Introduction to Machine Learning

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Outline

Overview of basic principles of machine learning

- Three components to any ML problem: the **task**, the **performance measure** and the **data**
- Essential definitions
  - **Features**
  - **Model**
  - **Parameters**
  - **Loss**
- Two (broad) kinds of tasks
  - **Supervised learning**: data is labeled/annotated
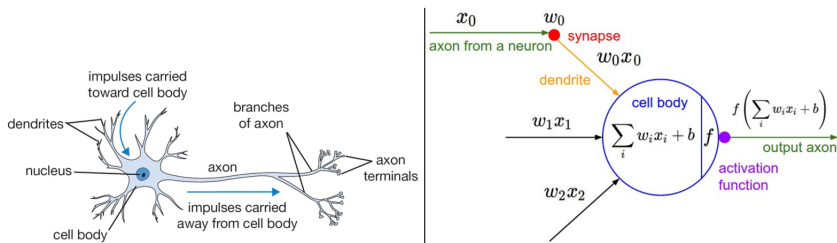 - **Unsupervised learning**: data is unlabeled

Example: Linear Regression

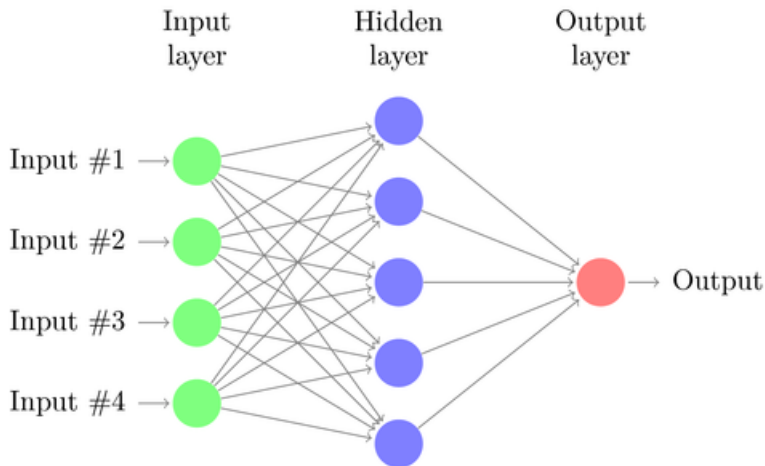- Can we **predict** y given x, using the model $\hat{\mathbf{y}} = m\mathbf{x} + \mathbf{b}$?
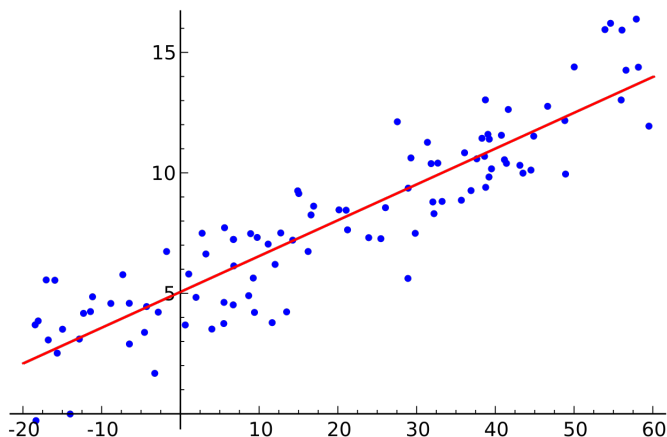
Introduction to Neural Networks

- Neurons are the building blocks of neural networks
- Each neuron is a **function**: $y = f(\mathbf{w}^T\mathbf{x} + \mathbf{b})$
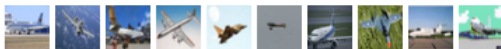

- Note: **neural networks $\neq$ neuroscience!!!!!**

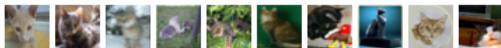# Neural Networks are Layers of Neurons

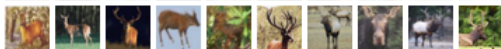# What are Neural Networks Good For?

airplane
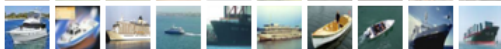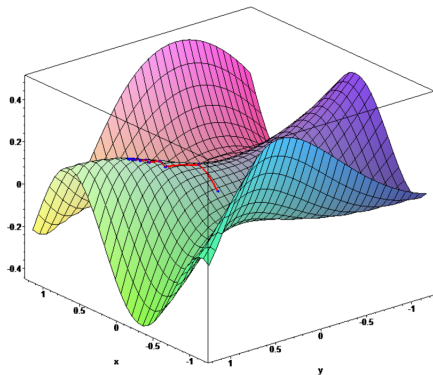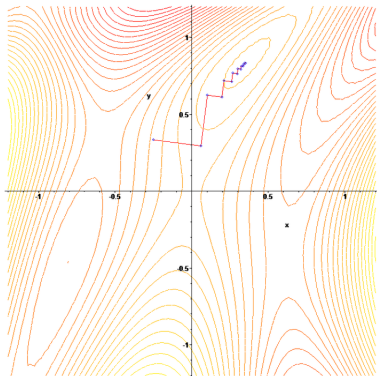automobile
bird
cat
deer
dog
frog
horse
ship
truck

Training Neural Networks: Gradient Descent

- Time to **build something**!
- Goals:
    - Give you a basic framework for thinking about what machine learning is and isn't
    - Have a project done or almost done at the end of the workshop
    - Get you set up to continue to tinker and play with machine learning models

Thanks!
Resources and references: yixinlin.net/intro-ml