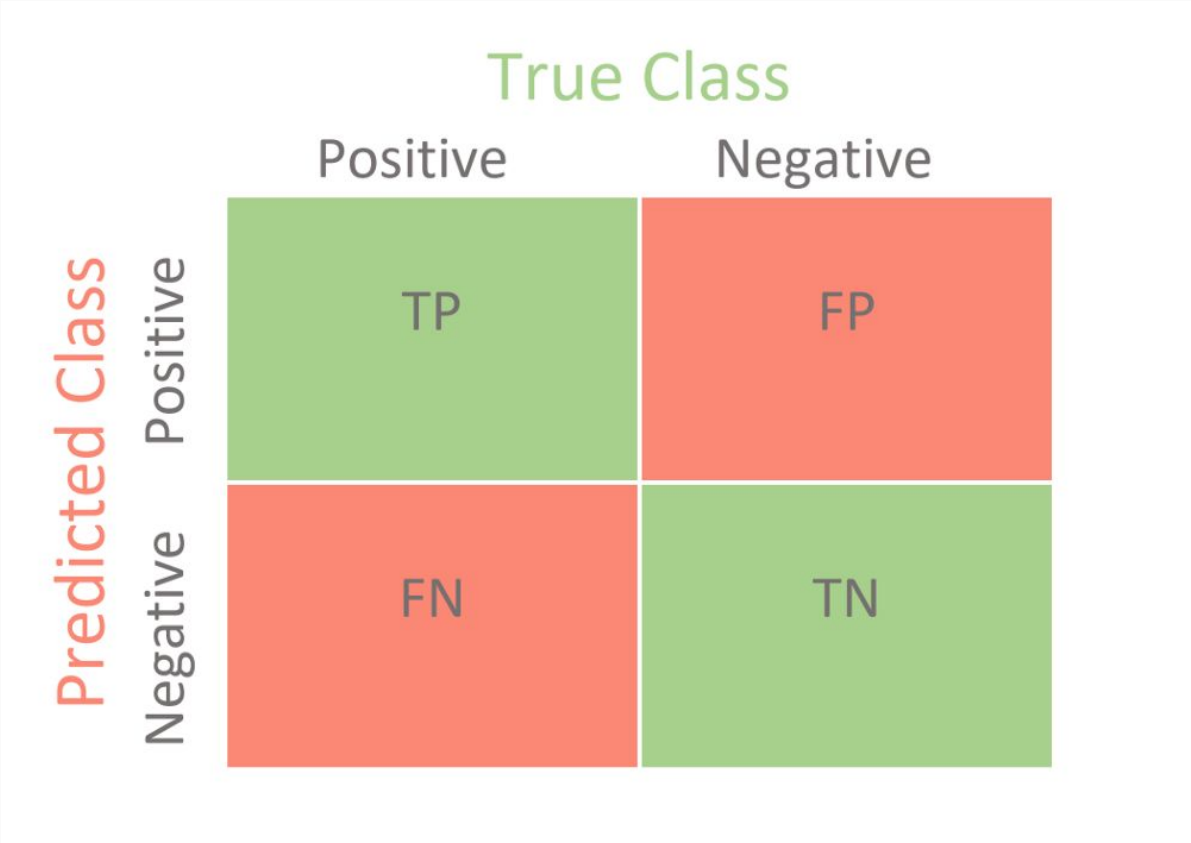
Evaluation using Confusion Matrix



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DEMO

Thank You! :)