



# Применение Python, машинное обучение

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Отмечайтесь на лекции!

# Сегодня

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

# Проекты

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

# Машинное обучение

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

# Машинное обучение

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- Supervised learning
- Unsupervised learning
- Reinforcement learning

# Reinforcement learning

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DeepMind — Reinforcement Learning  
with Unsupervised Auxiliary Tasks



# Reinforcement learning

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OpenAI Gym: CartPole



# Машинное обучение

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

# Pandas

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# Обучение модели

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

# Методы

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

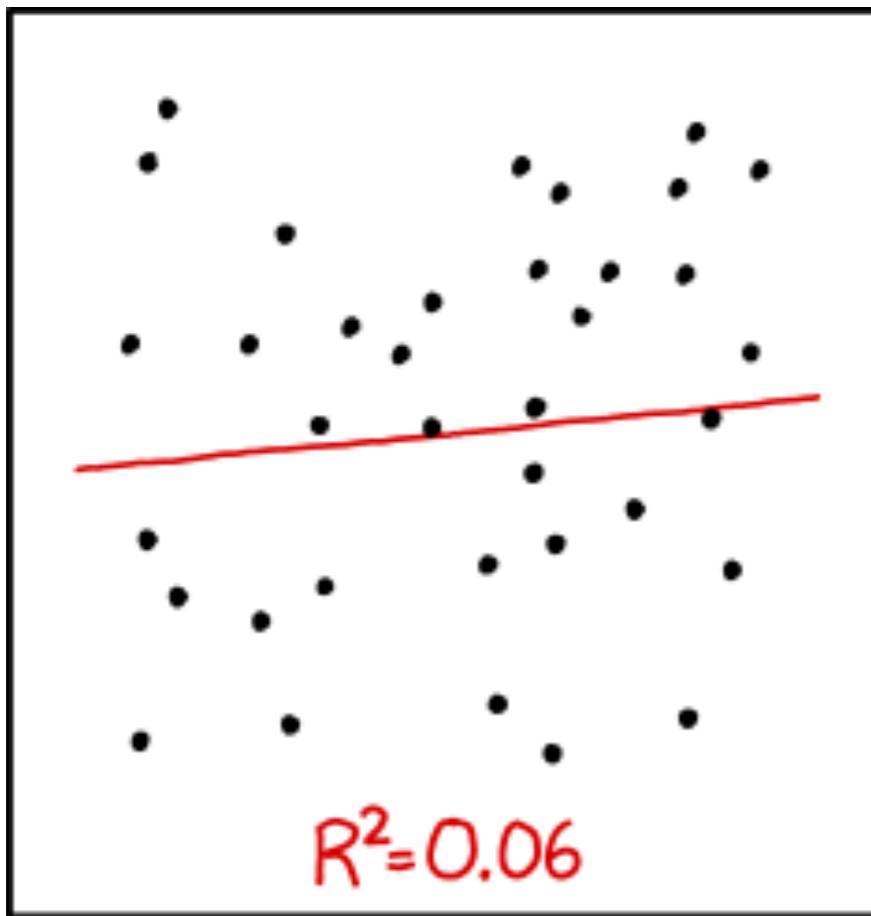
# Библиотеки

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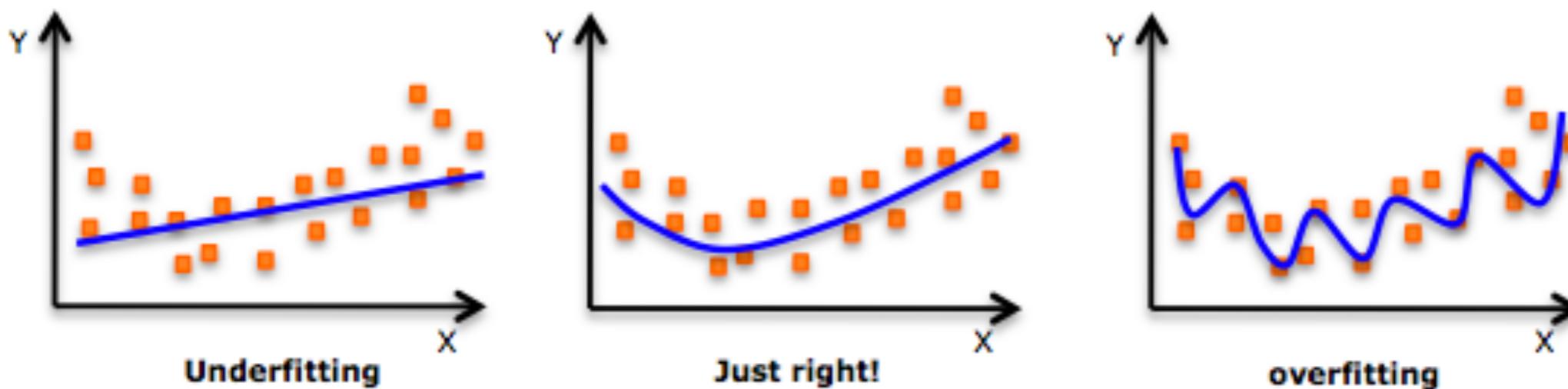
- scikit-learn
- xgboost
- tensorflow
- keras

