Logistic Regression

weight (y-axis), Age (x-axis)

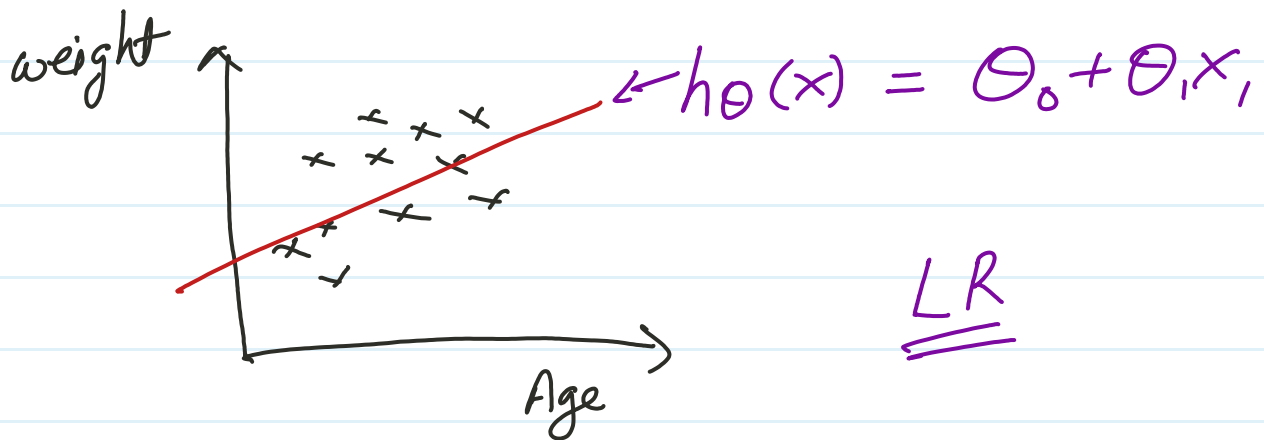$\leftarrow h_\theta(x) = \theta_0 + \theta_1 x_1$
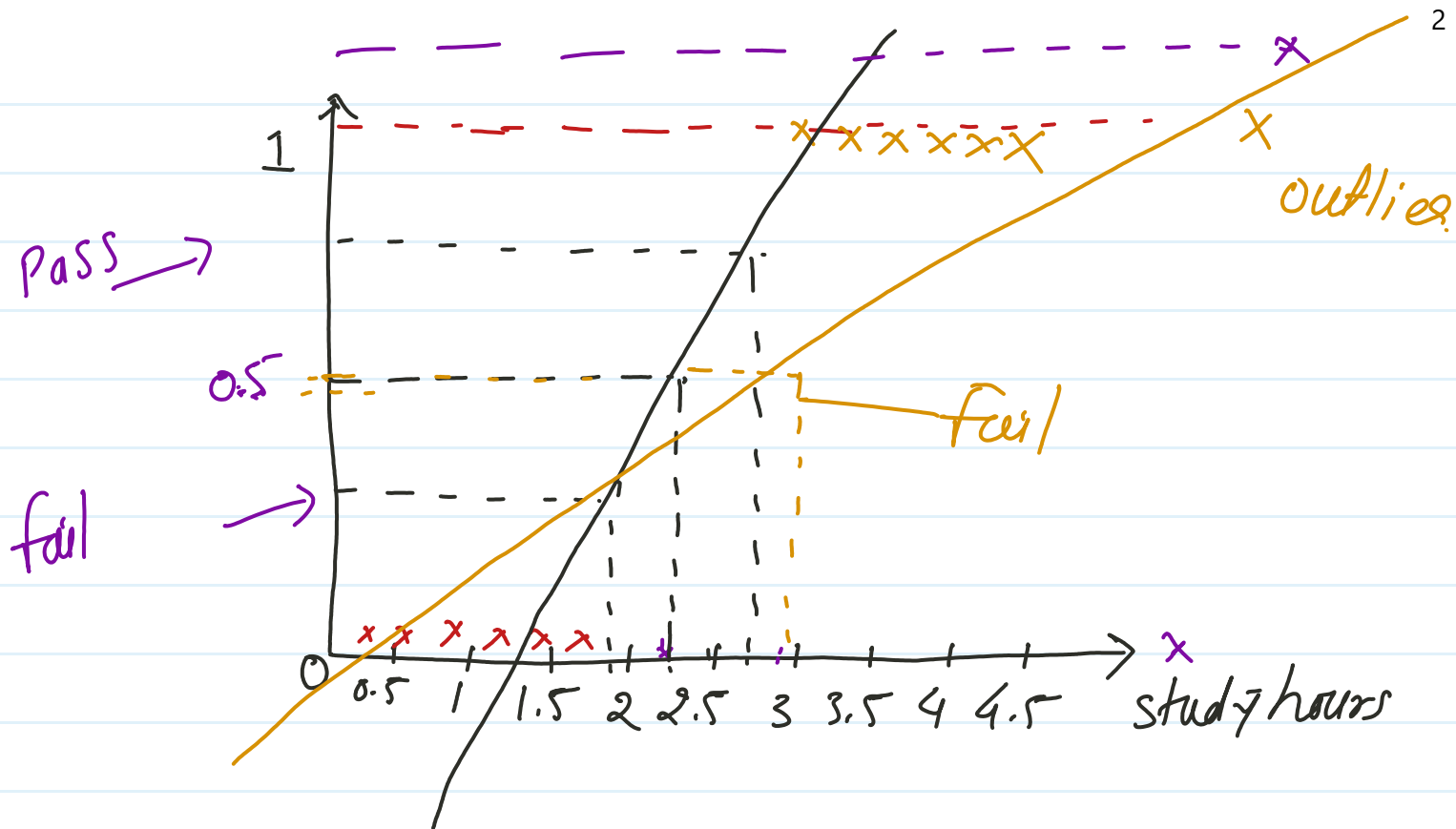
$\underline{\underline{LR}}$

