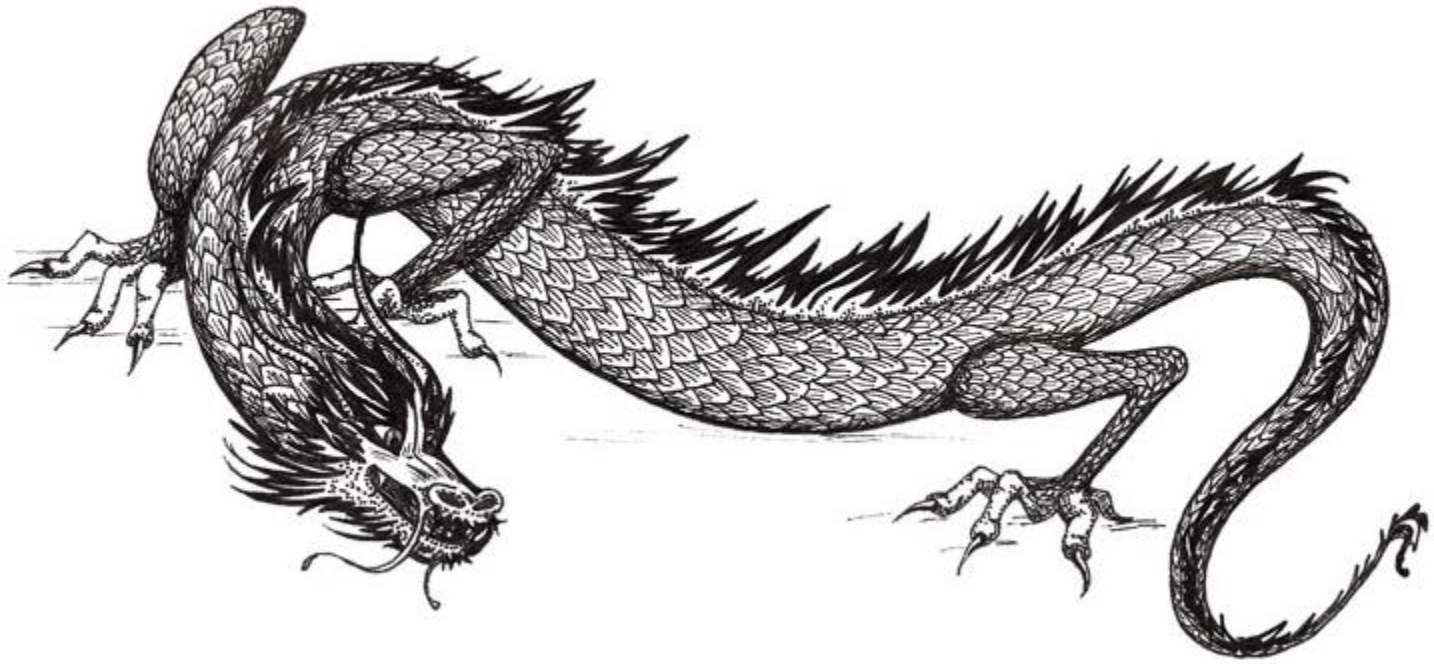


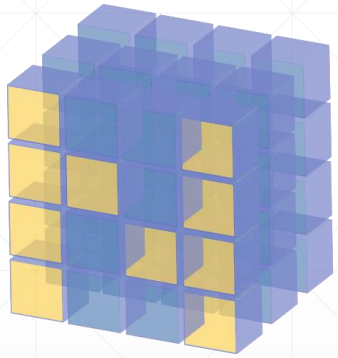
回归问题实战

主讲人：龙良曲

Find w', b'

- $loss = \sum_i (w * x_i + b - y_i)^2$

- $w' = w - lr * \frac{\partial loss}{\partial w}$
- $b' = b - lr * \frac{\partial loss}{\partial b}$
- $w' * x + b' \rightarrow y$



NumPy

Step1. Compute Loss

- $loss = \sum_i (w * x_i + b - y_i)^2$

- $w' = w - lr * \frac{\partial loss}{\partial w}$
- $b' = b - lr * \frac{\partial loss}{\partial b}$
- $w' * x + b' \rightarrow y$

Step1. Compute Loss

```python
# y = wx + b
def compute_error_for_line_given_points(b, w, points):
    totalError = 0
    for i in range(0, len(points)):
        x = points[i, 0]
        y = points[i, 1]
        # computer mean-squared-error
        totalError += (y - (w * x + b)) ** 2
    # average loss for each point
    return totalError / float(len(points))
```

Step2.Compute Gradient and update

- $loss = \sum_i (w * x_i + b - y_i)^2$

- $w' = w - lr * \frac{\partial loss}{\partial w}$
- $b' = b - lr * \frac{\partial loss}{\partial b}$

Step2.Compute Gradient and update

```
def step_gradient(b_current, w_current, points, learningRate):
    b_gradient = 0
    w_gradient = 0
    N = float(len(points))
    for i in range(0, len(points)):
        x = points[i, 0]
        y = points[i, 1]
        # grad_b = 2(wx+b-y)
        b_gradient += (2/N) * ((w_current * x + b_current) - y)
        # grad_w = 2(wx+b-y)*x
        w_gradient += (2/N) * x * ((w_current * x + b_current) -
y)  # update w'
    new_b = b_current - (learningRate * b_gradient)
    new_w = w_current - (learningRate * w_gradient)
    return [new_b, new_w]
```

Step3.Set w=w’ and loop

- $loss = \sum_i (w * x_i + b - y_i)^2$

- $w' = w - lr * \frac{\partial loss}{\partial w}$
- $b' = b - lr * \frac{\partial loss}{\partial b}$

- w ← w′
- b ← b′

Step3.Set w=w’ and loop

```
def gradient_descent_runner(points, starting_b, starting_w, learning_rate, num_iterations):
    b = starting_b
    w = starting_w
    # update for several times
    for i in range(num_iterations):
        b, w = step_gradient(b, w, np.array(points), learning_rate)
    return [b, w]
```


JUST
DO
IT.

下一课时

Discrete Problem Prediction

Thank You.