



Применение Python, машинное обучение

Александр Жебрак

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Отмечайтесь на лекции!

Сегодня



- Python в Mail.Ru
- Python в машинном обучении
- Процесс сдачи экзамена
- Презентации и проекты

Проекты



- Поиск
- Почта (антиспам)
- Реклама (myTarget), RB
- Mail.Ru для Бизнеса
- ICQ, Maps.Me
- Контентные проекты
- Тестирование
- INTDEV

Машинное обучение



- Что такое?
- Зачем?
- Где применяется?
- Почему сейчас?

Машинное обучение



- Supervised learning
- Unsupervised learning
- Reinforcement learning

Reinforcement learning



DeepMind — Reinforcement Learning
with Unsupervised Auxiliary Tasks



Reinforcement learning



OpenAI Gym: CartPole



Машинное обучение



- Постановка задачи
- Подготовка данных
- Обучение модели
- Использование модели

Pandas



Обучение модели



- Dataset split
- Overfitting
- Cross-validation
- Loss function
- Optimization
- Regularization

Методы



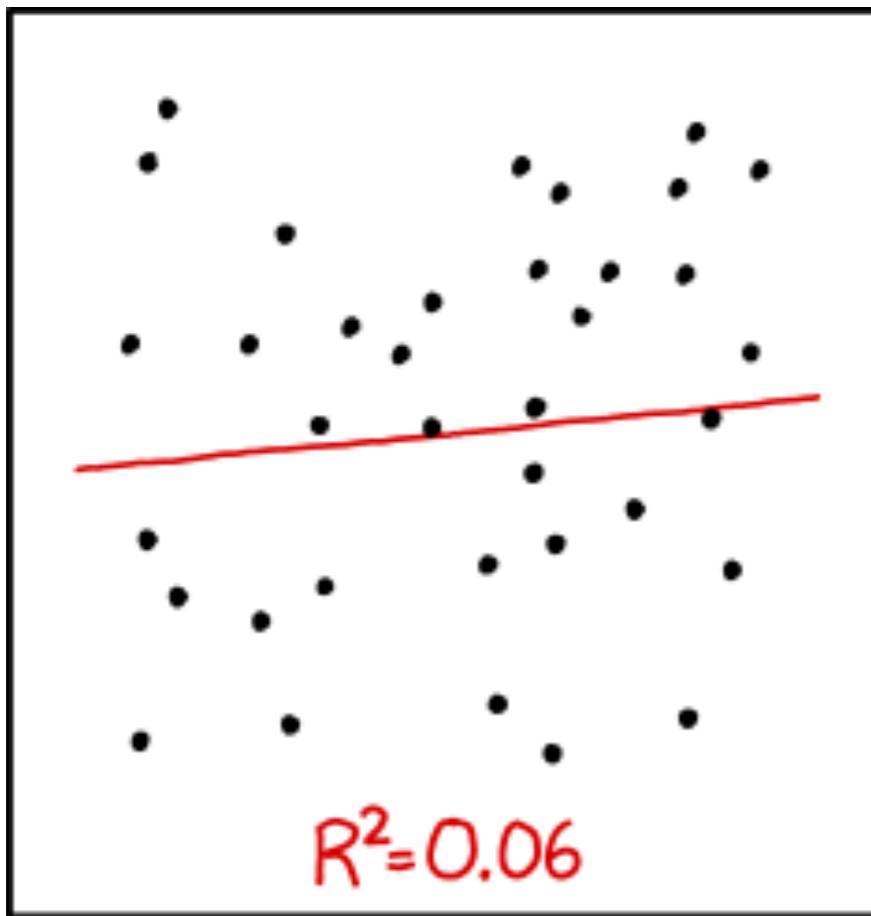
- Линейная регрессия
- Градиентный бустинг
- Нейронные сети (MLP/CNN/RNN/GAN)

Библиотеки



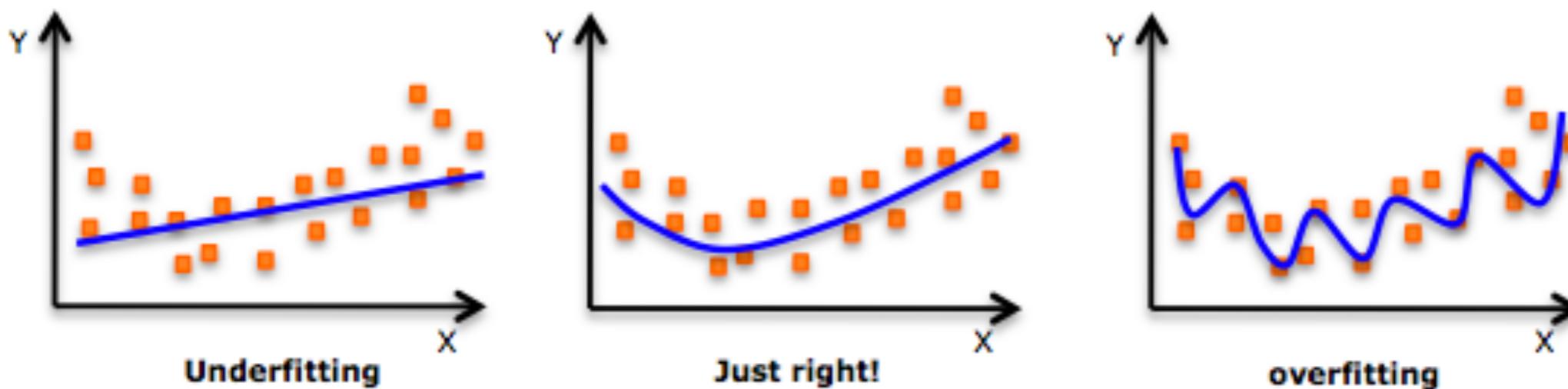
- scikit-learn
- xgboost
- tensorflow
- keras

Linear Regression



I DON'T TRUST LINEAR REGRESSIONS WHEN IT'S HARDER
TO GUESS THE DIRECTION OF THE CORRELATION FROM THE
SCATTER PLOT THAN TO FIND NEW CONSTELLATIONS ON IT.

