

age	have_insurance
22	0
25	0
47	1
52	0
46	1
56	1
55	0
60	1
62	1
61	1
18	0
28	0
27	0
29	0
49	1

↳

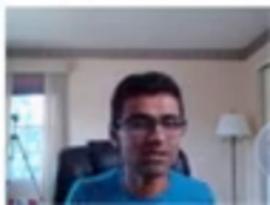


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46	1
56	1
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60	1
62	1
61	1
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28	0
27	0
29	0
49	1

Given an age of a person, come up with a **function** that can predict if person will buy insurance or not



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25	0
47	1
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46	1
56	1
55	0
60	1
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61	1
18	0
28	0
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29	0
49	1

Binary Classification

Given an age of a person, come up with a **function** that can predict if person will buy insurance or not



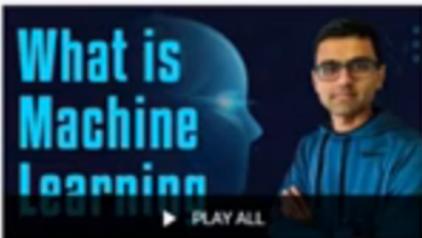
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Given an age of a person, come up with a **function** that can predict if person will buy insurance or not



Search



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DISCUSSION



Yellow Brick Dice



Machine learning tutorial playlist that is best suitable for a total beginner. It will start with basics of machine learning, cover various ML algorithms for regression and classification, feature engineering and also includes some real life end to end projects. In terms of technology I use these tools: sklearn, python, pandas, numpy, jupyter notebook, keras, tensorflow.



codebase

-  Machine Learning Tutorial Python - 7: Training and Testing Data
codebasics

 Machine Learning Tutorial Python - 8: Logistic Regression (Binary Classification)
codebasics

 Machine Learning Tutorial Python - 8 Logistic Regression (Multiclass Classification)
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 Machine Learning Tutorial Python - 9 Decision Tree
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DISCUSSION



Yellow Brick Pipe -



240 IV



ChaoChao Goto



still soundly awake

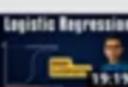


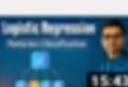
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-  Machine Learning Tutorial Python - 7: Training and Testing Data
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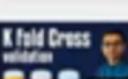
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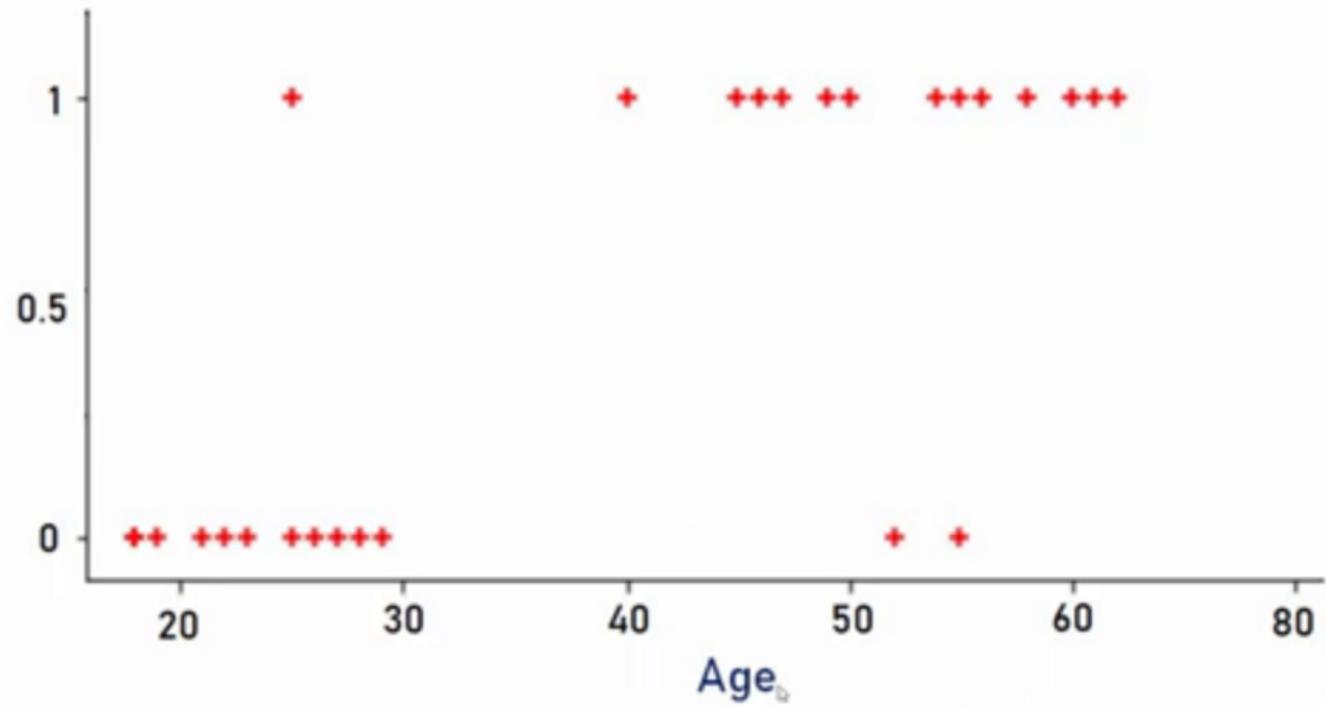
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Binary Classification

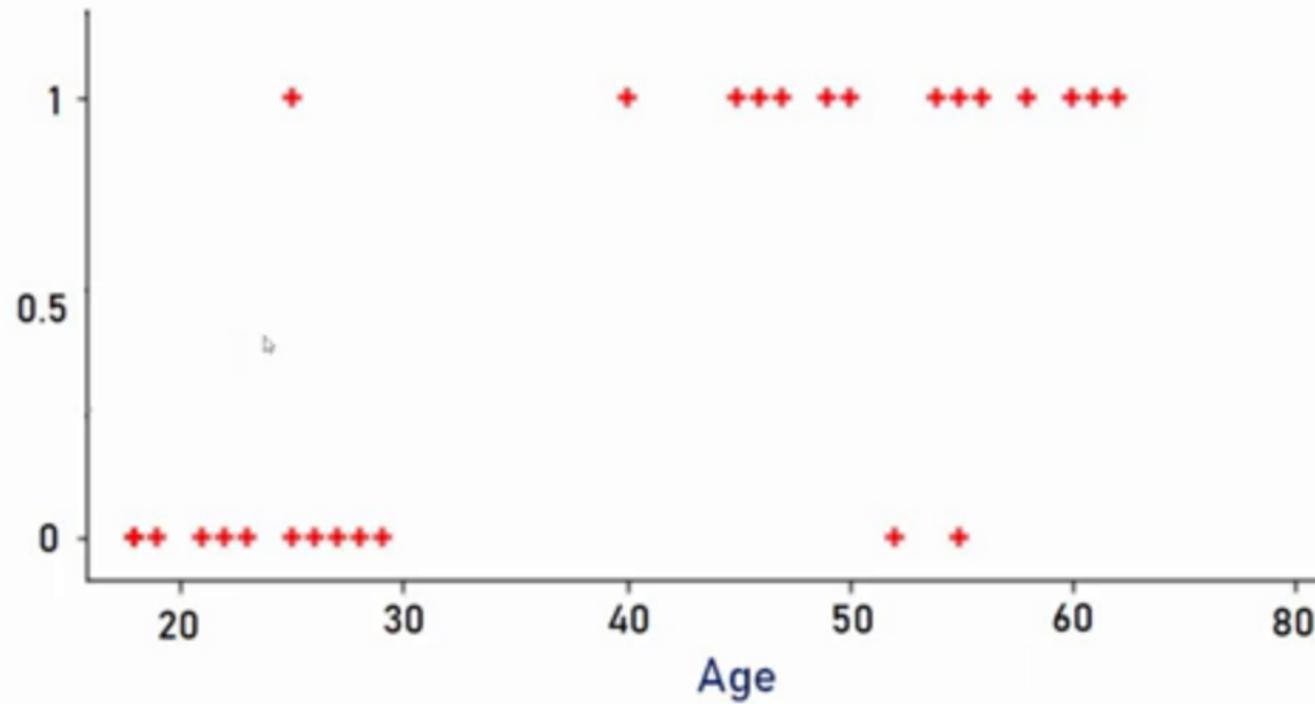
Given an age of a person, come up with a **function** that can predict if person will buy insurance or not



