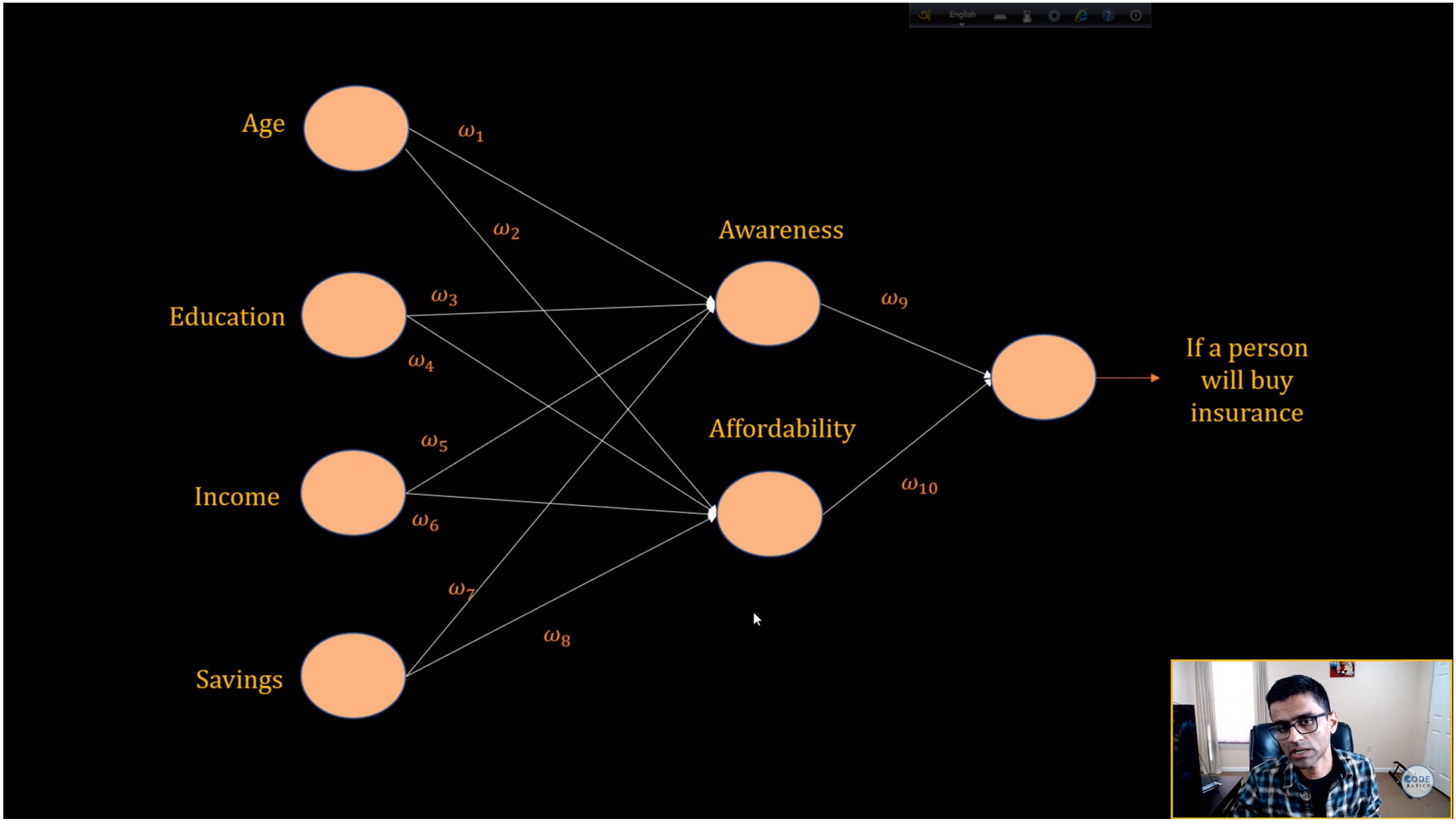