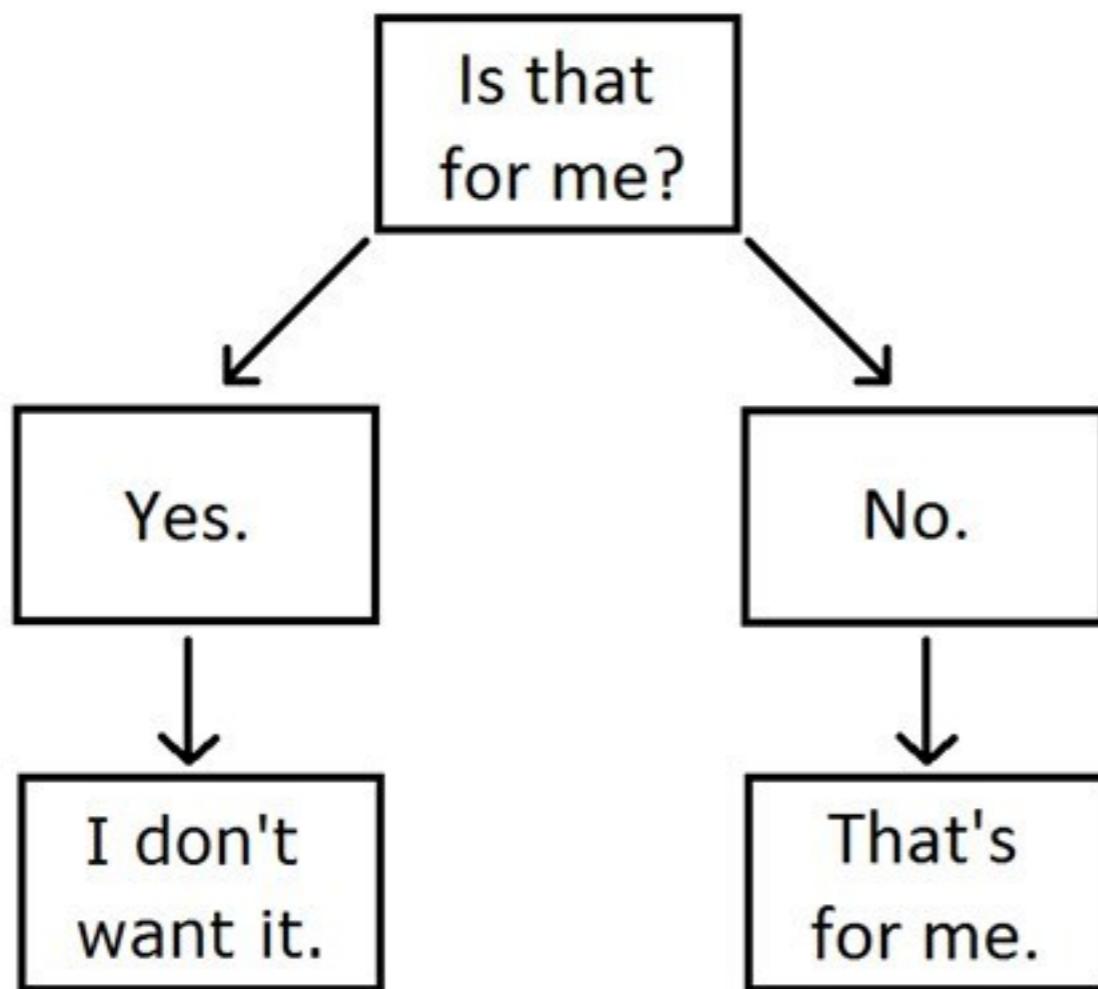
Linear Regression



Decision Tree



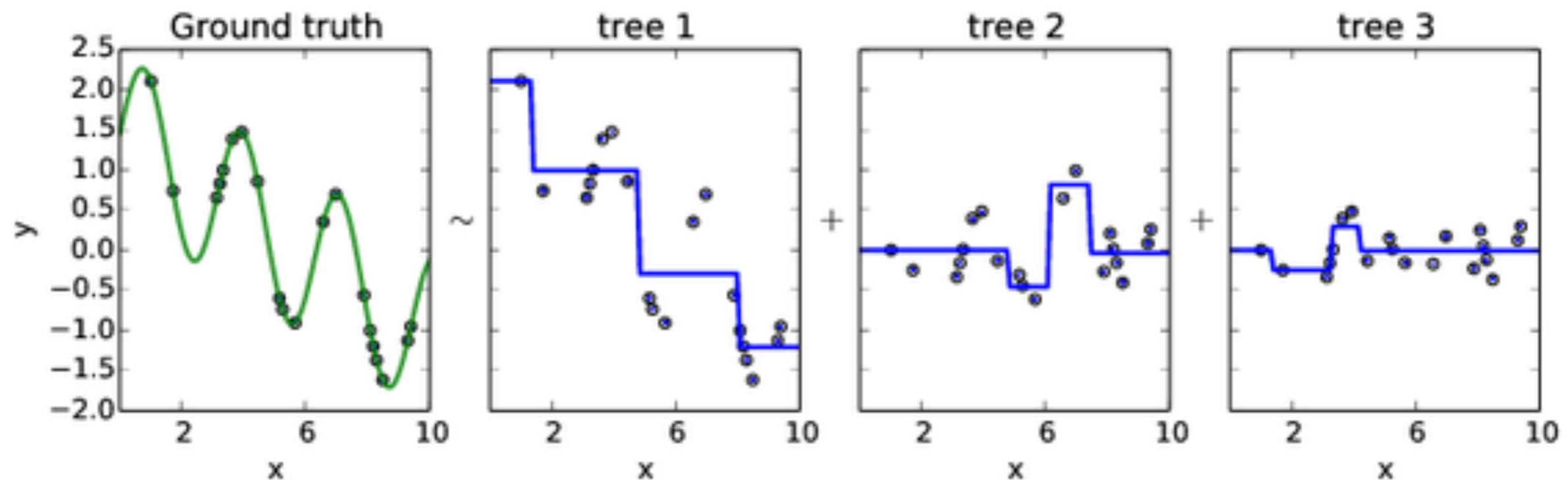
My Cat's Decision-Making Tree.