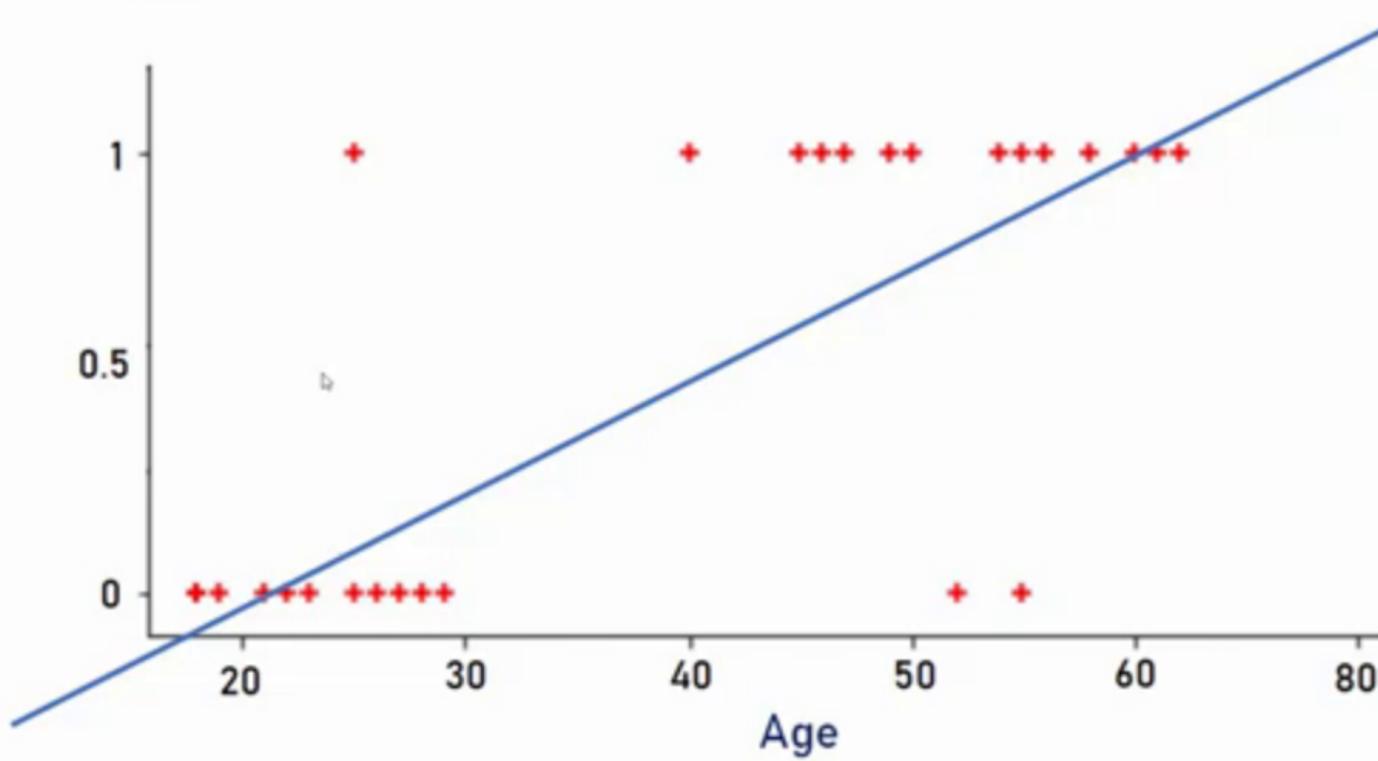
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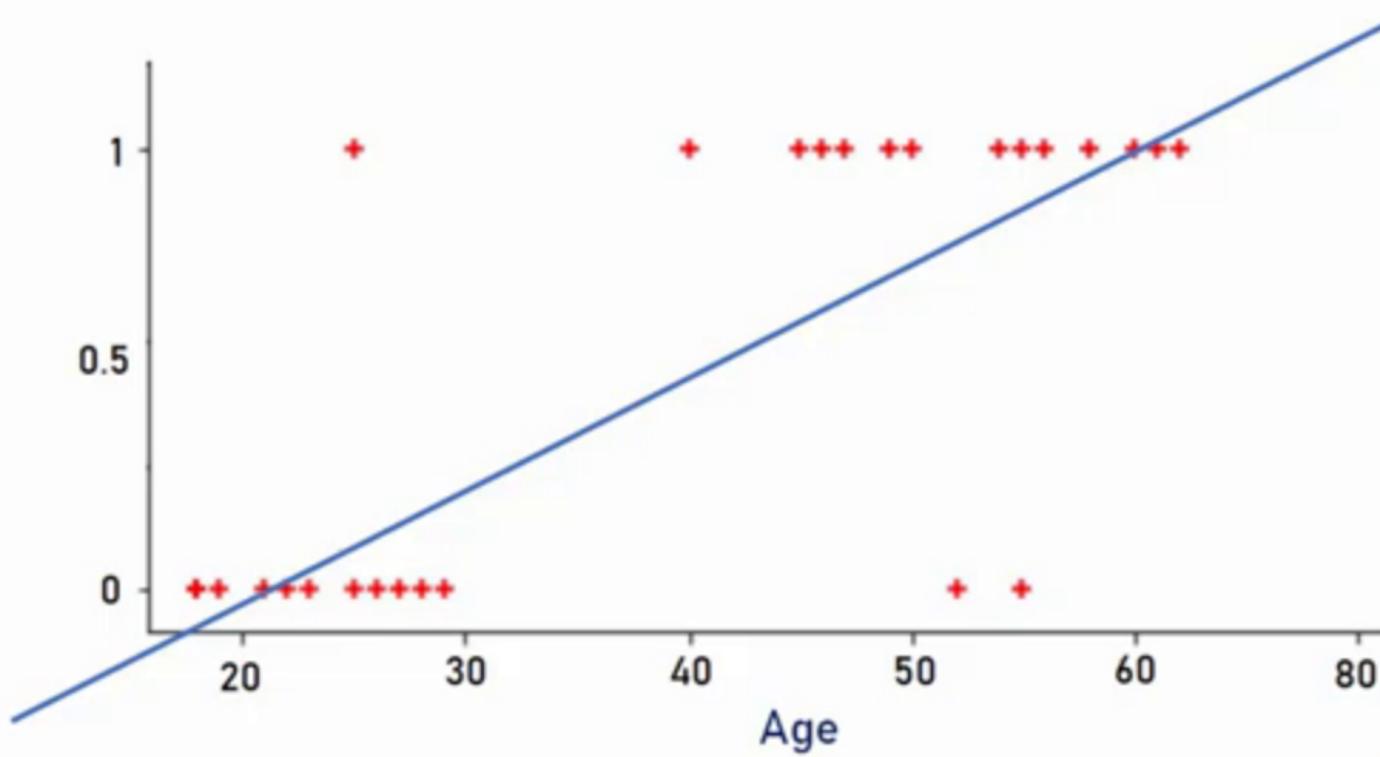
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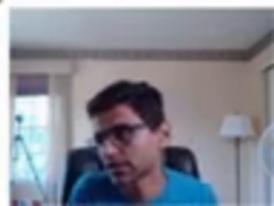
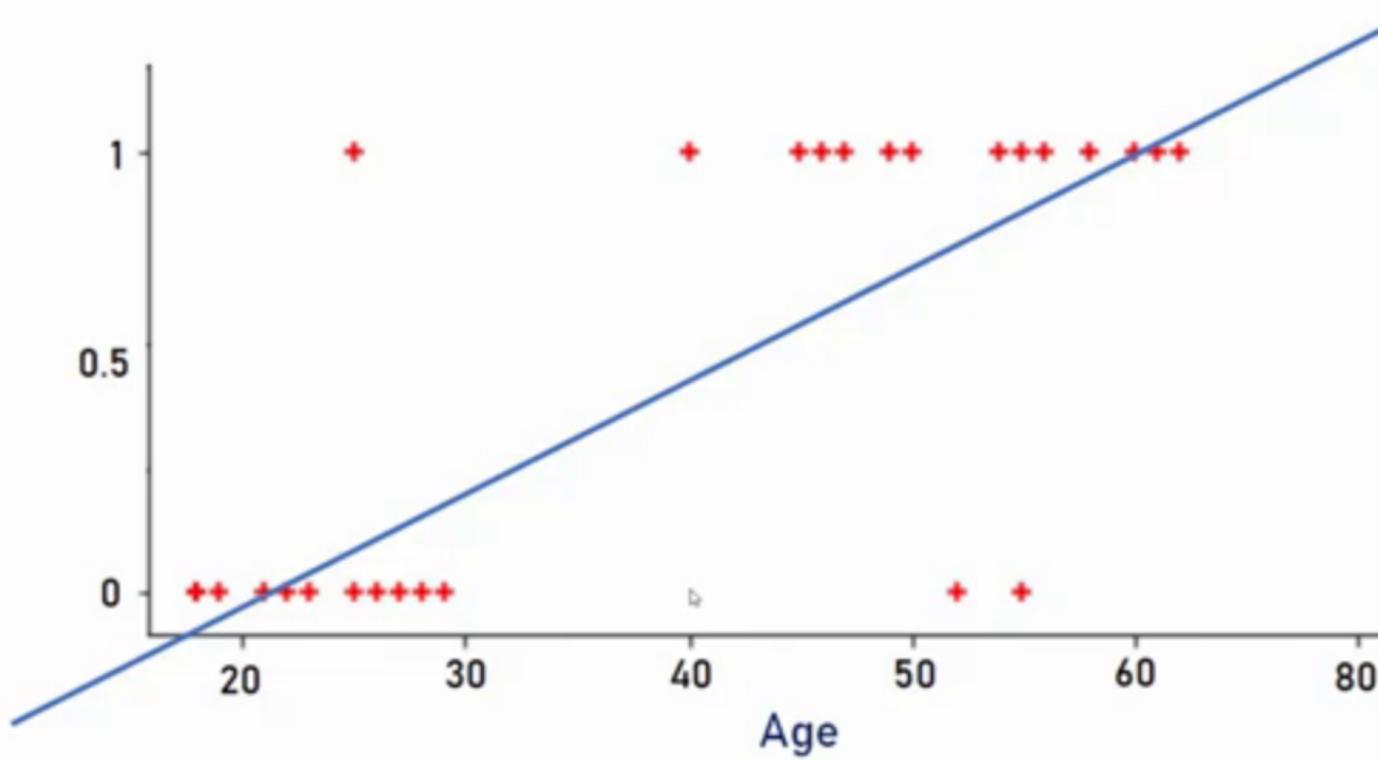
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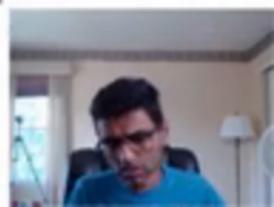
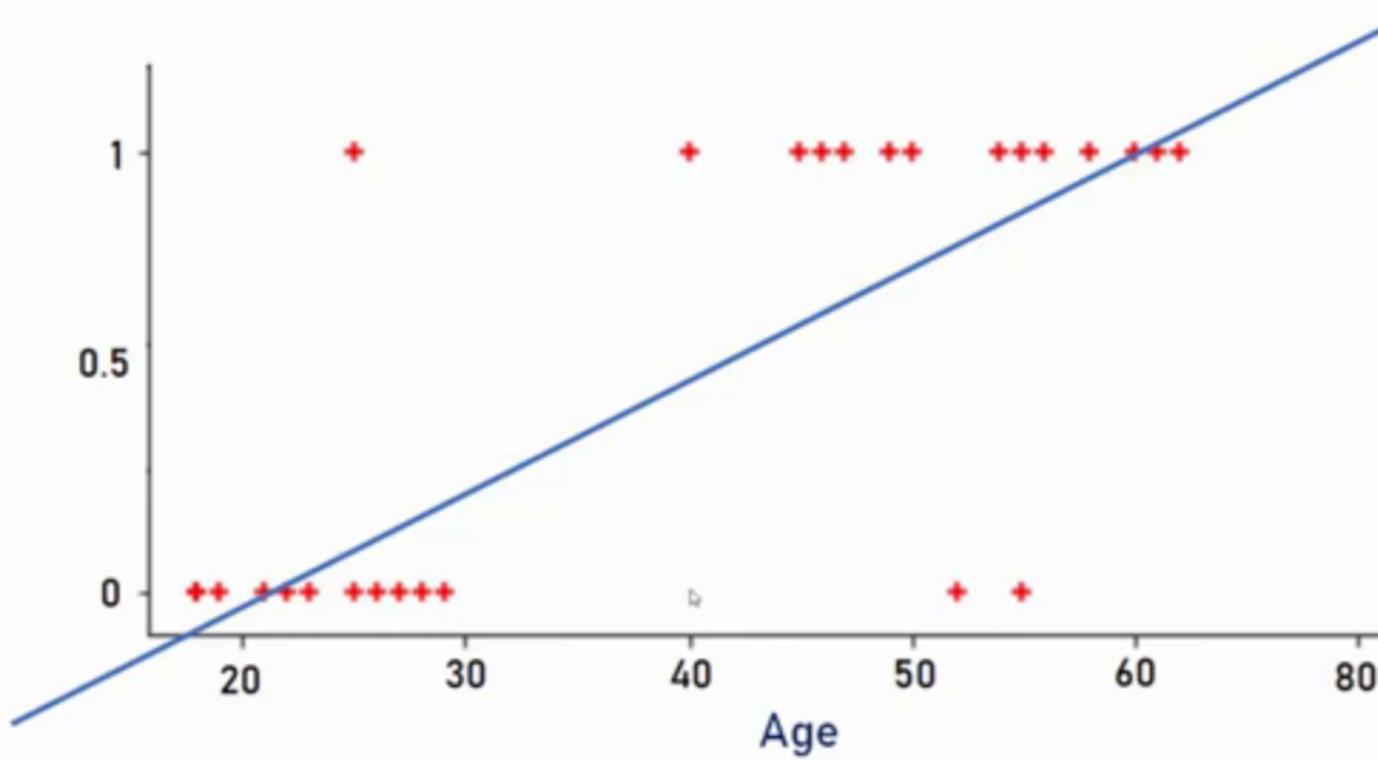
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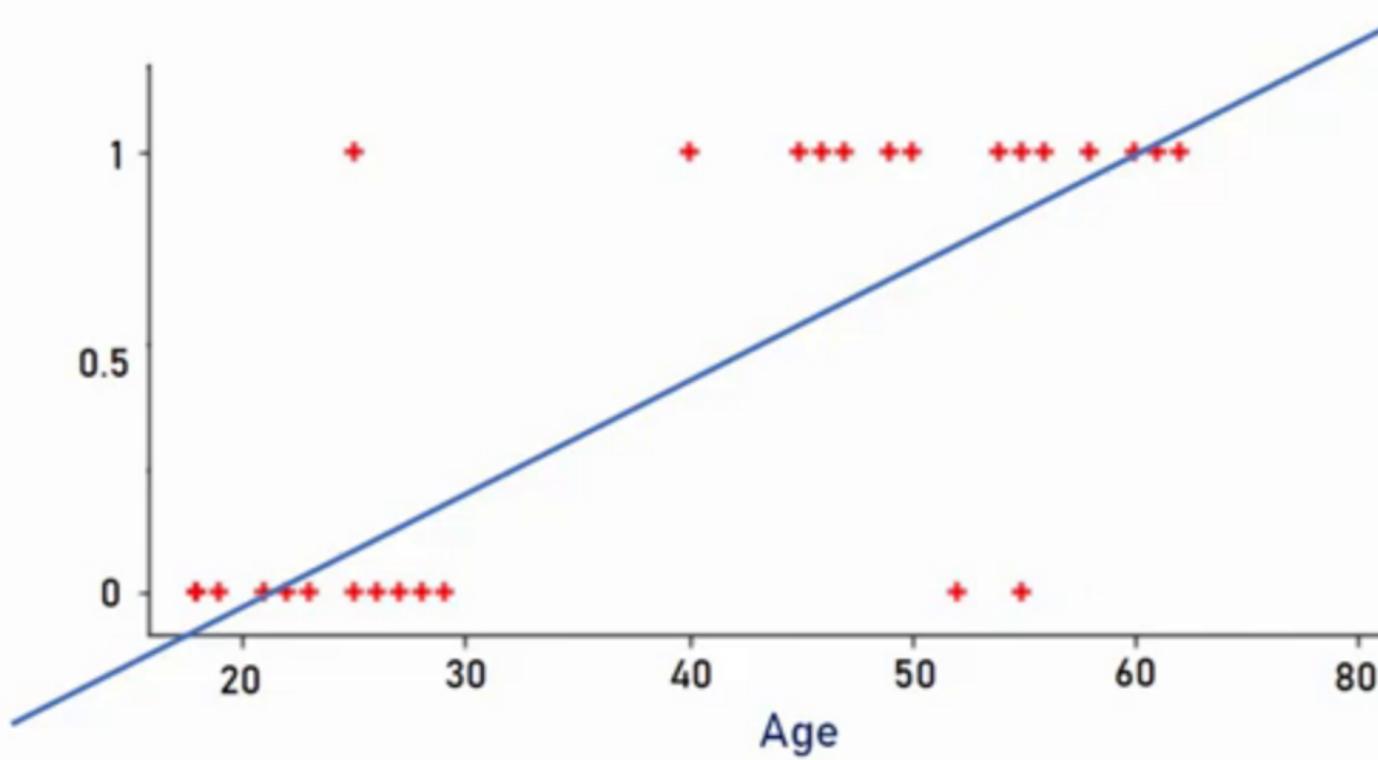
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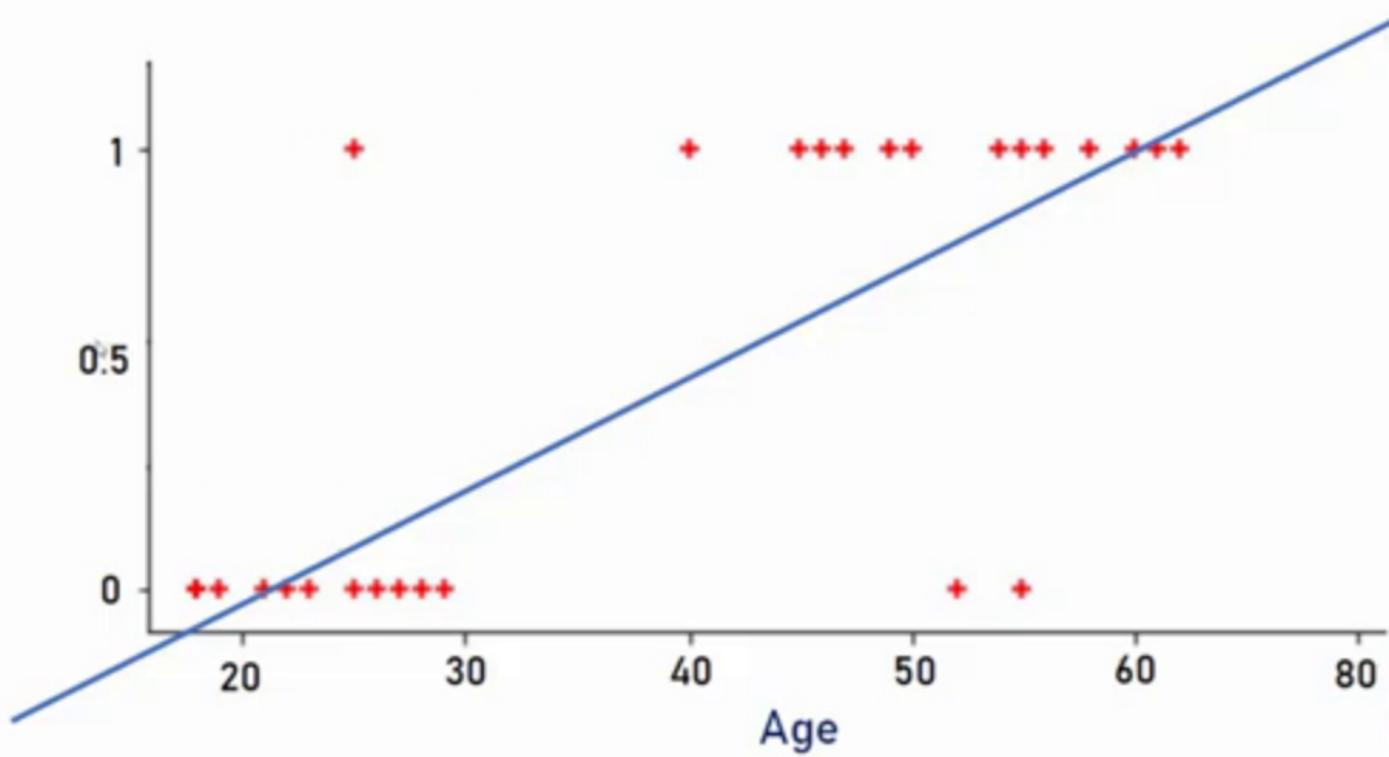
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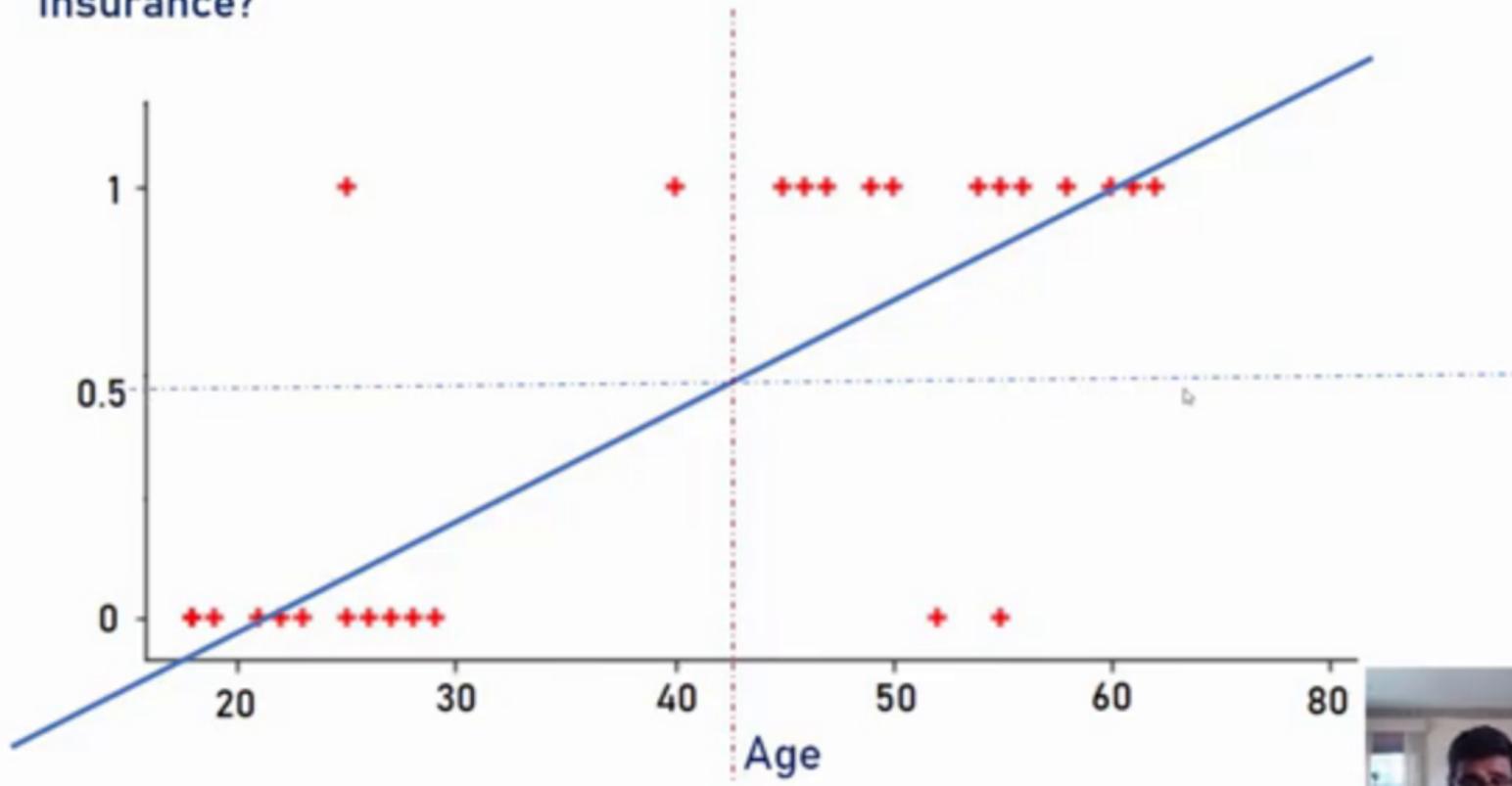
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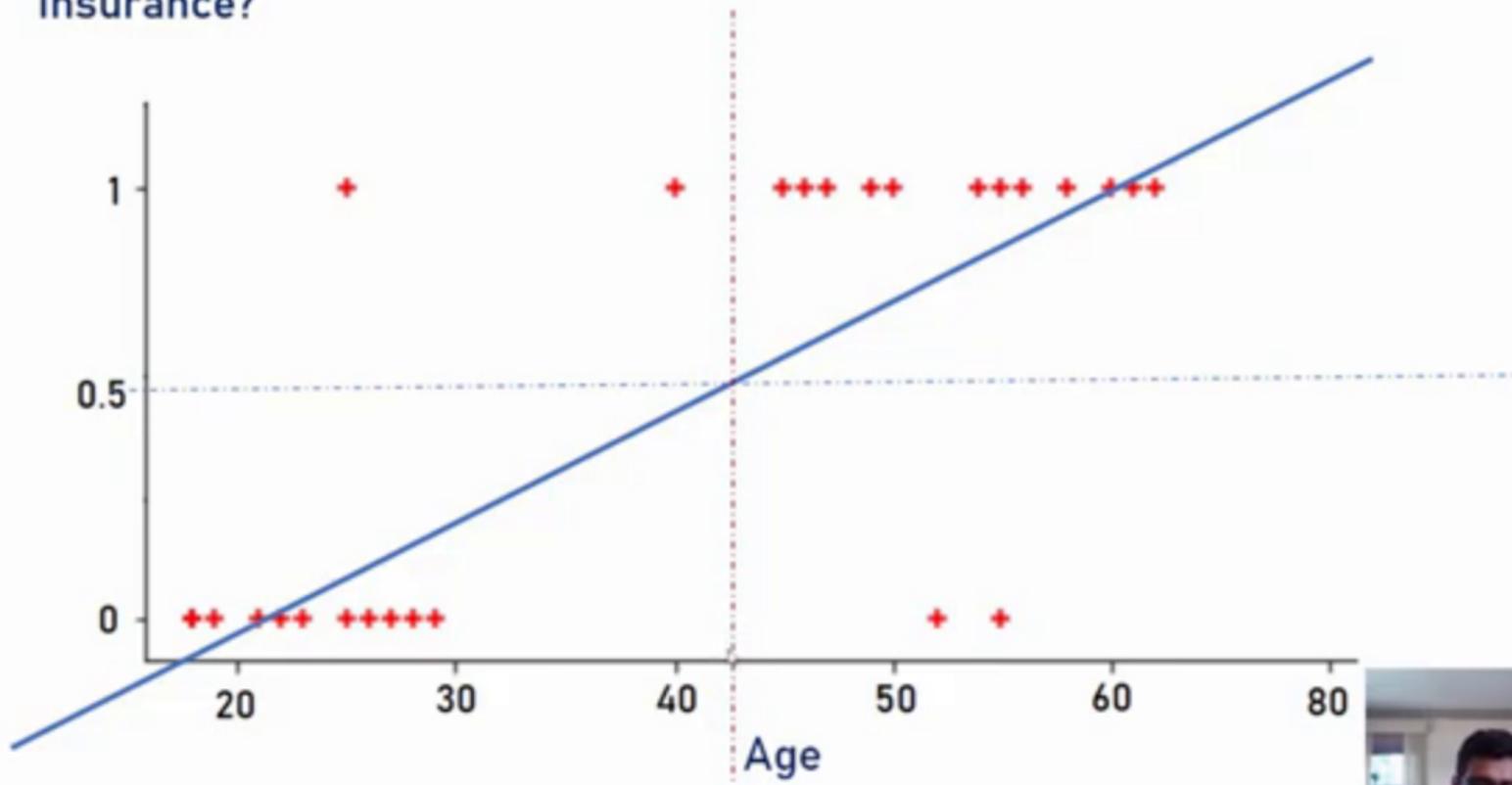
Have Insurance?