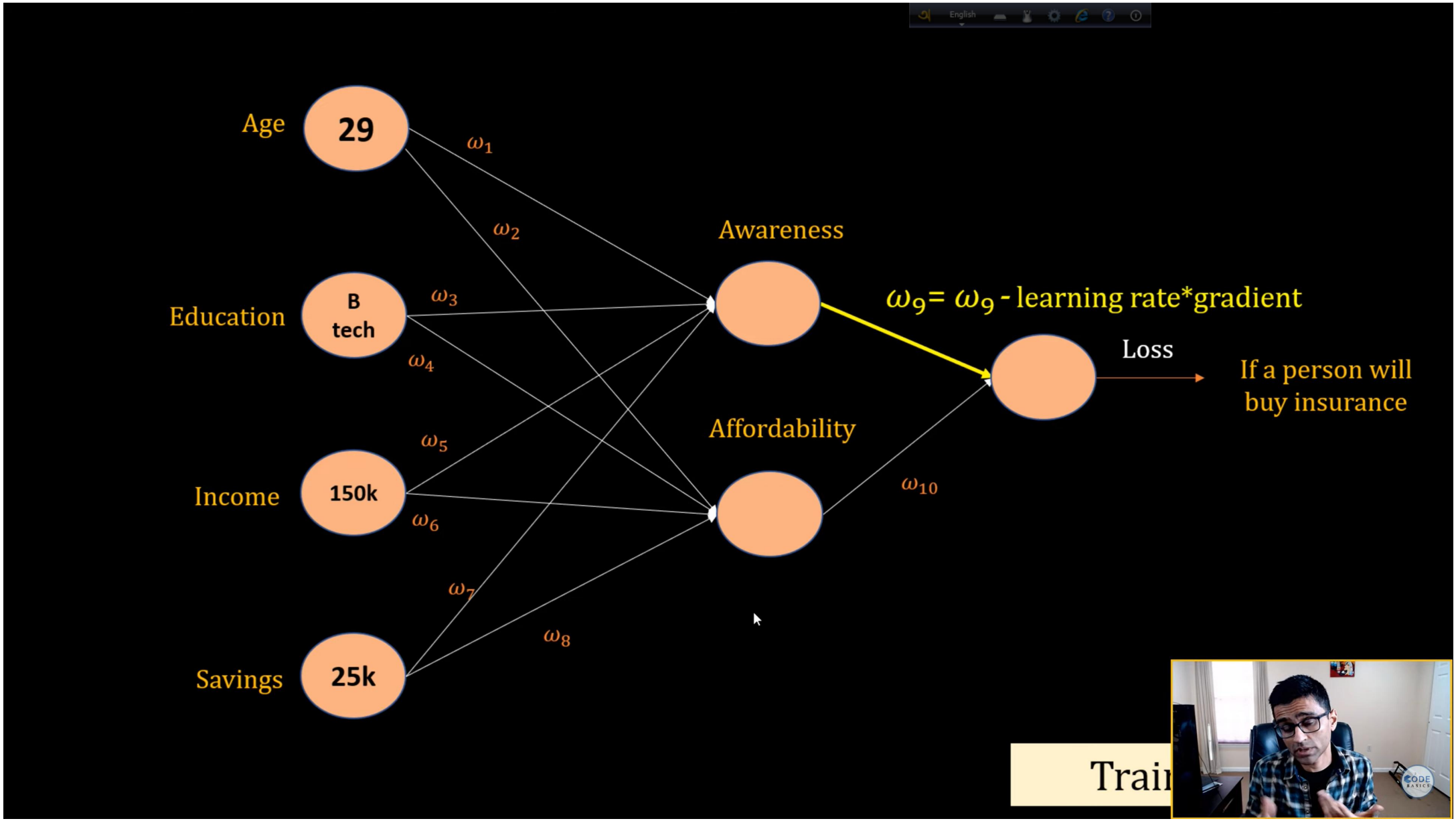