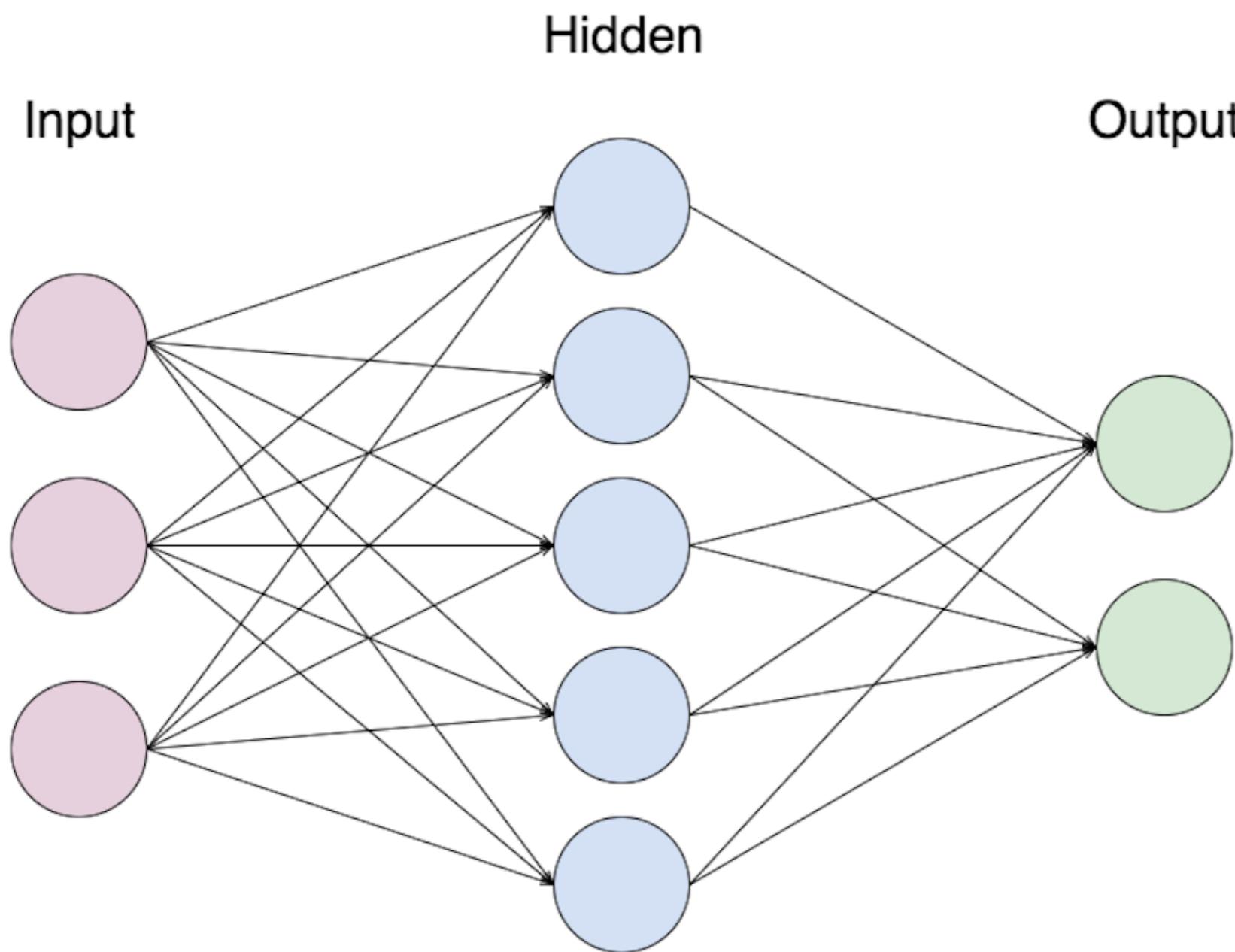
Random forest



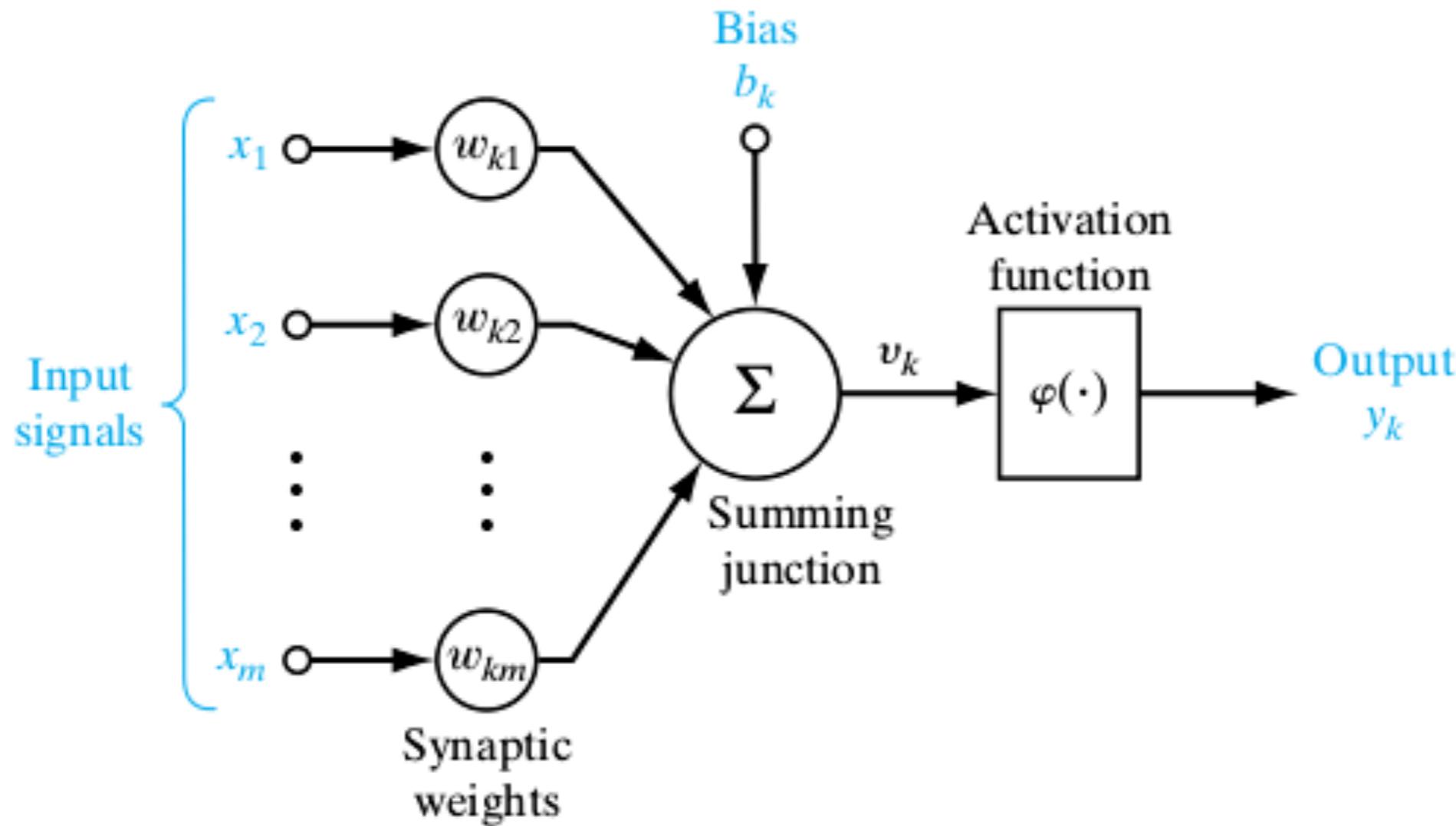
Gradient boosting



Neural Network



Neuron

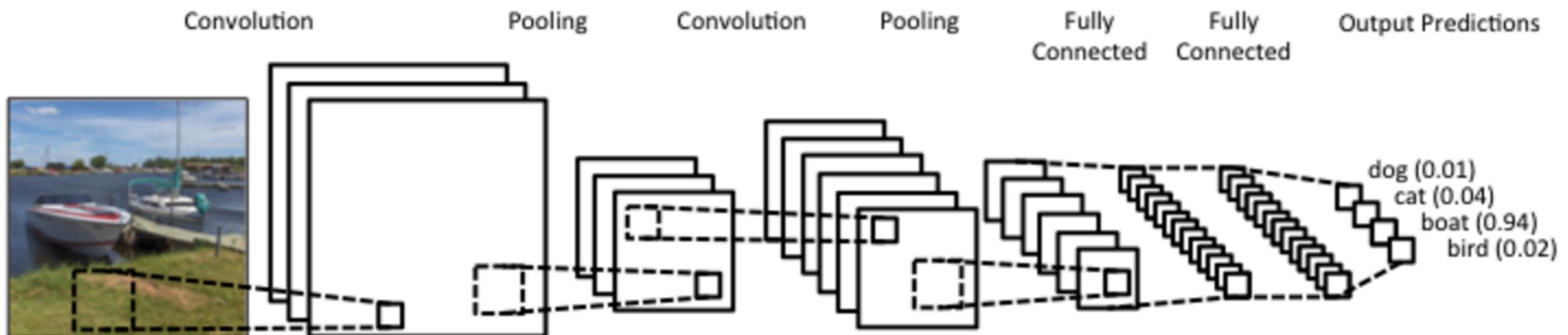


MNIST



3	4	2	1	9	5	6	2	1	8
8	9	1	2	5	0	0	6	6	4
6	7	0	1	6	3	6	3	7	0
3	7	7	9	4	6	6	1	8	2
2	9	3	4	3	9	8	7	2	5