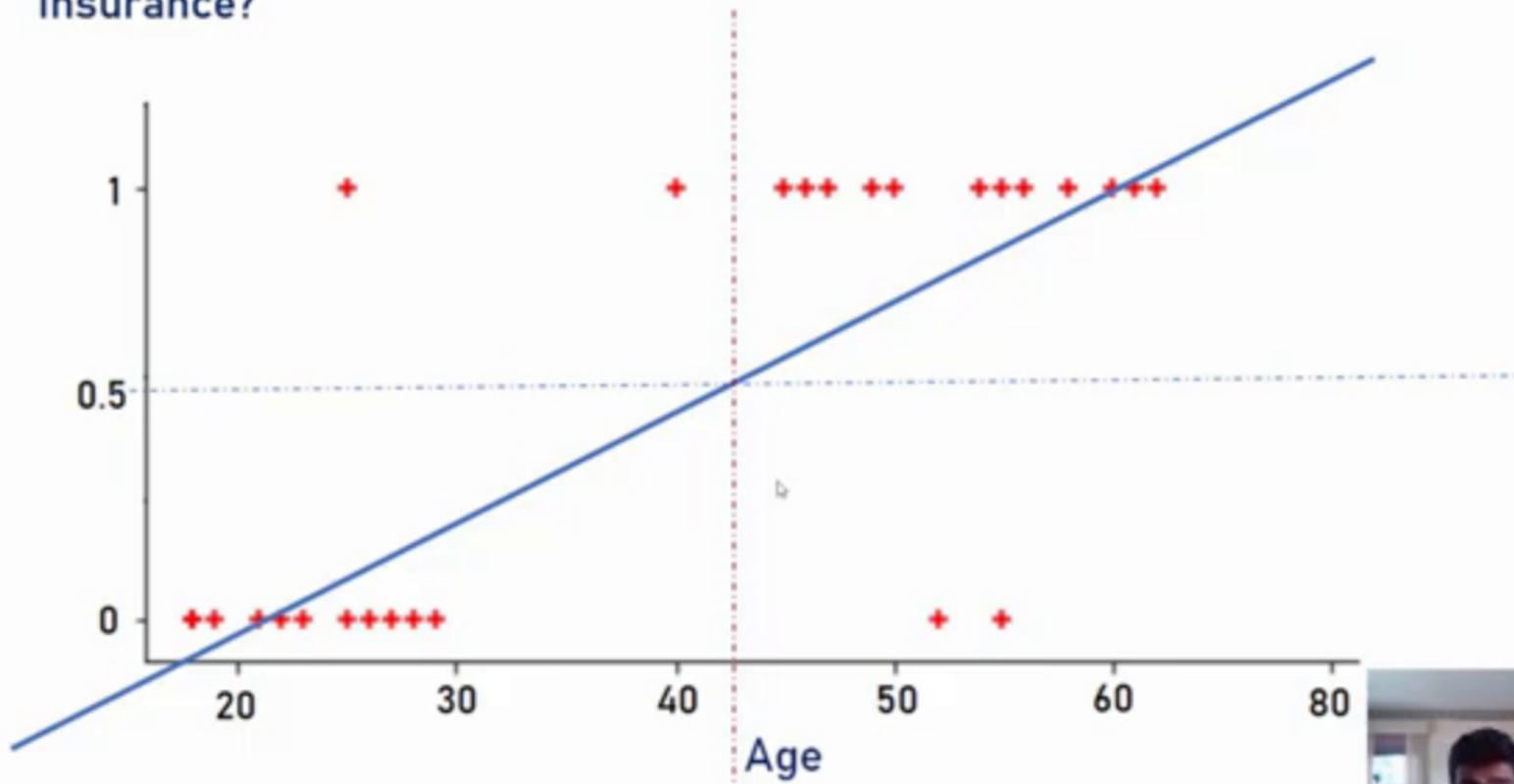
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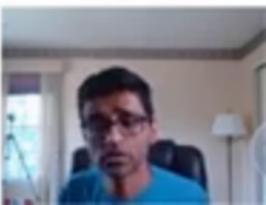
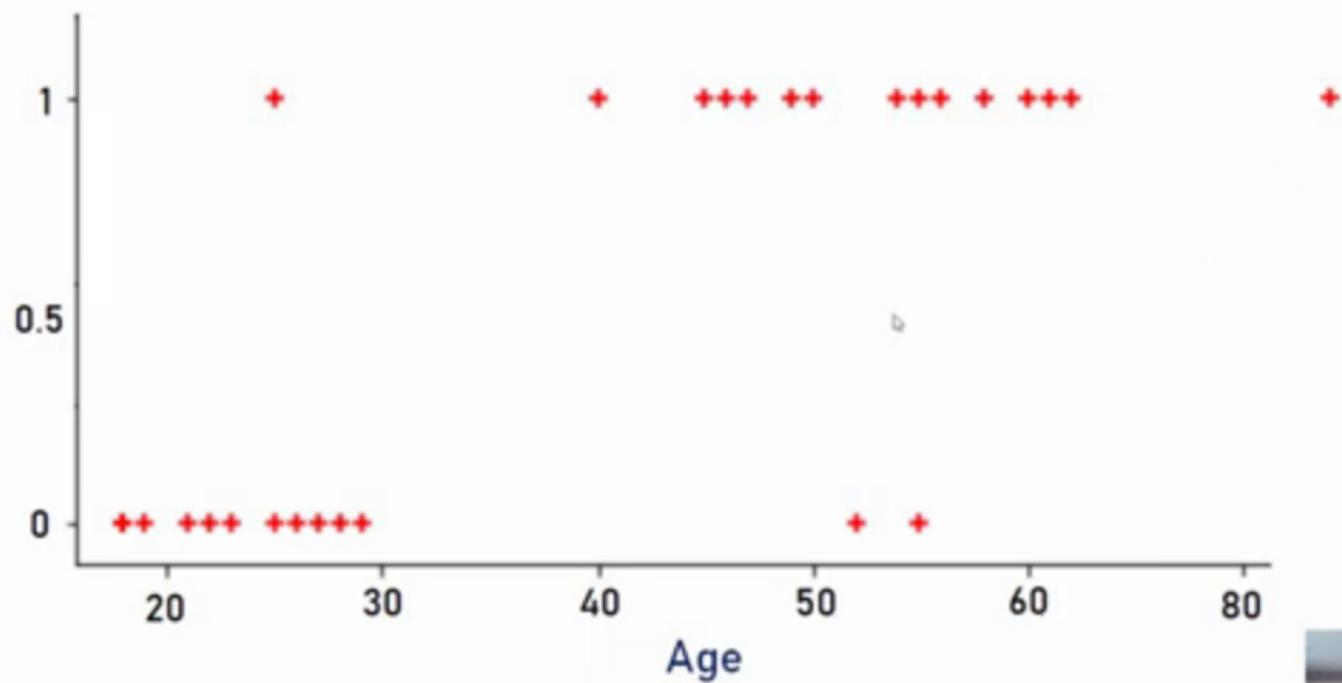
Have Insurance?