$\Rightarrow$ Cost fun of

$$J(\theta_0, \theta_1) = \frac{1}{2m} \sum_{i=1}^{m} \left(h_\theta(x)^i - y^i \right)^2$$

We solve regression problem with the above eqn in the linear regression

If we solve classi. problem by Linear regression what result we get see in example

Duration	result
1	fail
1.5	fail
2	fail
2.5	pass
3	pass
3.5	pass
4	pass
4.5	pass
5	pass

1

pass →

0.5

fail →

O 0.5 1 1.5 2 2.5 3 3.5 4 4.5   study hours

outlier

fail

Because of the outlier kind out problem
we cannot solve classification problem
by Lin. Reg.

Sometime value can be greater than
1 and less than 0.

But we need value blw 0 to 1 for
classification problem

So that we use sigmoid function
to use linear eqn in classification
problem

$$\text{sigmoid fun} = \frac{1}{1 + e^{-z}}$$

$$z = h_\theta(x)$$

$$h_\theta(x) = \theta_0 + \theta_1 x_1$$
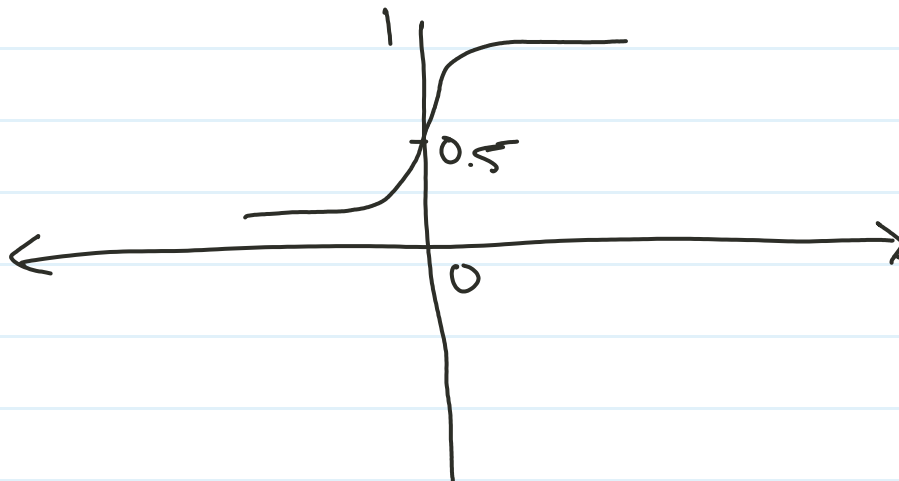
OR

$$h_\theta(x) = g(\theta_0, \theta_1 x)$$

g, introduced for squash of the line to prevent from upper limit and lower limit.

$$g = \frac{1}{1 + e^{-z}}$$

$$\boxed{h_\theta(x) = \frac{1}{1 + e^{-(\theta_0 + \theta_1 x_1)}}}$$

hypothesis function of Log. Reg.

sigmoid Activation function visual like

If $z \geq 0$, $g(z) \geq 0.5$

$z \leq 0$, $g(z) \leq 0.5$

Training Dataset