1	5	9	8	3	6	5	7	2	3
9	3	1	9	1	5	8	0	8	4
5	6	2	6	8	5	8	8	9	9
3	7	7	0	9	4	8	5	4	3
7	9	6	4	7	0	6	9	2	3

Convolutional Neural Network



Convolution



kernel

1	0	1
0	1	0
1	0	1

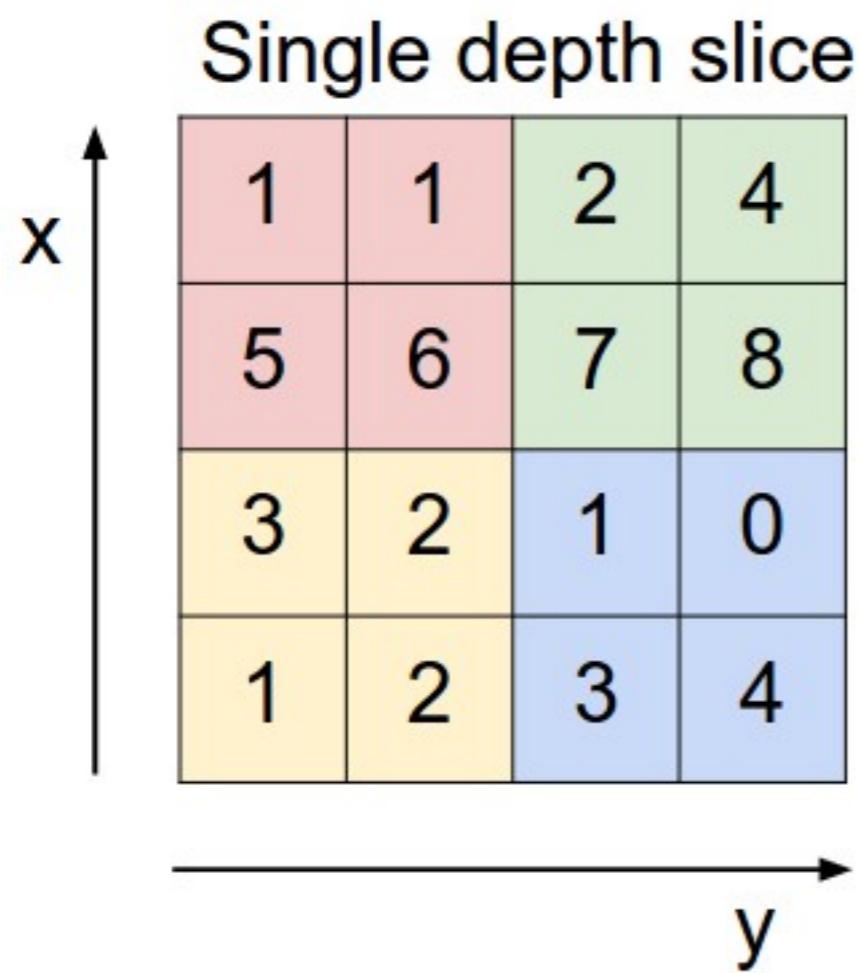
1 x1	1 x0	1 x1	0	0
0 x0	1 x1	1 x0	1	0
0 x1	0 x0	1 x1	1	1
0	0	1	1	0
0	1	1	0	0