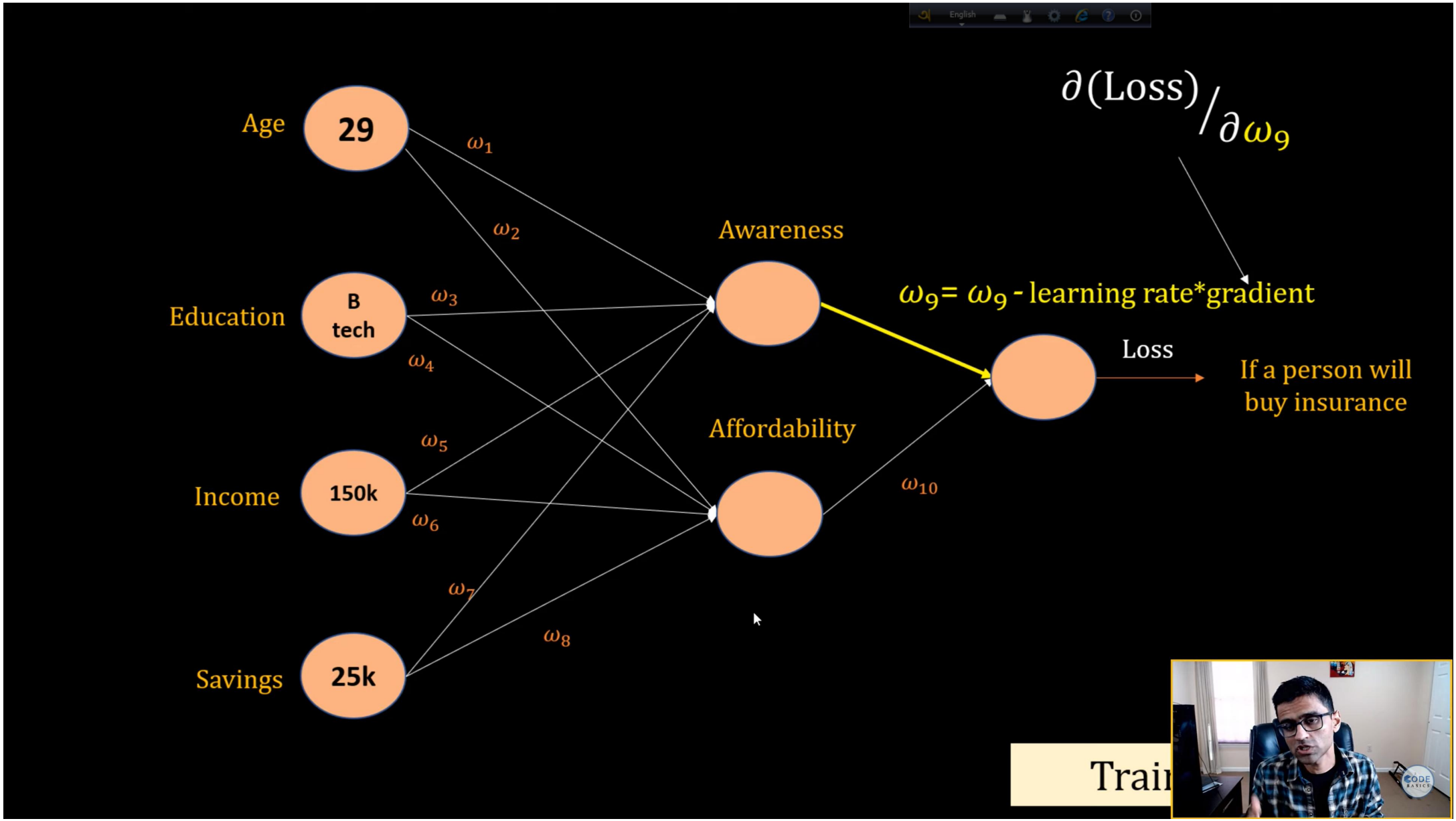