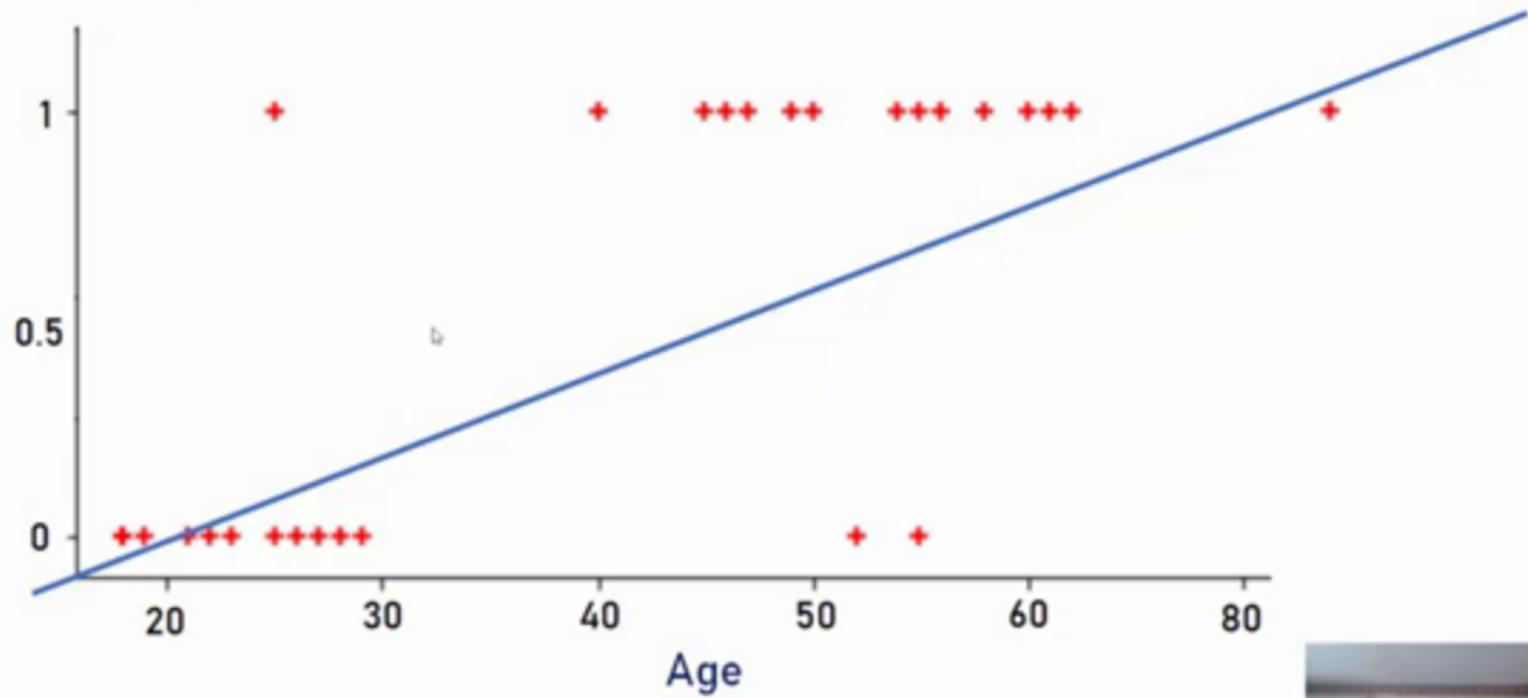
Have Insurance?