# 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

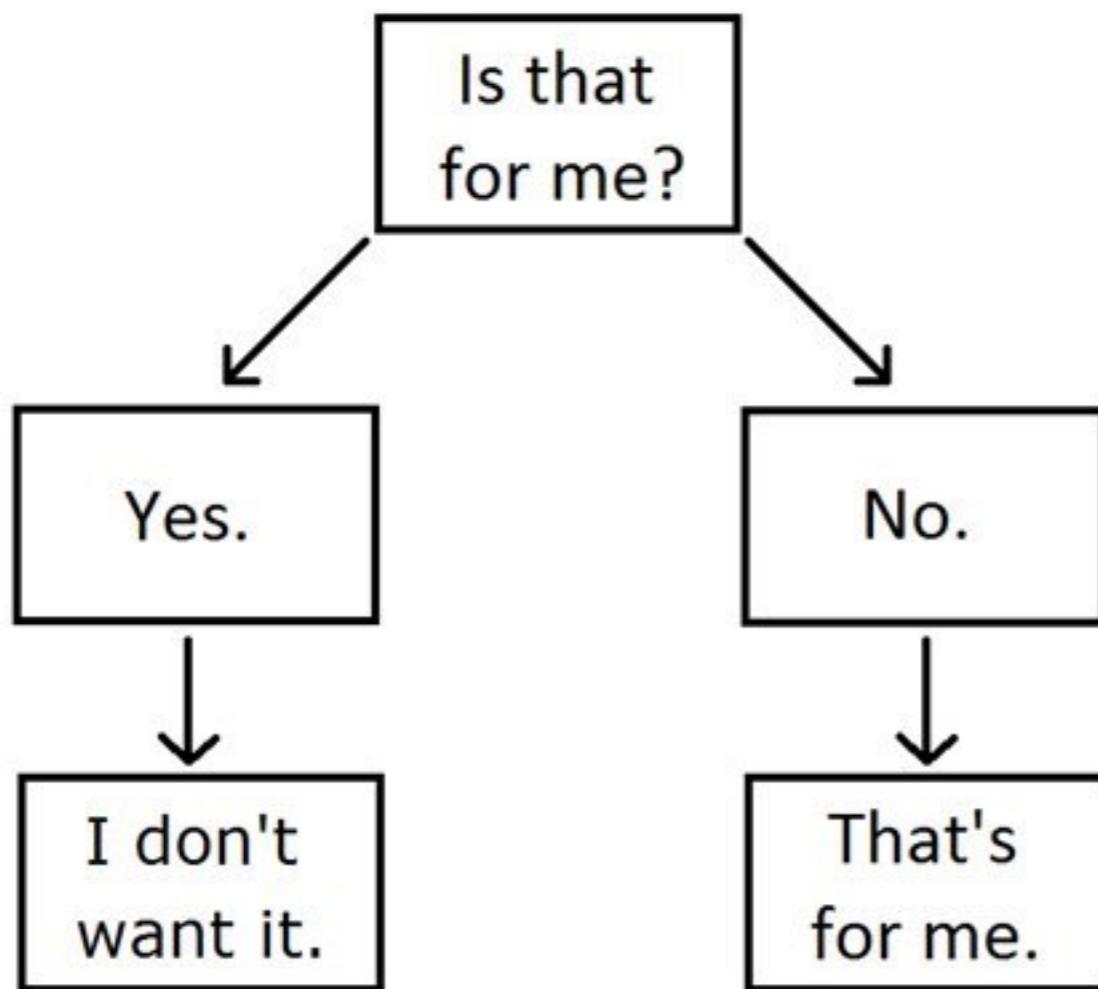


# Decision Tree

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My Cat's Decision-Making Tree.

