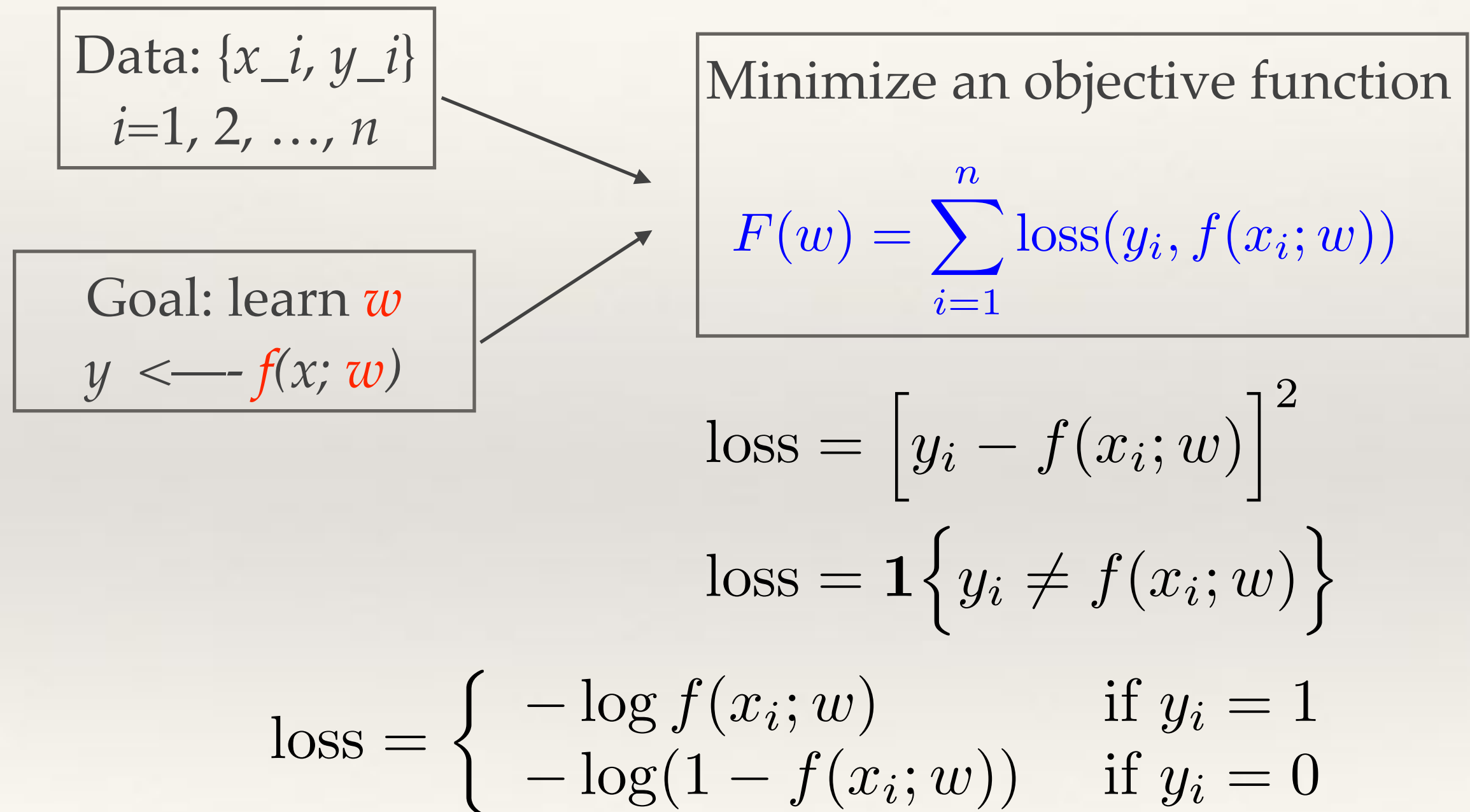
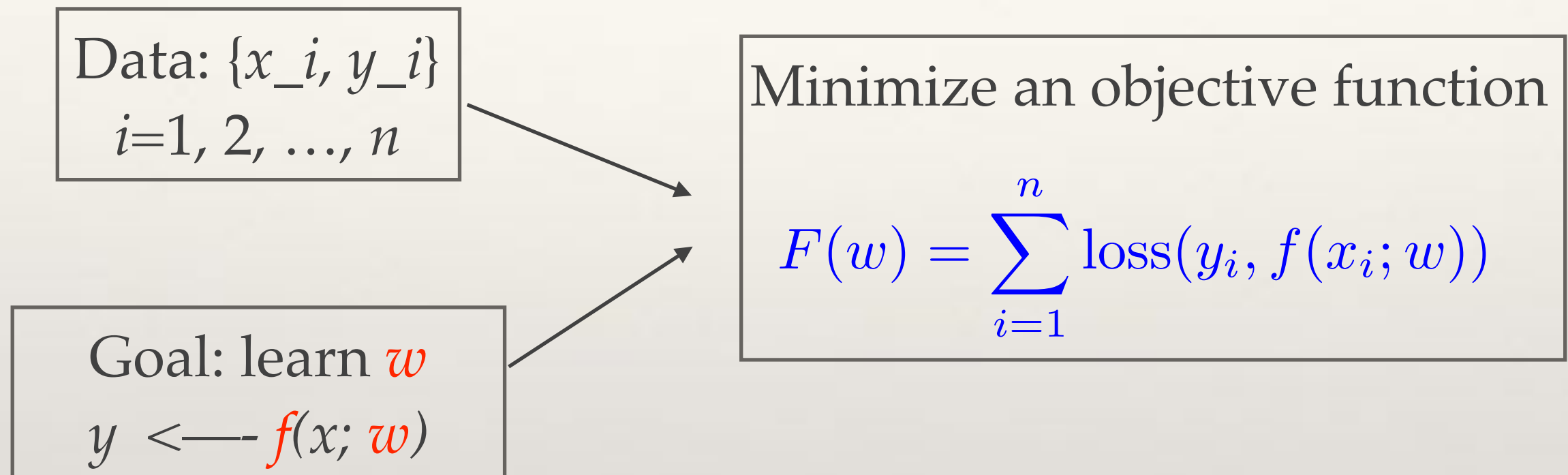


How does Supervised Learning Work?



How does Supervised Learning Work?



1. The minimizer w^* may be in closed form.
2. Try optimization algorithms that can guarantee to converge to the global minimizer.
3. In the worst case, try *gradient descent*.

Overview

- ❖ Types of statistical learning problems
- ❖ Why learning is difficult?
- ❖ Bias variance tradeoff
- ❖ An example: kNN *vs* Linear Regression (in a separate pdf file)
- ❖ Not all about prediction

Challenges

- ❖ Training error underestimates test / generalization error.
- ❖ **Overfitting**: perform well on the training data but not on the future (unseen) data.
- ❖ p denotes the number of parameters the regression / classification function f has, i.e., the number of parameters we need to learn from the data.
- ❖ The gap between the two errors (training *vs.* test) gets large when p is large.