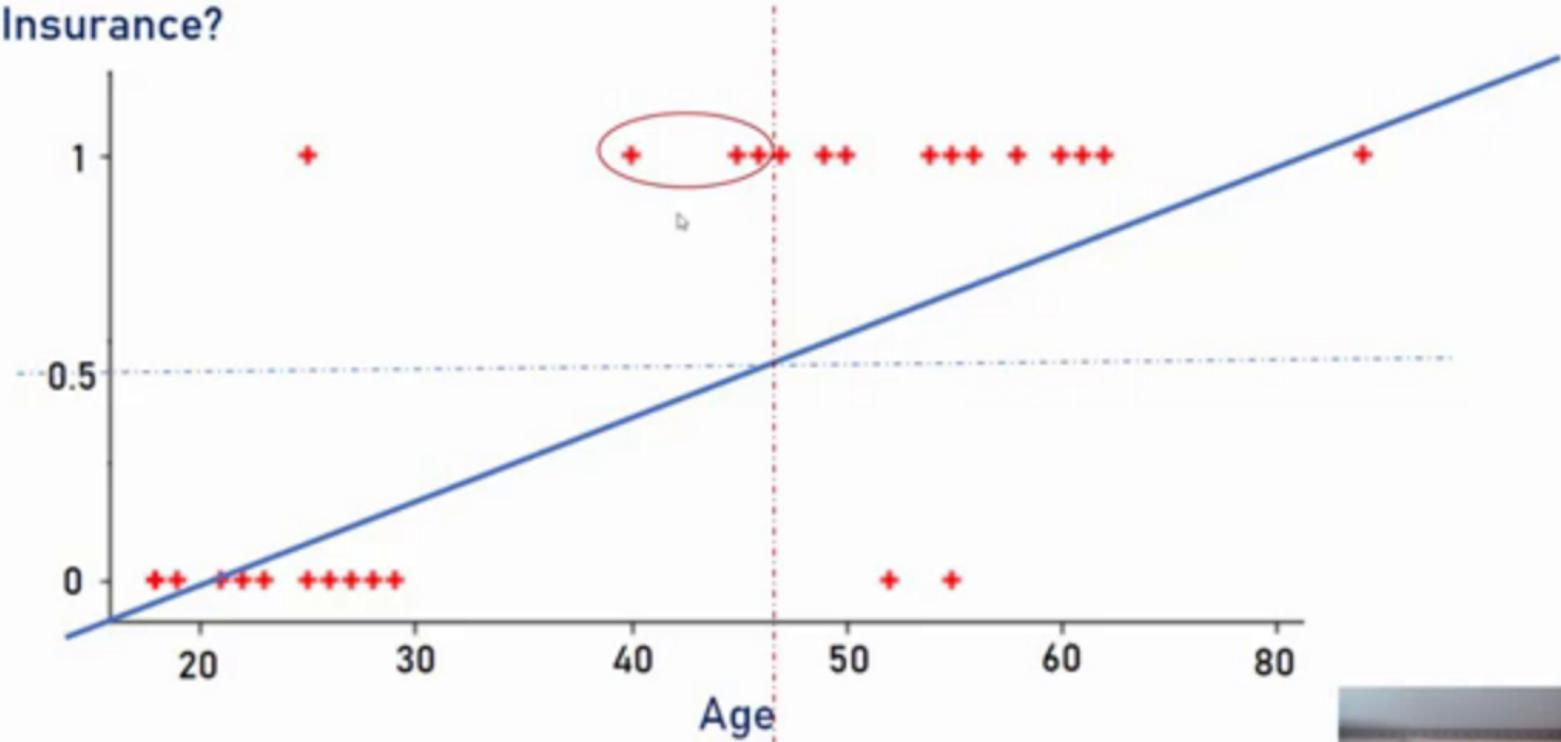
Have Insurance?