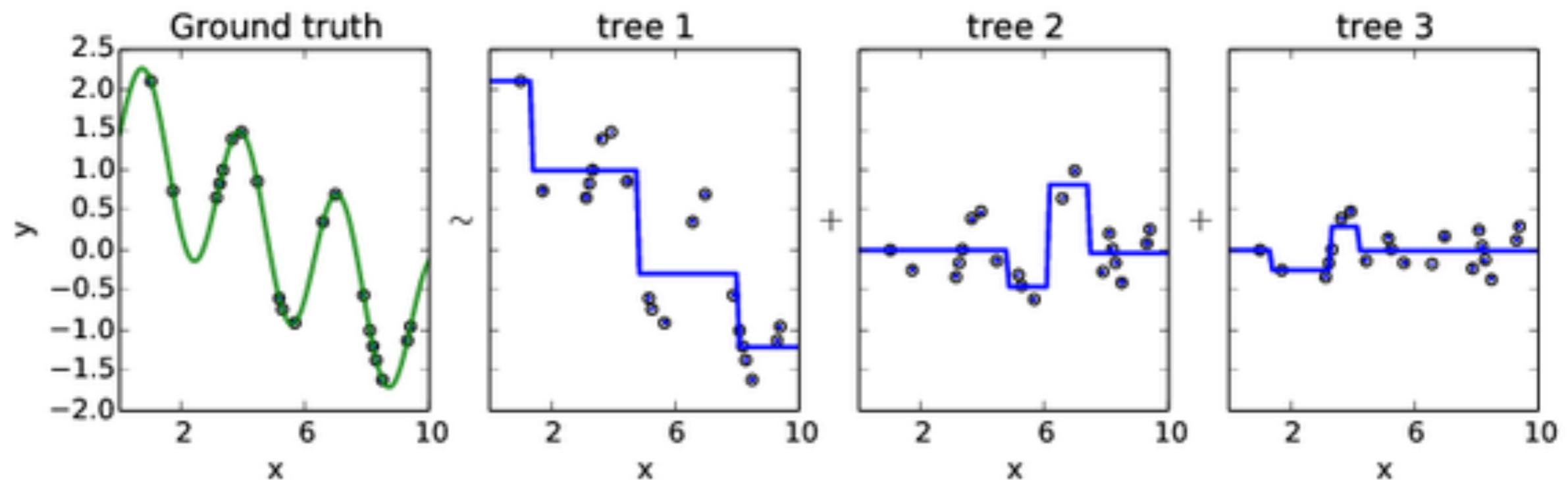


# Random forest

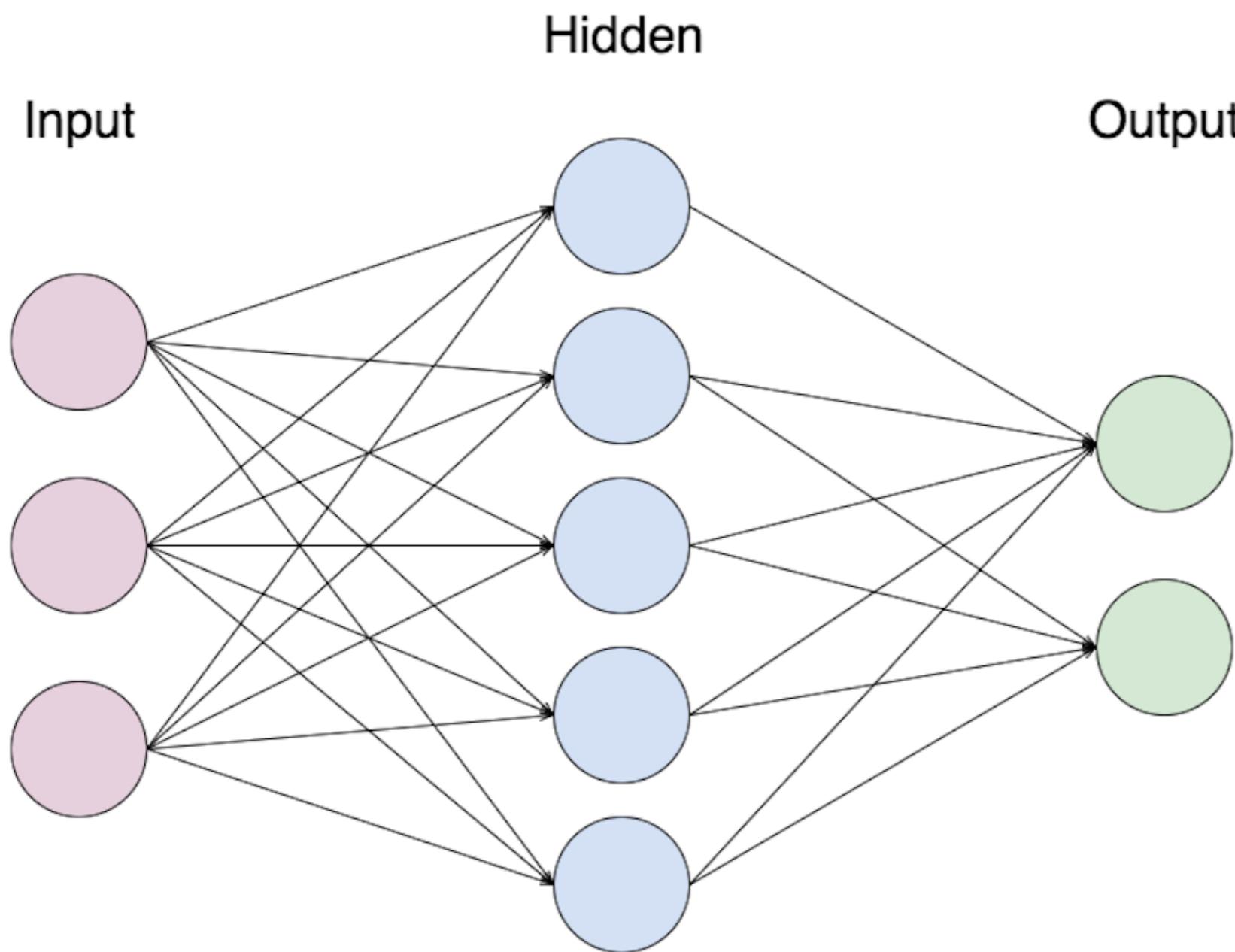