Image

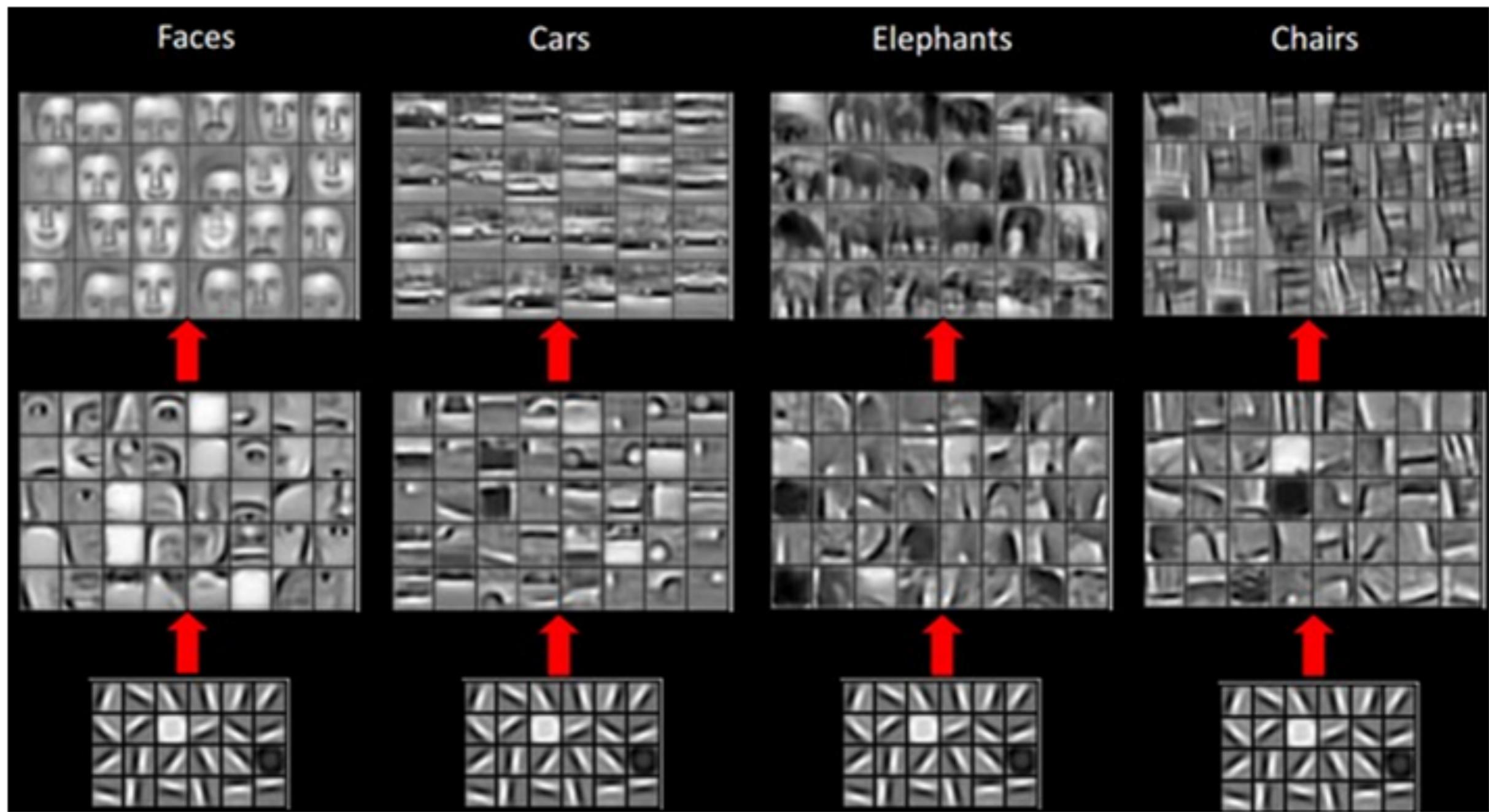
4		

Convolved
Feature

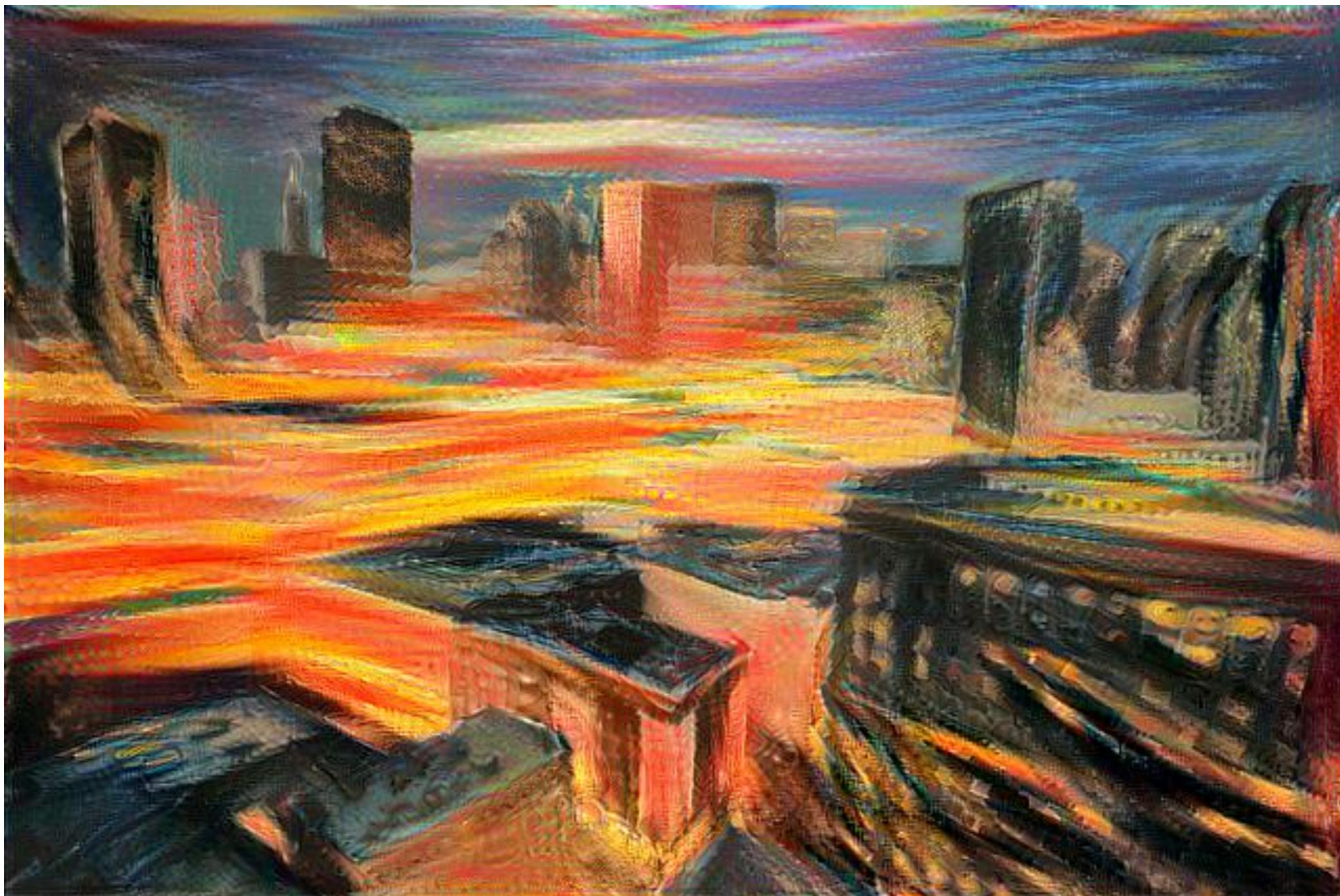
Pooling



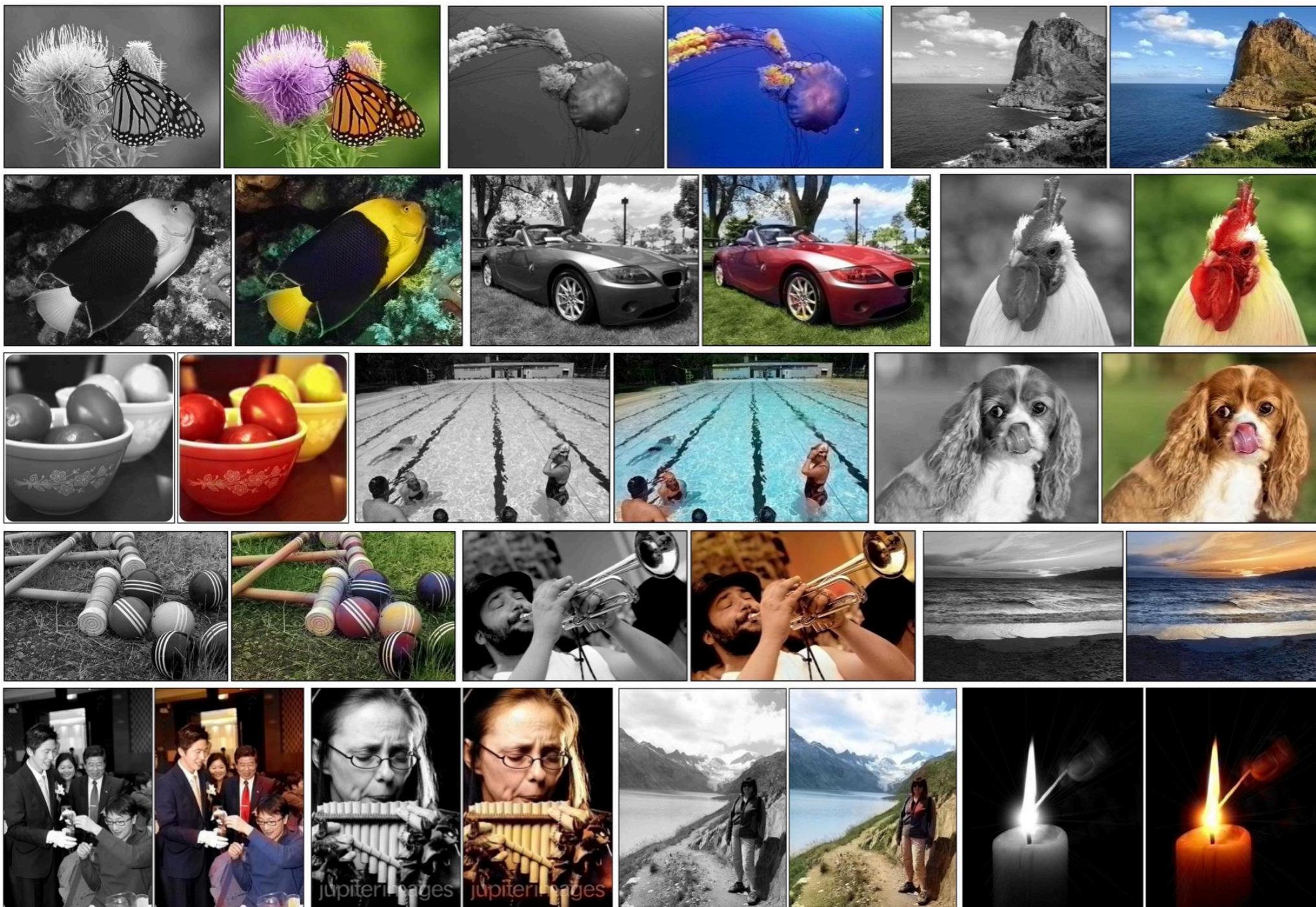
Layers



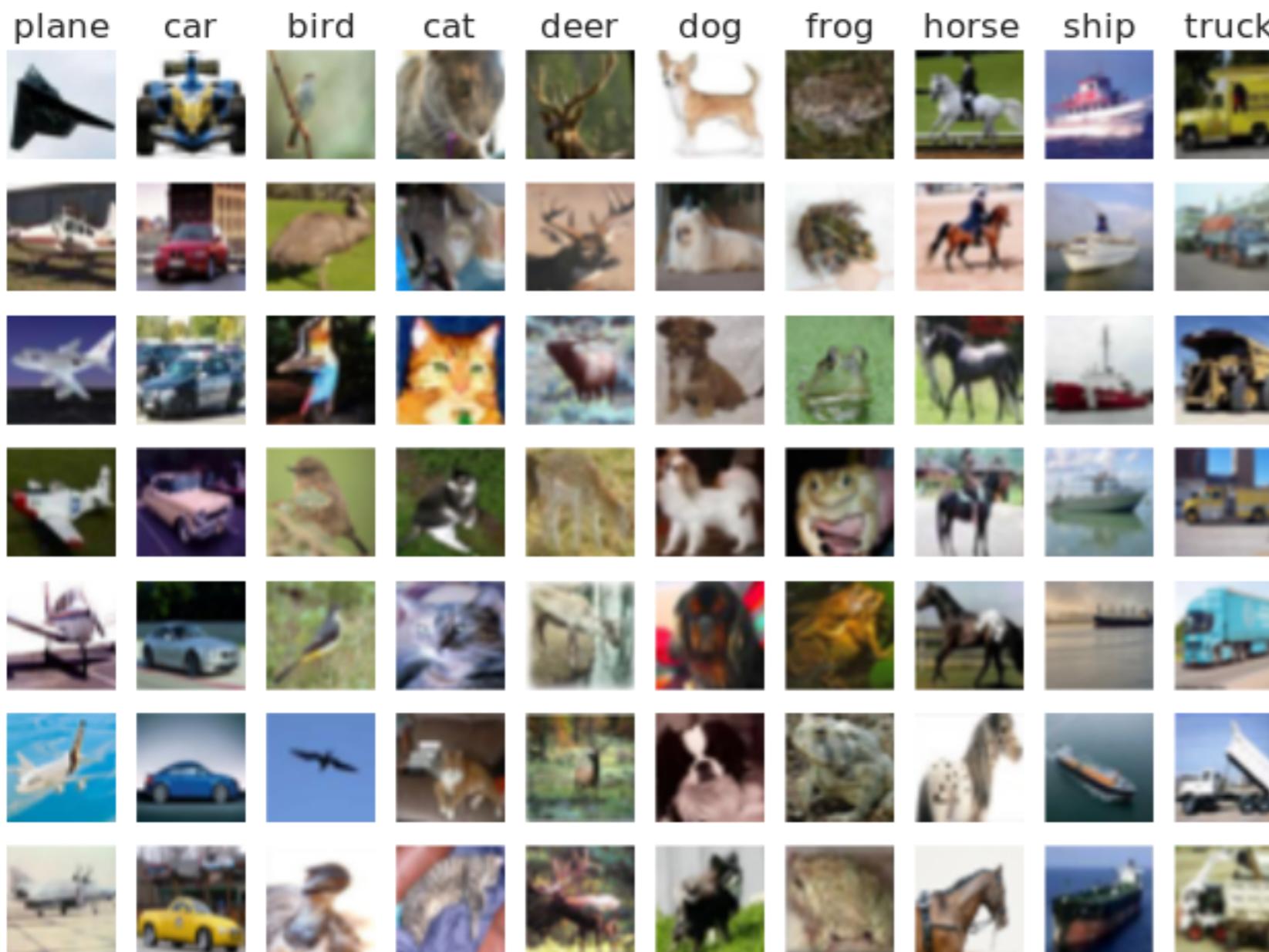
Style transfer