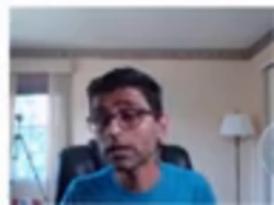
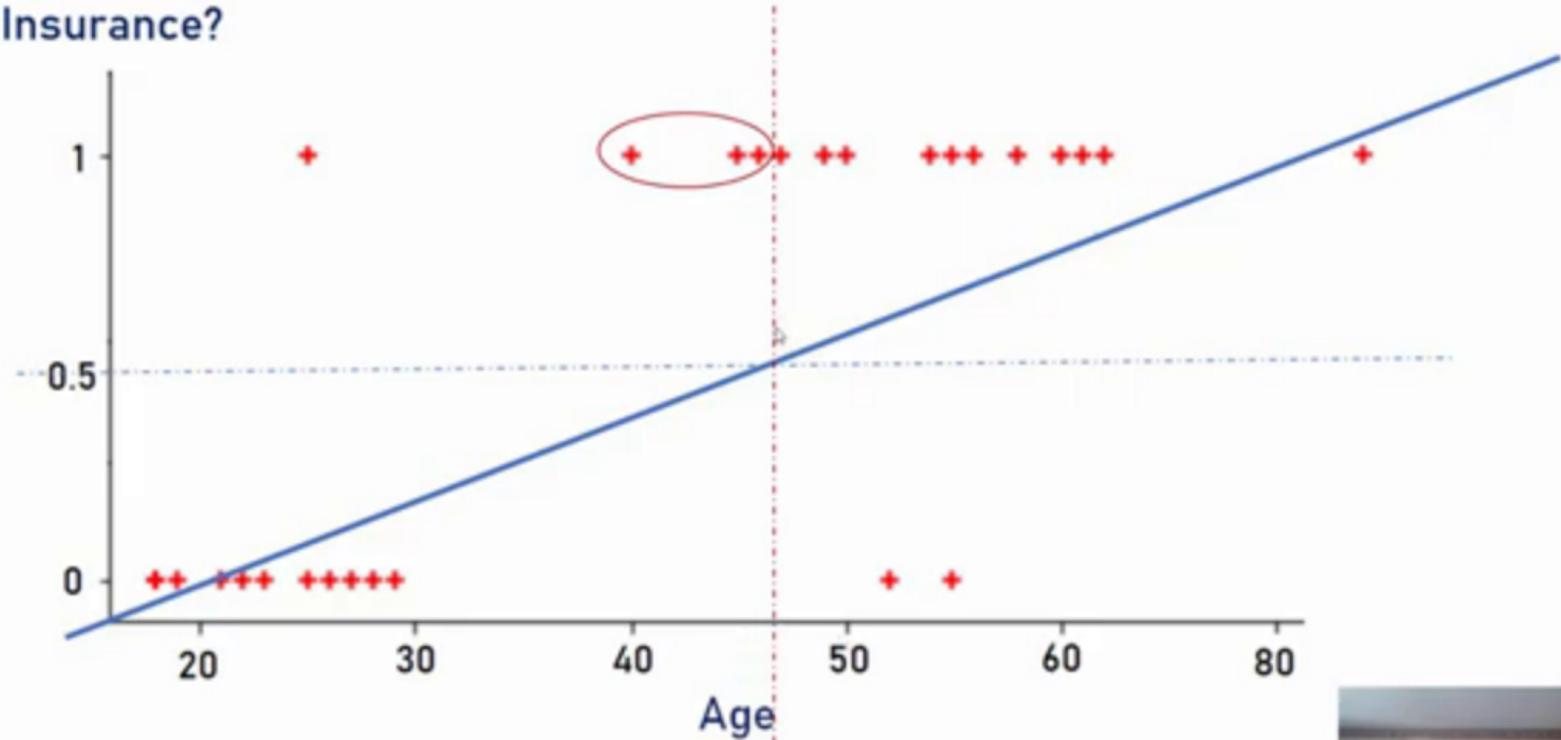
Have Insurance?