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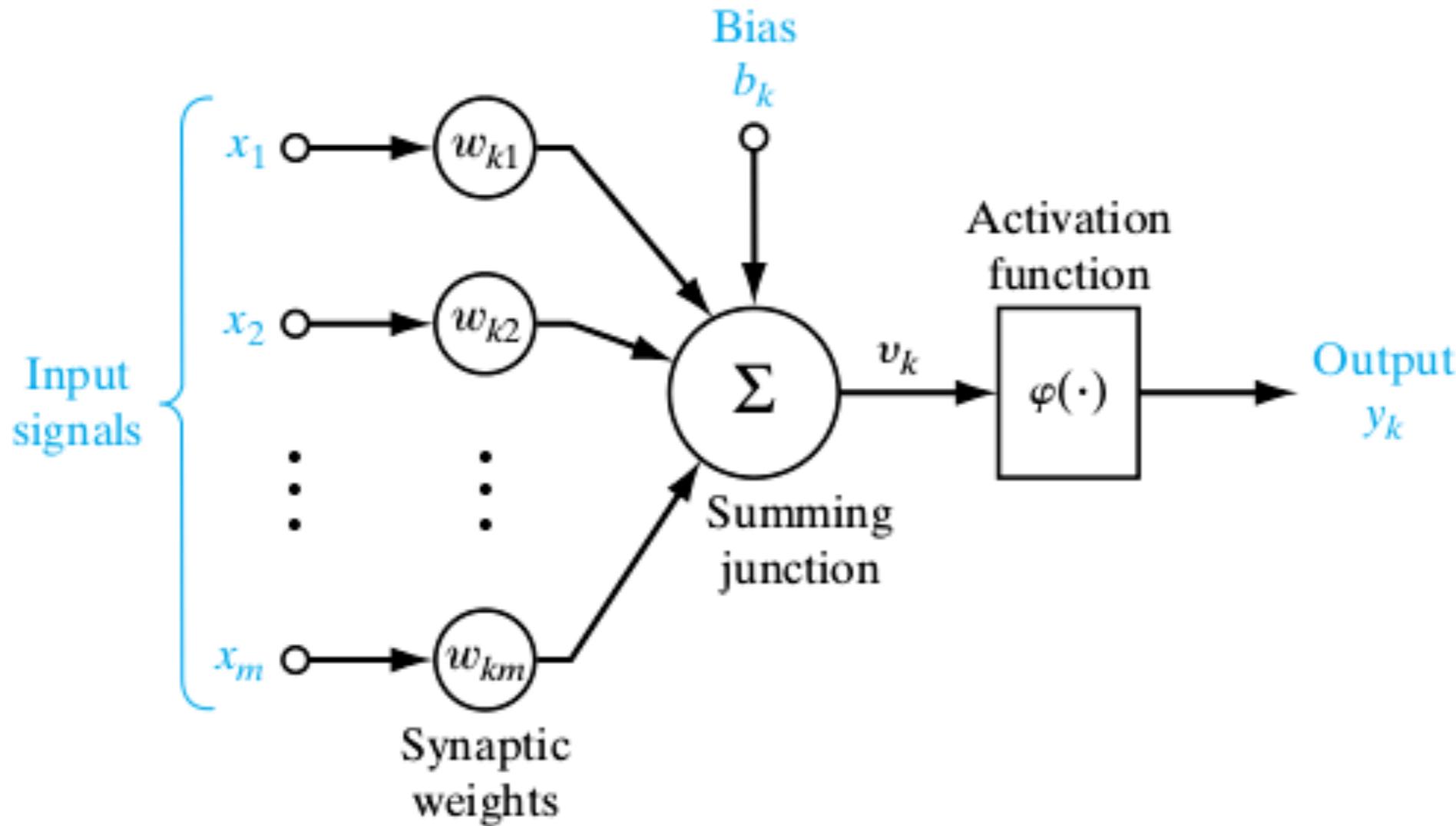
# Gradient boosting



