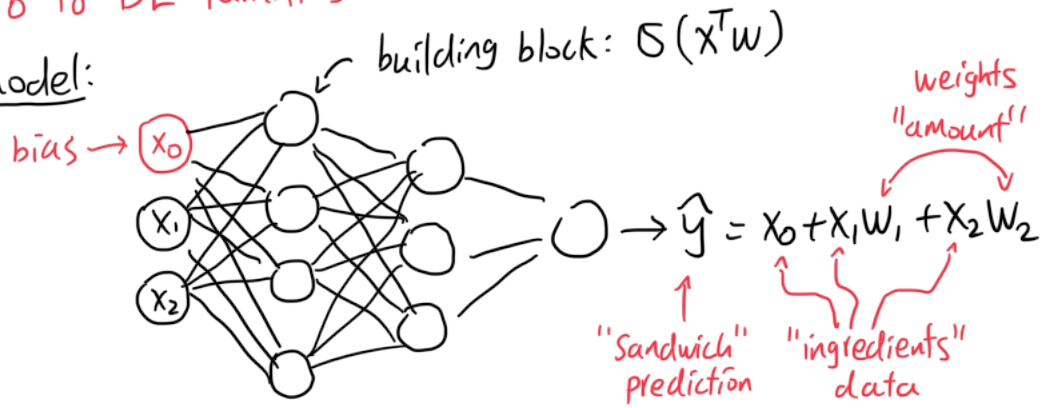
3) Concepts in Deep Learning

Intro to DL families

- Model:



blackbox

in → [Model] → out

↑

ANN, CNN, RNN, ...

- Workflow:

i) Forward Propagation: Make the sandwich →→→

ii) Backward Propagation: Adjust the amount based on negative feedback ←←←

Philosophy of DL

- Universal Approximation Thm: A rich DL model can approximate any function X↦Y
  - Let model figure out the complexity of theories iteratively, not us
  - Formula: $\sup_{x,\theta} \|f(x) - g_\theta(x)\| < \varepsilon$ (x: input, θ: metaparam, g: model, f: function)
- Artificial Neuron is NOT Biological Neuron

Experimental DL Research

- Builds intuition about how DL models work in general
- Parametric Experiment: repeat experiment while systematically tweaking variables
  - IV: variables u tweak (ex. learning rate, batch size, optimizer, loss function, ...)
  - DV: outcome variable to evaluate model performance (ex. accuracy, speed, ...)