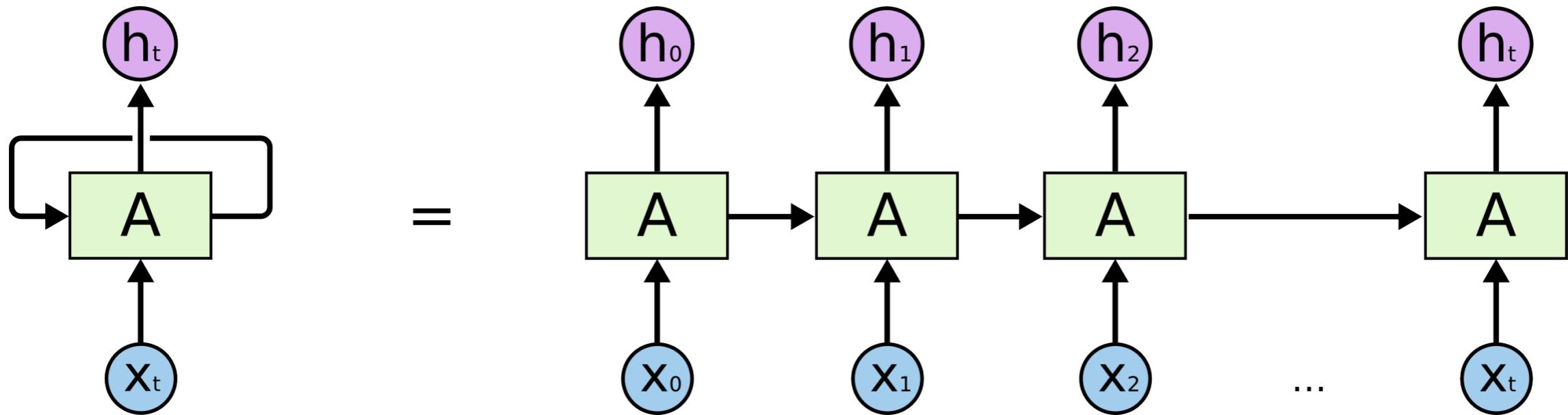
Colorization



CIFAR 10



Recurrent Neural Network

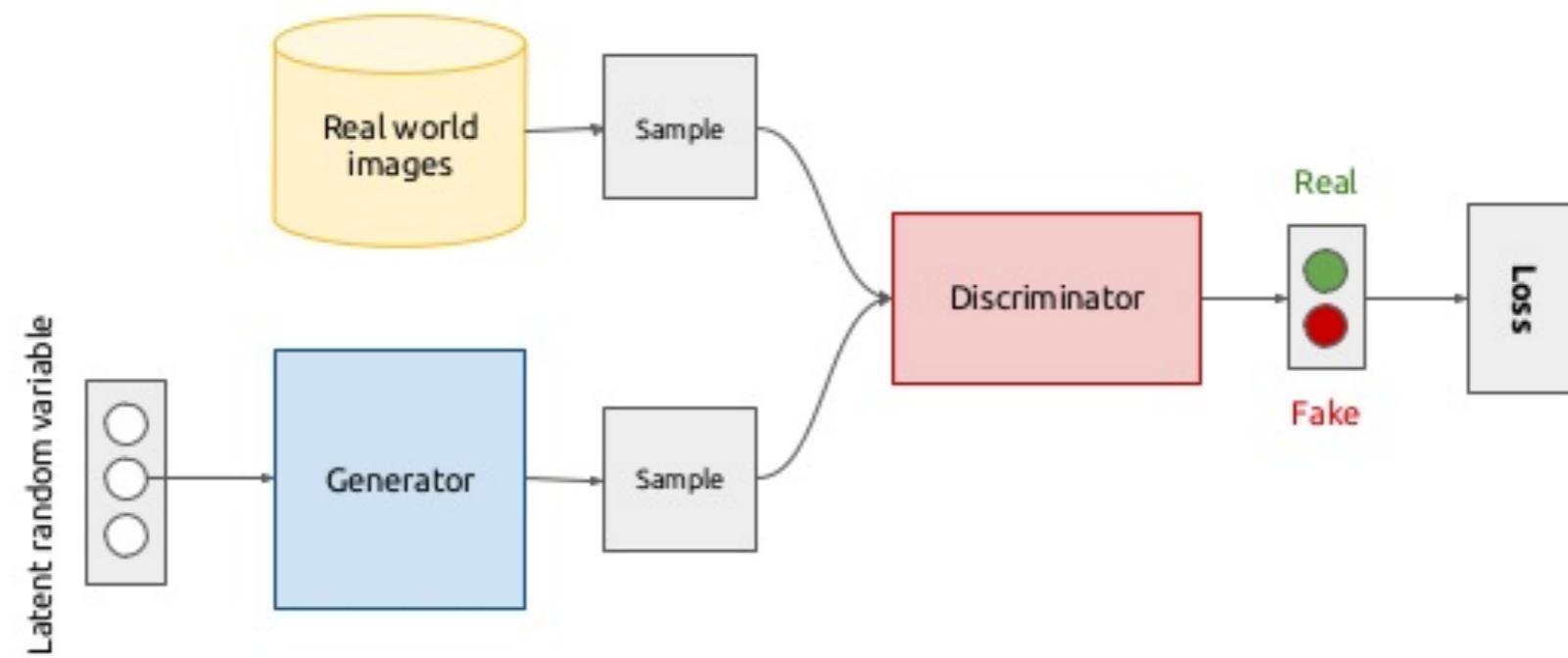


WaveNet: A Generative Model for Raw Audio

Generative Adversarial Network



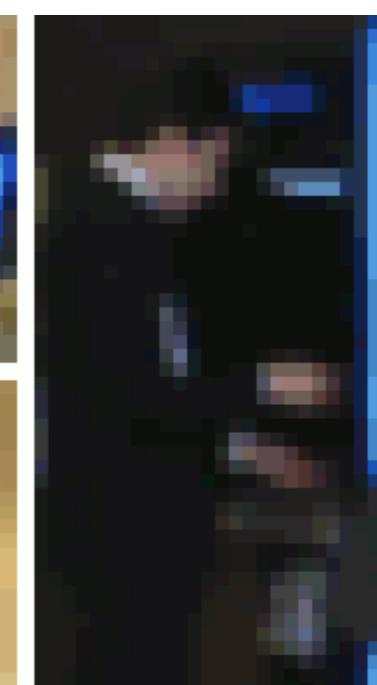