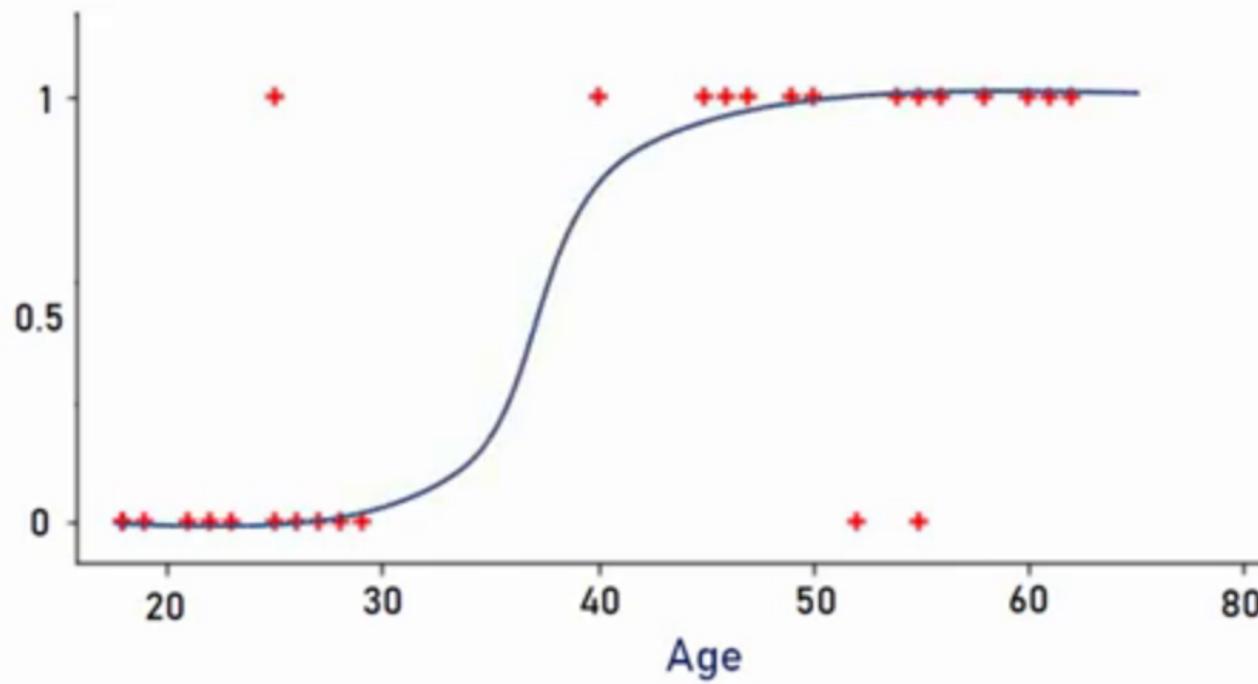
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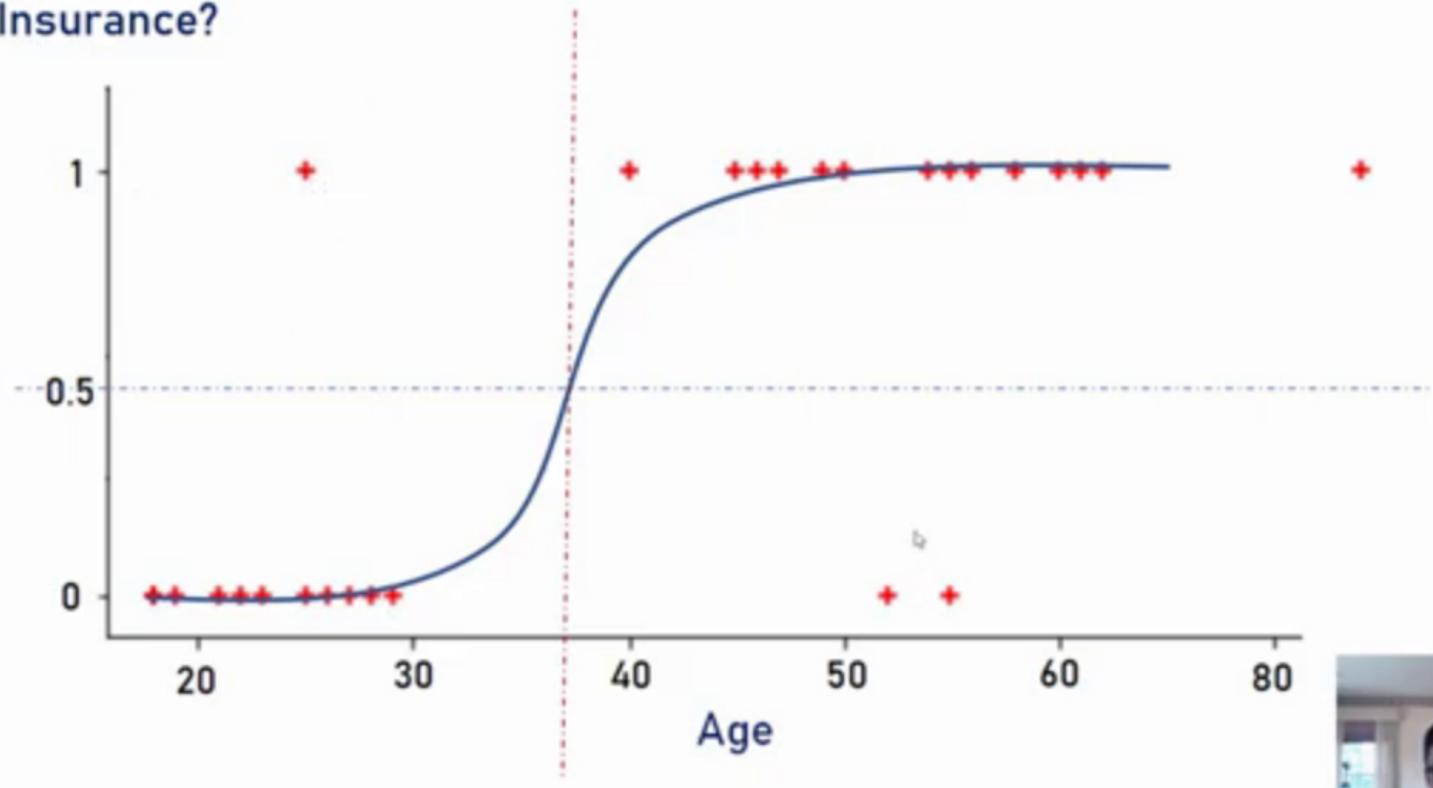
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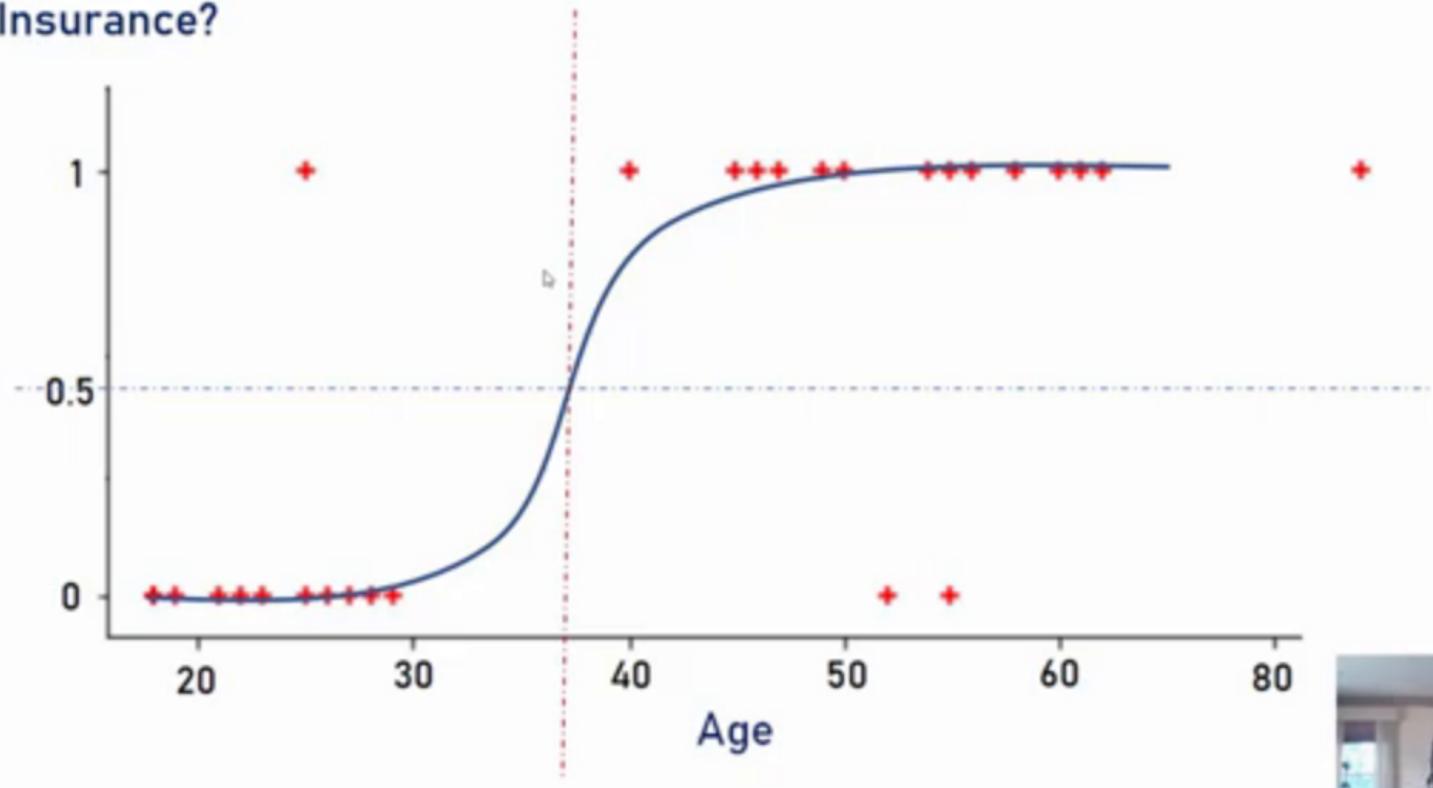
Have
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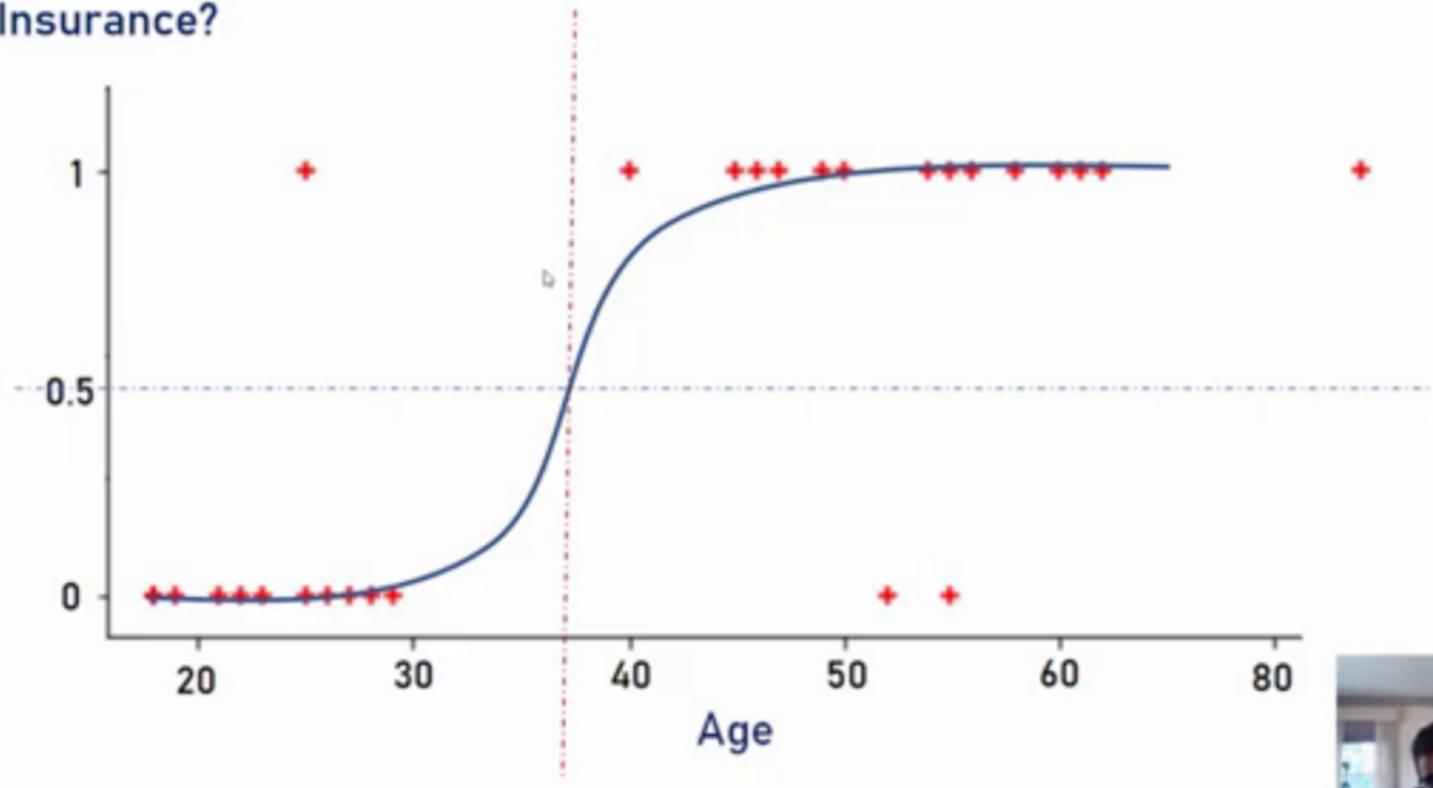
Have Insurance?