# Neural Network



# Neuron



# MNIST

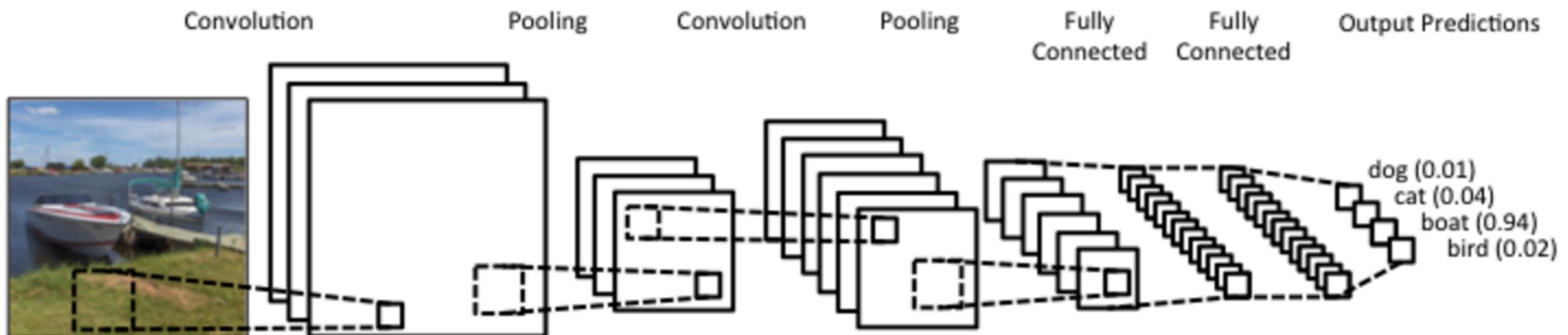
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3	4	2	1	9	5	6	2	1	8
8	9	1	2	5	0	0	6	6	4
6	7	0	1	6	3	6	3	7	0
3	7	7	9	4	6	6	1	8	2
2	9	3	4	3	9	8	7	2	5
1	5	9	8	3	6	5	7	2	3
9	3	1	9	1	5	8	0	8	4
5	6	2	6	8	5	8	8	9	9
3	7	7	0	9	4	8	5	4	3
7	9	6	4	7	0	6	9	2	3

# Convolutional Neural Network

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# Convolution



kernel

1	0	1
0	1	0
1	0	1

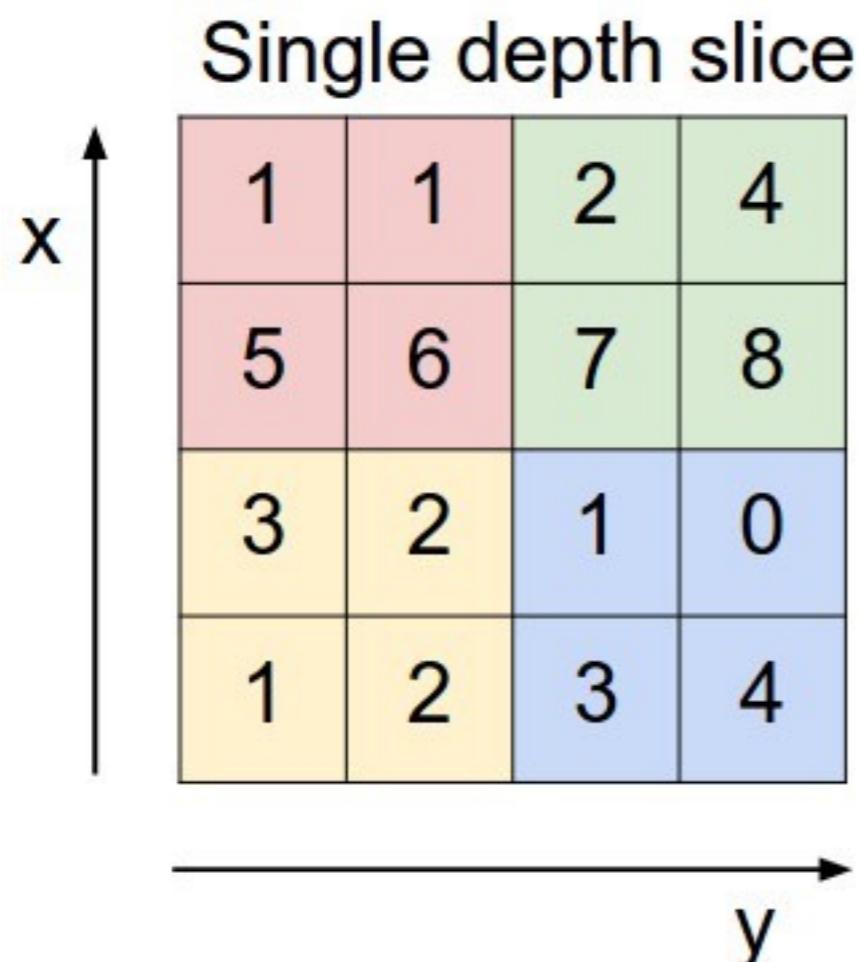
1 <small>×1</small>	1 <small>×0</small>	1 <small>×1</small>	0	0
0 <small>×0</small>	1 <small>×1</small>	1 <small>×0</small>	1	0
0 <small>×1</small>	0 <small>×0</small>	1 <small>×1</small>	1	1
0	0	1	1	0
0	1	1	0	0