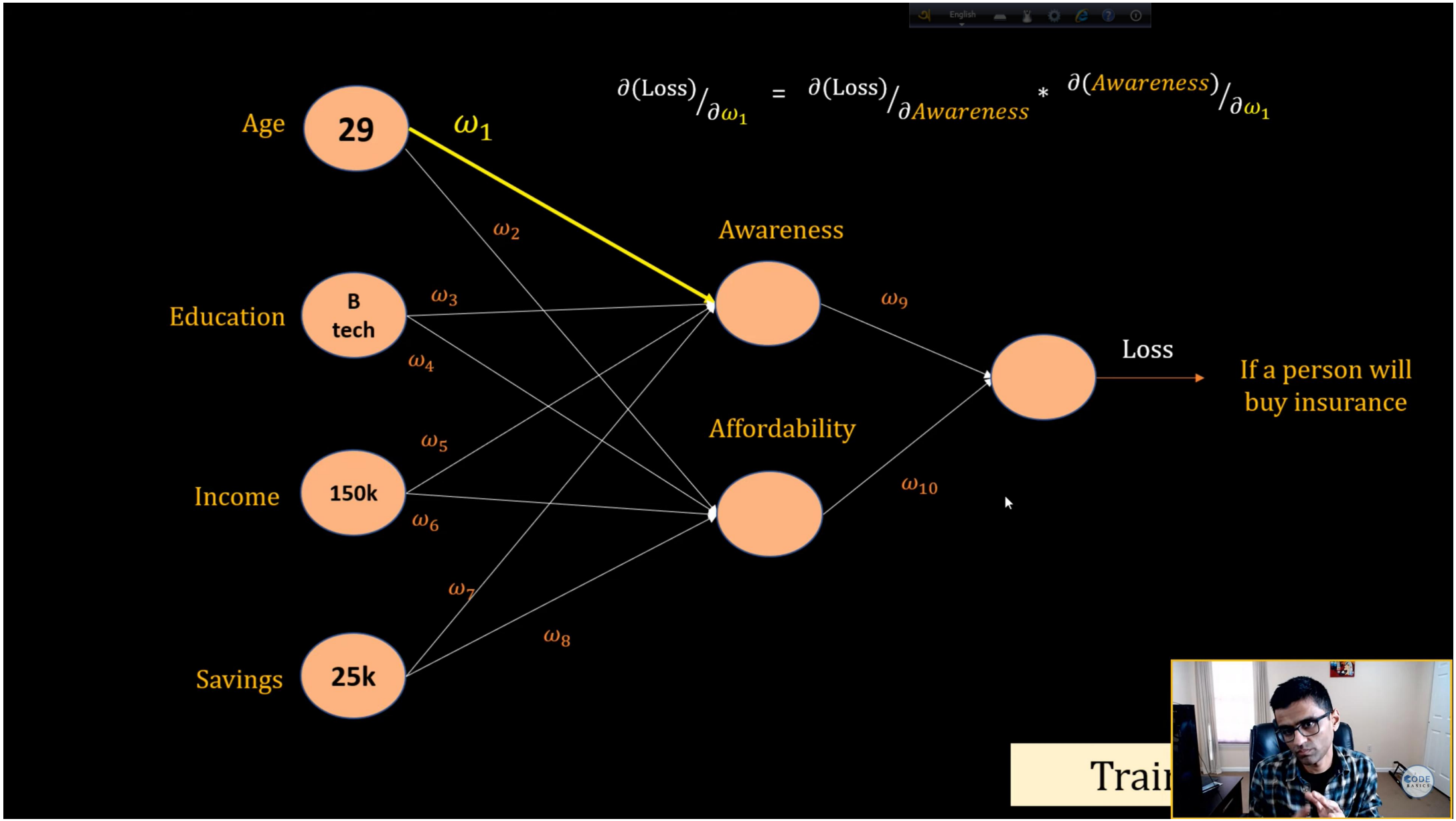

