

# Chapter 1

## Neural Network Foundations with TF

### 1.1 Multi-layer perceptron: our first example of a network

#### 1.1.1 Two additional activation functions: ELU and Leaky ReLU

Exponential Linear Unit (ELU) is defined as  $f(a, x) = \begin{cases} \alpha(e^x - 1), & \text{if } x \leq 0 \\ x, & \text{if } x > 0 \end{cases}$  for  $\alpha > 0$ .

LeakyReLU is defined as  $f(a, x) = \begin{cases} ax, & \text{if } x \leq 0 \\ x, & \text{if } x > 0 \end{cases}$  for  $\alpha > 0$ .

### 1.2

#### 1.2.1 Further improving the simple net in TensorFlow with dropout

这种改进背后的想法是，随机丢失迫使网络学习有助于更好泛化的冗余模式。

#### 1.2.2 Testing different optimizers in TensorFlow

ReLU 在 0 处不可微。然而，我们可以通过将 0 处的一阶导数定义为 0 或 1，将其扩展到整个域上的函数。

ReLU 的分段导数  $\frac{\partial y}{\partial x} \begin{cases} 0, x \leq 0 \\ 1, x > 0 \end{cases}$