Image

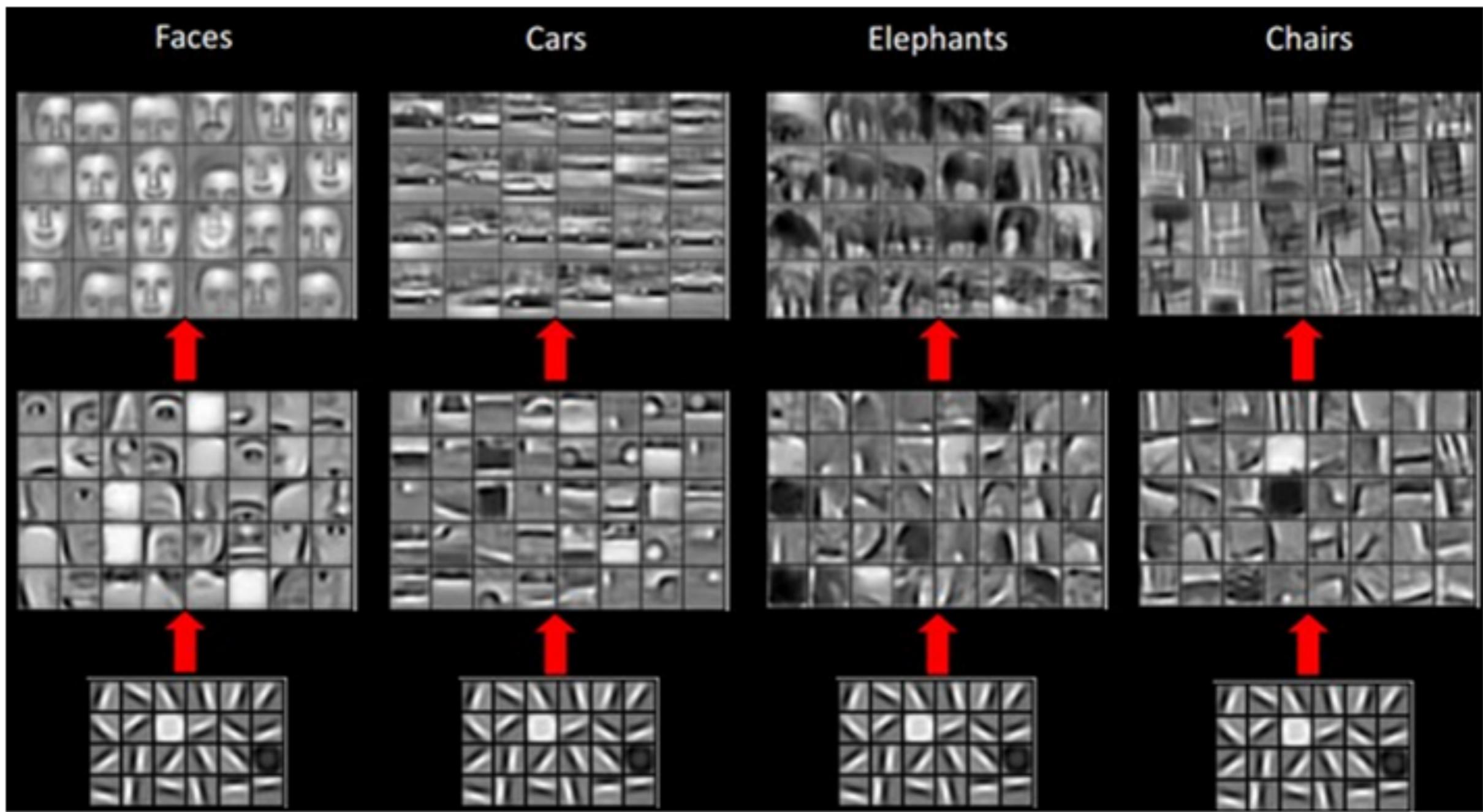
4		

Convolved  
Feature

# Pooling



# Layers

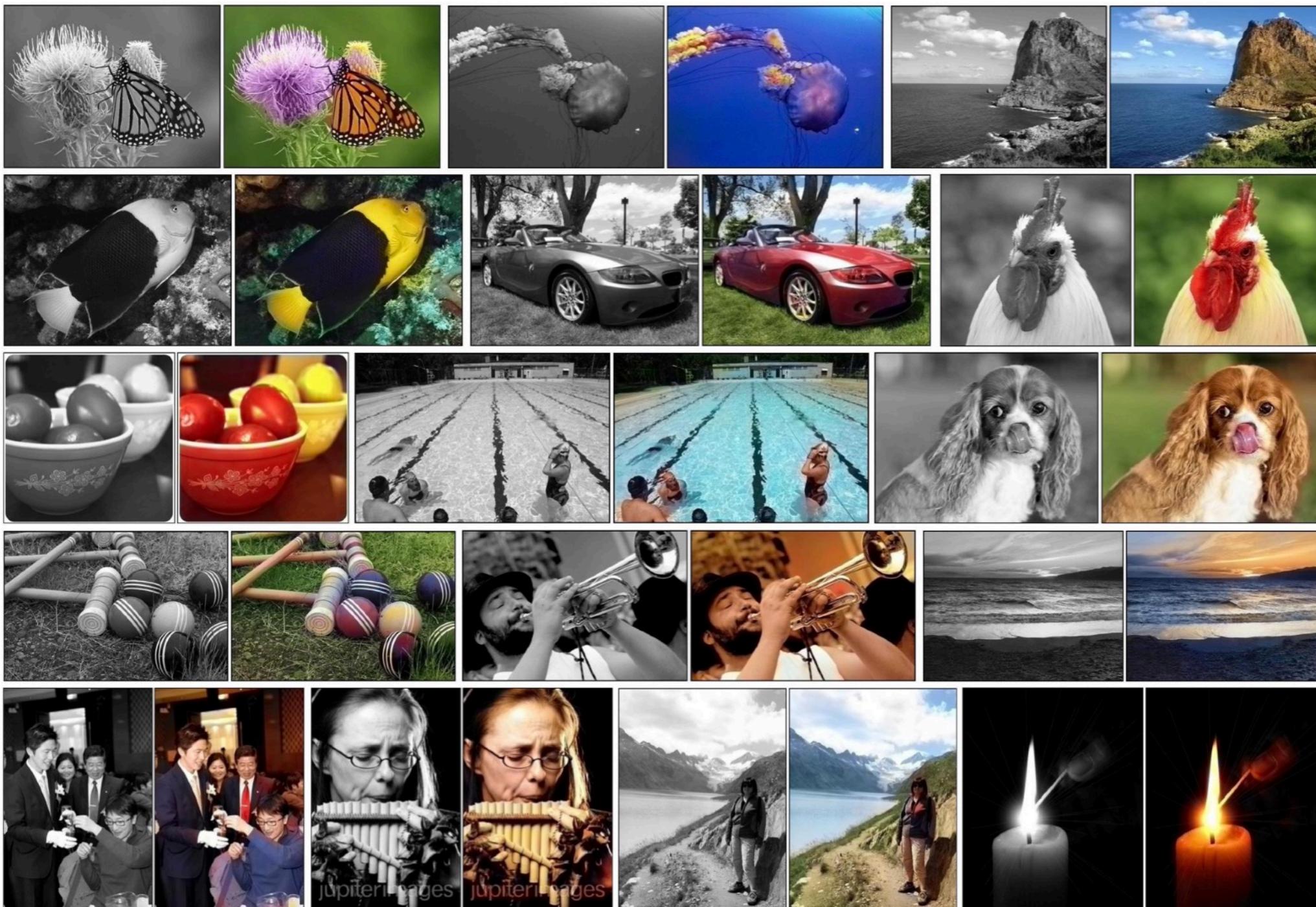


# Style transfer