Age
Education
Income
Savings
ω_1
ω_2
ω_3
ω_4
ω_5
ω_6
ω_7
ω_8
Awareness
Affordability
ω_9
ω_{10}
If a person will buy insurance


Age
29
Education
B tech
Income
150k
Savings
25k
ω_1
ω_2
ω_3
ω_4
ω_5
ω_6
ω_7
ω_8
Awareness
Affordability
ω_9= ω_9 - learning rate*gradient
Loss
ω_{10}
If a person will buy insurance
Trai


Age
29
Education
B tech
Income
150k
Savings
25k
ω_1
ω_2
ω_3
ω_4
ω_5
ω_6
ω_7
ω_8
Awareness
Affordability
ω_{10}
$\partial(\text{Loss})/\partial\omega_9$
$\omega_9 = \omega_9$ - learning rate*gradient
Loss
If a person will buy insurance
Trai

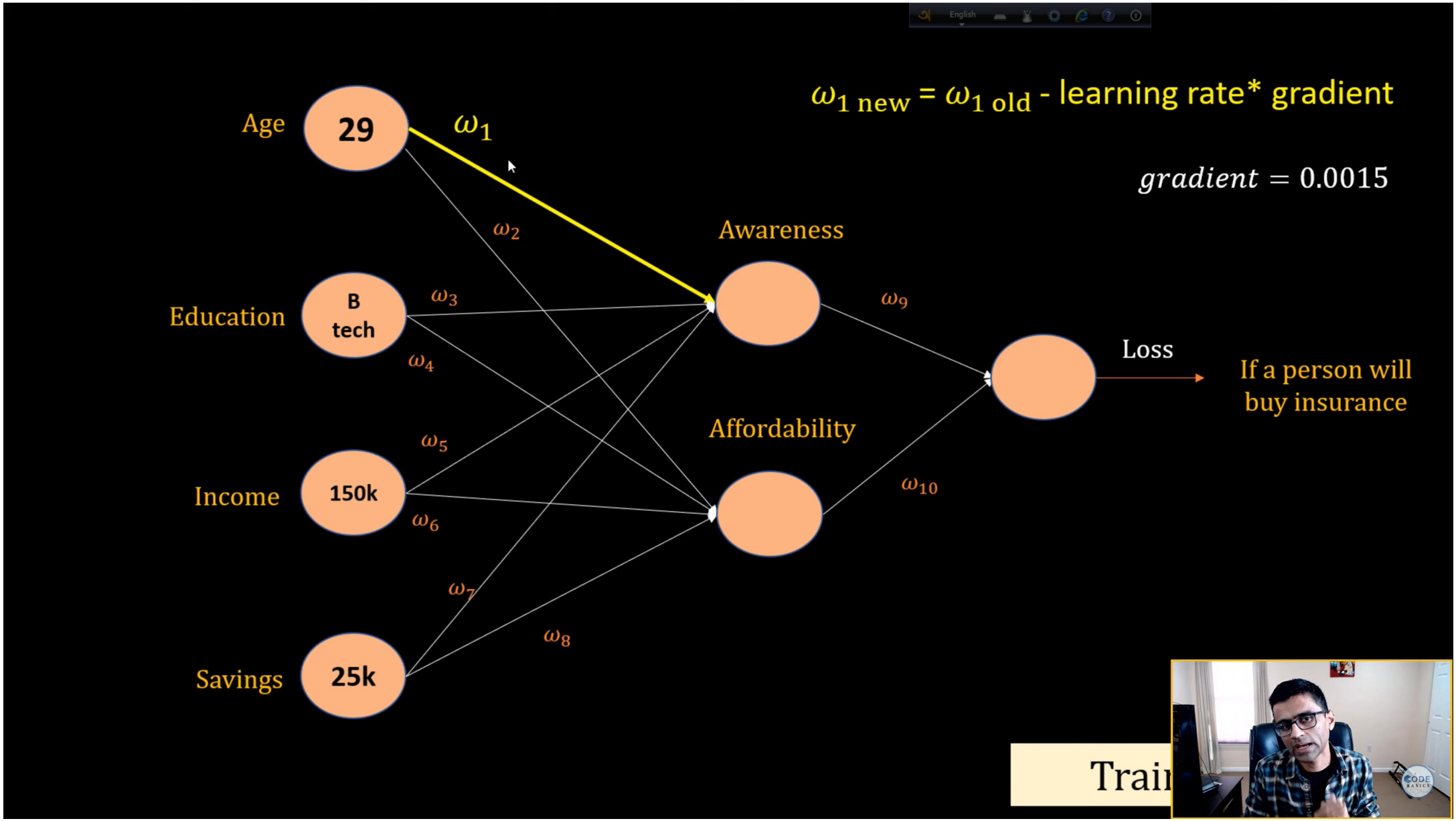

$\partial(\text{Loss})/\partial\omega_1 = \partial(\text{Loss})/\partial Awareness * \partial(Awareness)/\partial\omega_1$
Age
29
ω_1
ω_2
Awareness
Education
B tech
ω_3
ω_4
ω_9
Loss
If a person will buy insurance
Affordability
ω_5
Income
150k
ω_6
ω_{10}
ω_7
ω_8
Savings
25k
Trai

$$\partial(\text{Loss})/\partial\omega_1 = \partial(\text{Loss})/\partial Awareness * \partial(Awareness)/\partial\omega_1$$

$$gradient = d1 * d2$$

$$gradient = 0.03 * 0.05$$

$$gradient = 0.0015$$


$\omega_{1\ new} = \omega_{1\ old}$ - learning rate* gradient
$gradient = 0.0015$
Age
29
ω_1
ω_2
Awareness
Education
B tech
ω_3
ω_4
ω_9
Loss
If a person will buy insurance
Affordability
ω_5
Income
150k
ω_6
ω_{10}
ω_7
ω_8
Savings
25k
Trai

As number of hidden layers grow, gradient becomes very small and weights will hardly change . This will hamper the learning process.