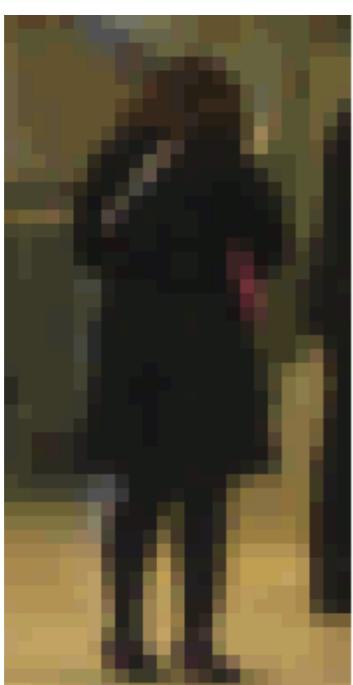
Generative adversarial networks (conceptual)



Generative Adversarial Network



Super Resolution



Что читать?



- Murphy — ML: A Probabilistic Perspective
- Smola — Introduction to ML
- Barber — Bayesian Reasoning and ML
- Goodfellow, Bengio, Courville — Deep Learning Book

Что смотреть?



- Coursera / edX / Udacity
- Stepik / CSC / ШАД
- ML — Andrew Ng, ...
- NN, CNN — Hinton, CS231N
- RL — David Silver (Youtube), Udacity



Оставляйте обратную
связь!

That's all Folks!