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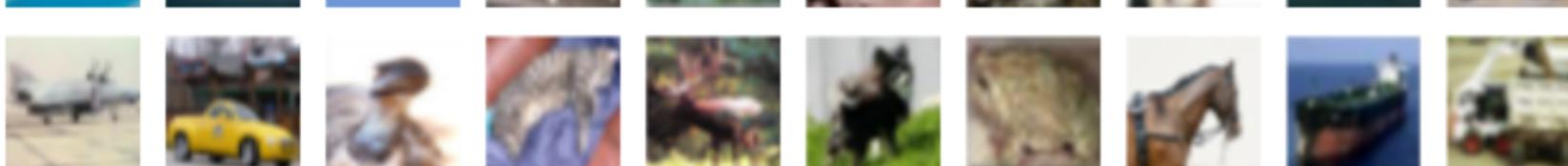
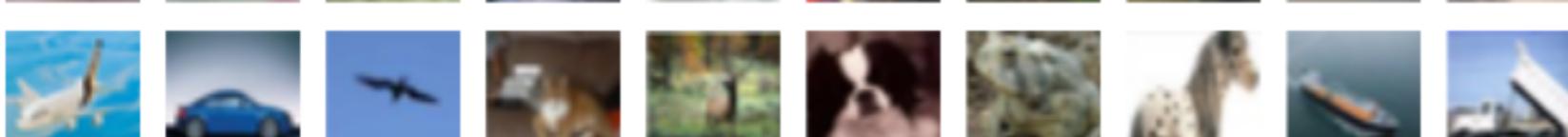
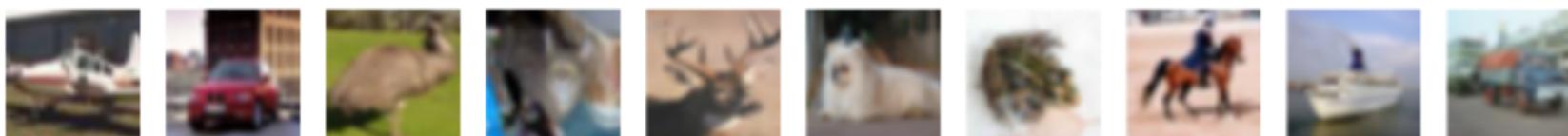
# Colorization