Vanishing Gradients

$$\partial(\text{Loss})/_{\partial \omega_1} = \partial(\text{Loss})/_{\partial Awareness} * \partial(Awareness)/_{\partial \omega_1}$$

$$gradient = d1 * d2$$

$$gradient = 100 * 500$$

$$gradient = 50000$$

When individual derivatives are large, the final derivate will also become huge and weights would change drastically.

Exploding Gradients

$$gradient = d1 * d2 * d3 * d4 * ... * dn$$

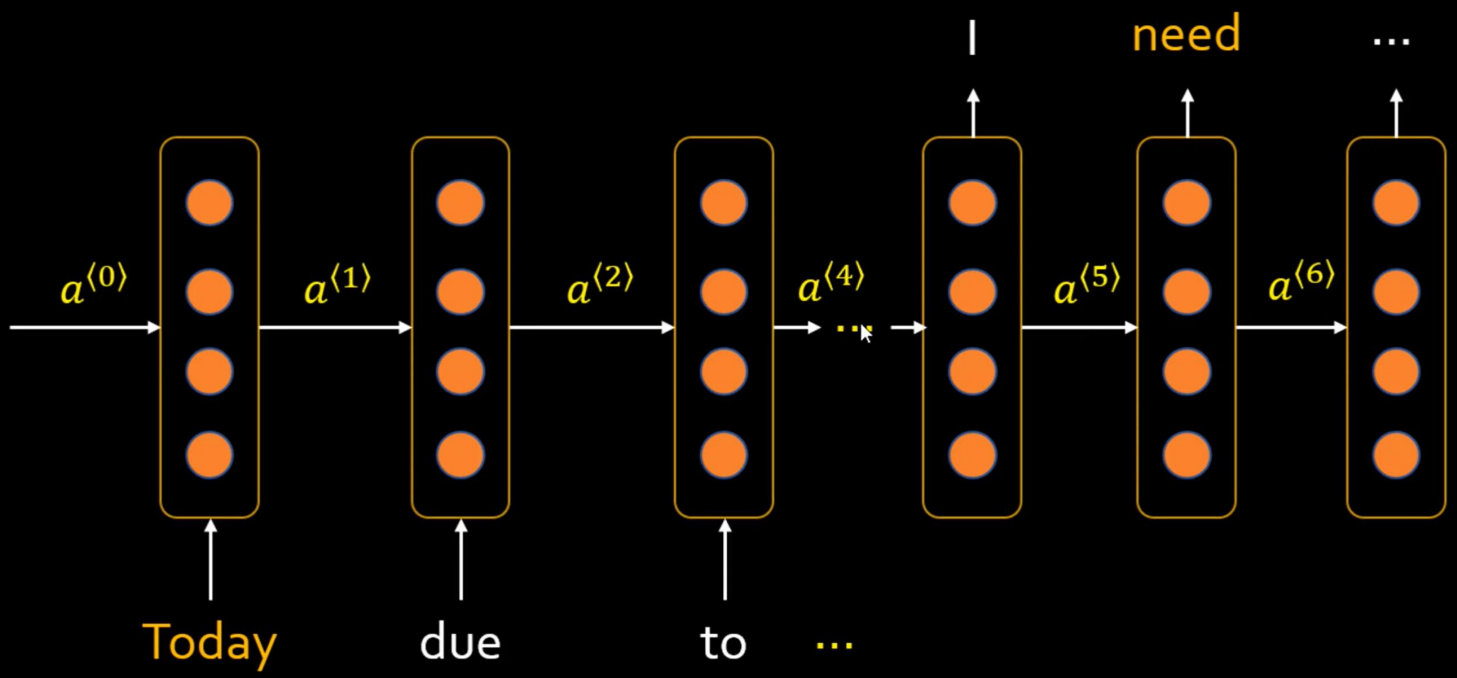
Vanishing gradient problem is more prominent in very deep neural networks.

Vanishing gradient problem in **RNN**

Today, due to my current job situation and family conditions, I need to take a loan.

Last year, due to my current job situation and family conditions, I had to take a loan.

Today, due to my current job situation and family conditions, I need to take a loan.



Solutions?

GRU

LSTM