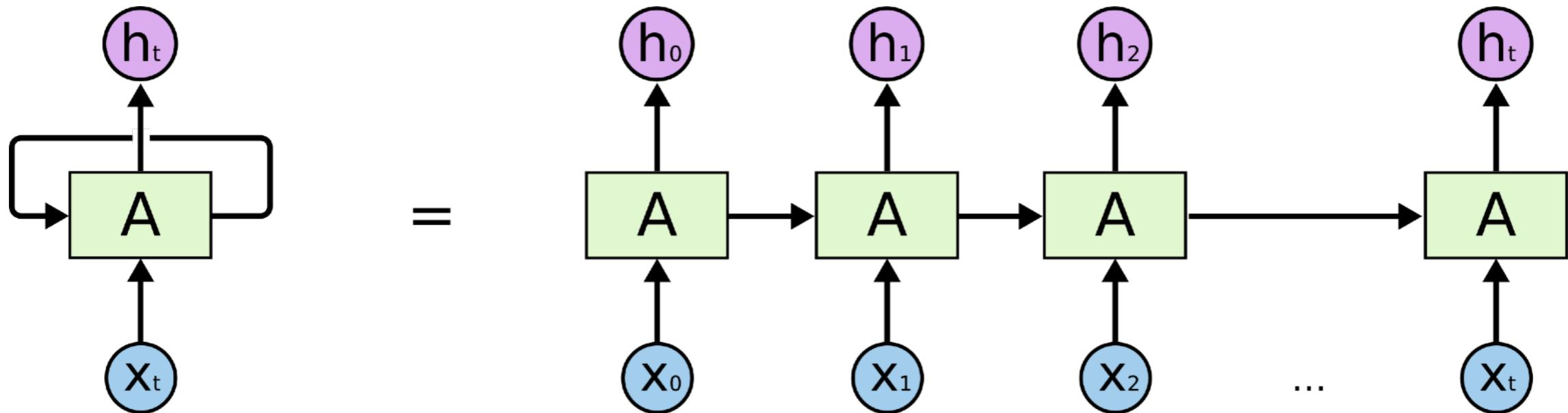
# CIFAR 10



plane car bird cat deer dog frog horse ship truck



# Recurrent Neural Network

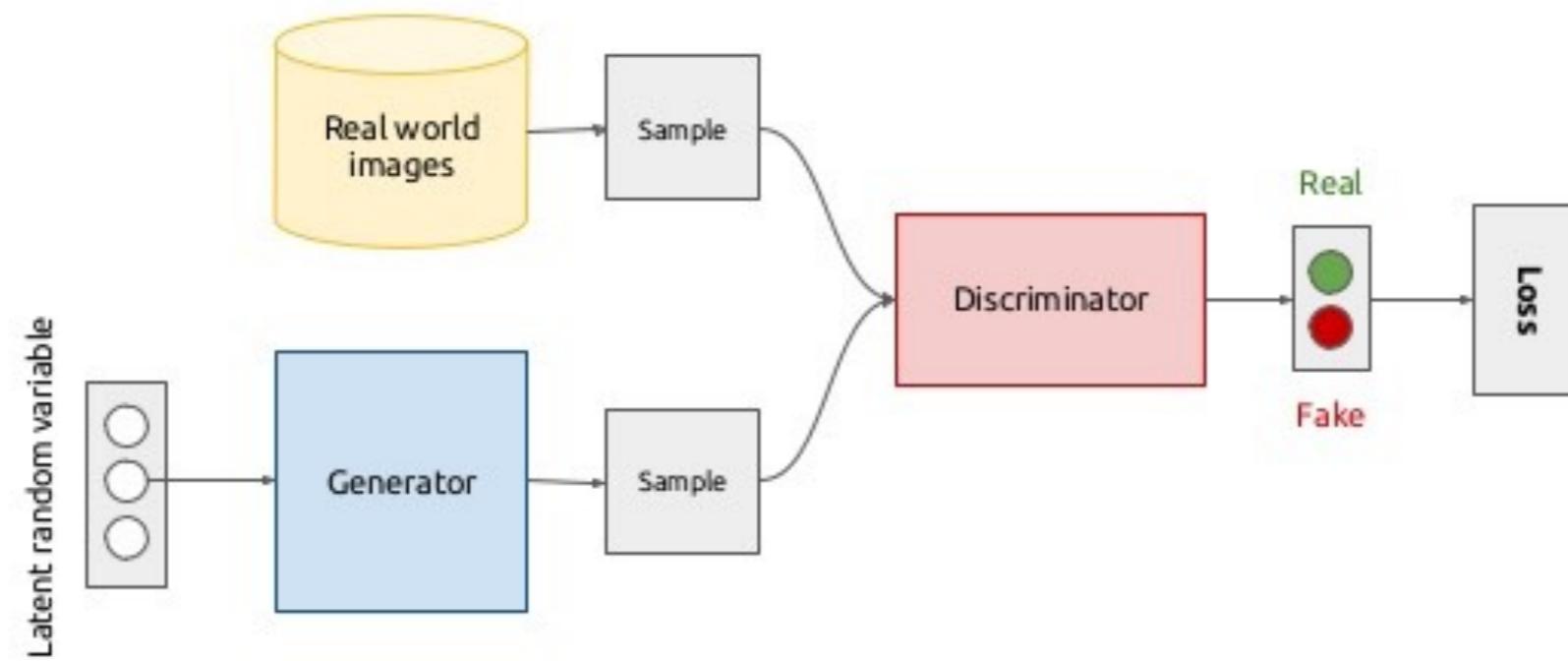


WaveNet: A Generative Model for Raw Audio

# Generative Adversarial Network



Generative adversarial networks (conceptual)



# Generative Adversarial Network

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# Super Resolution



# Что читать?

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

# Что смотреть?

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- 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!*