Have Insurance?

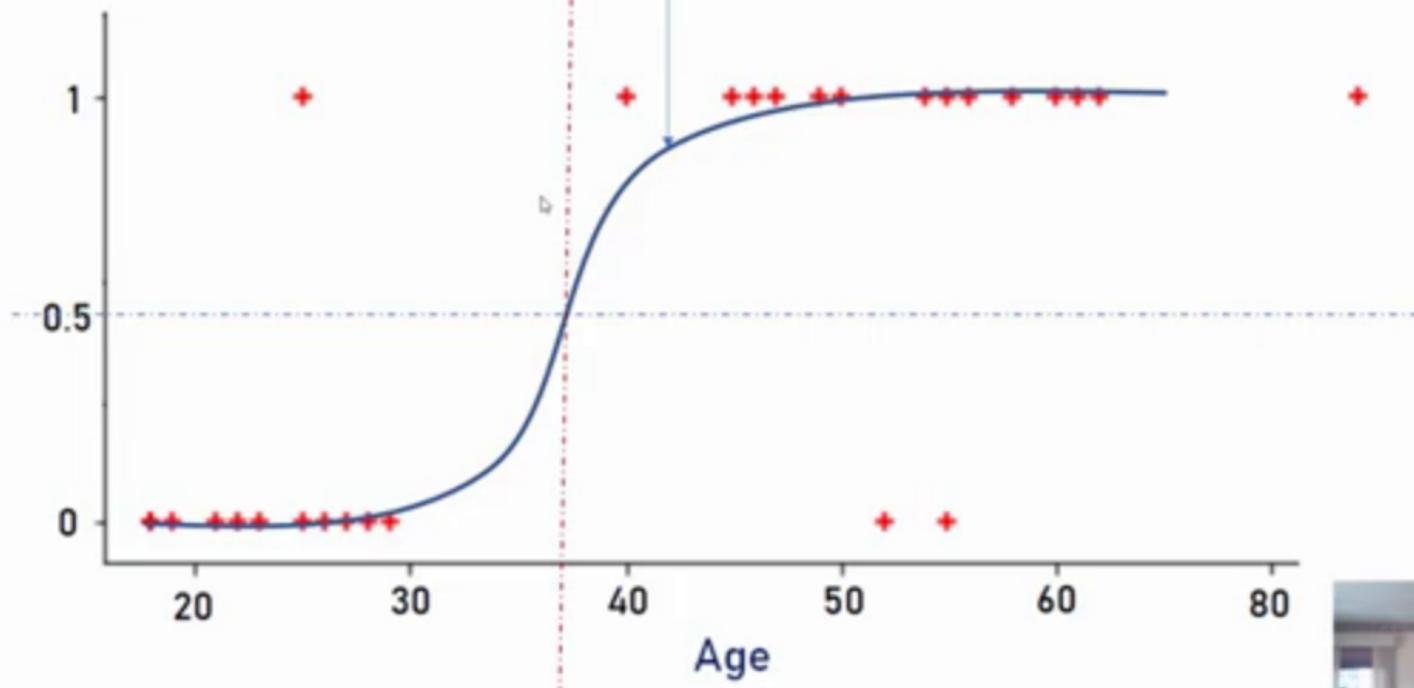


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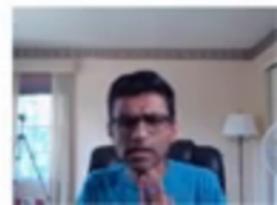
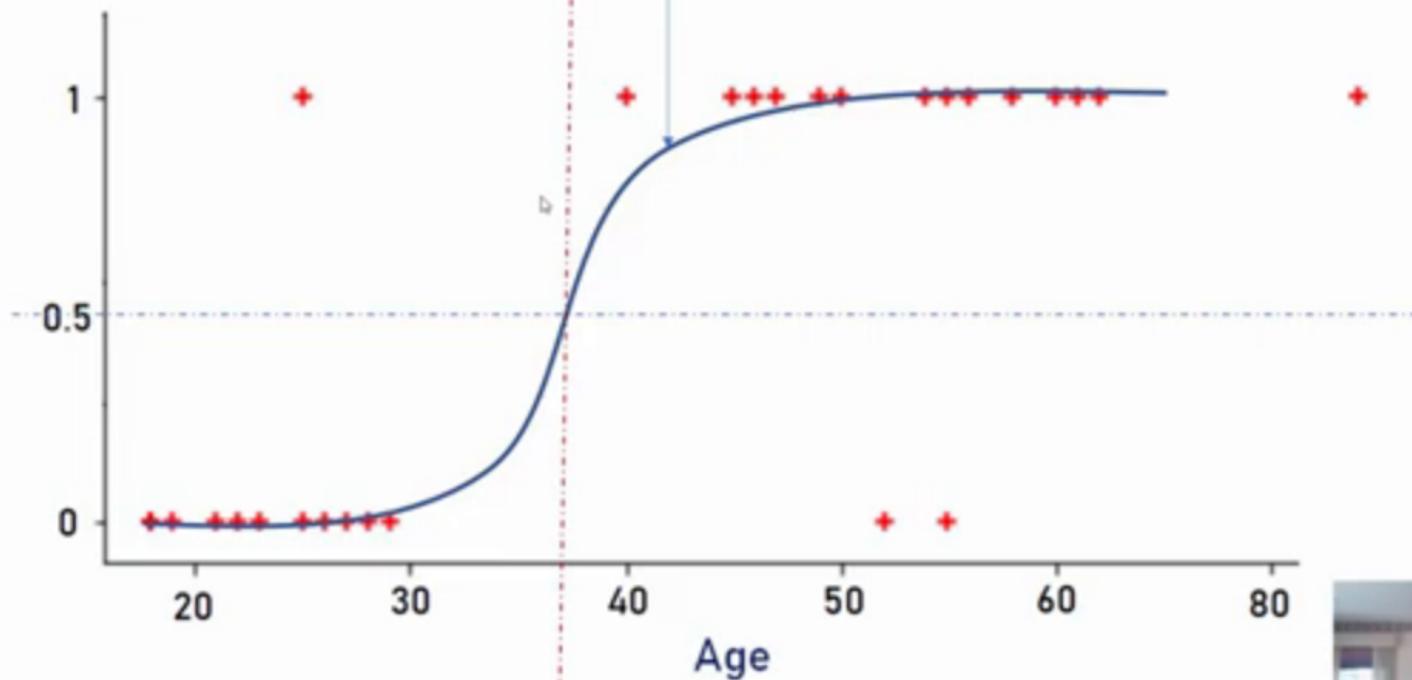
Sigmoid or Logit Function

Have Insurance?



Sigmoid or Logit Function

Have Insurance?



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

e = Euler's number ~ 2.71828

b₇



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$$\text{sigmoid}(-200) = \frac{1}{1+2.71^{200}} = \text{almost close to } 0$$

Sigmoid function converts input into range 0 to 1



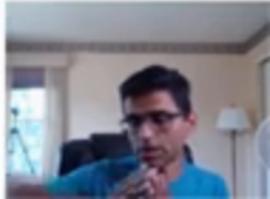
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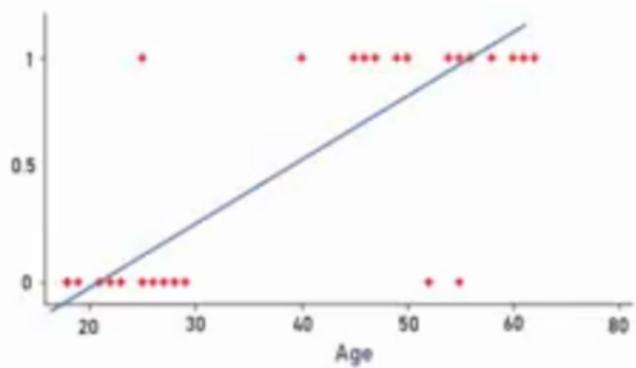
Sigmoid function converts input into range 0 to 1



Step 1

$$y = m * x + b$$

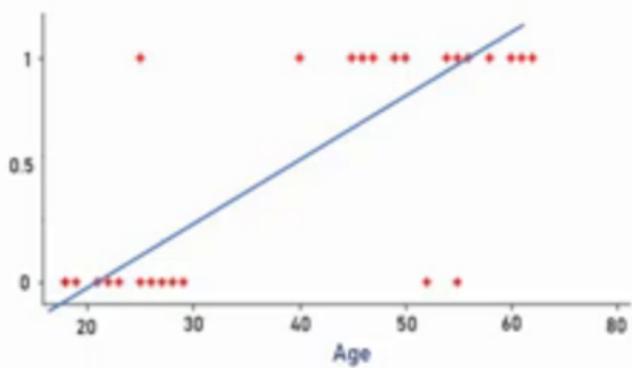
Step 2



Step 1

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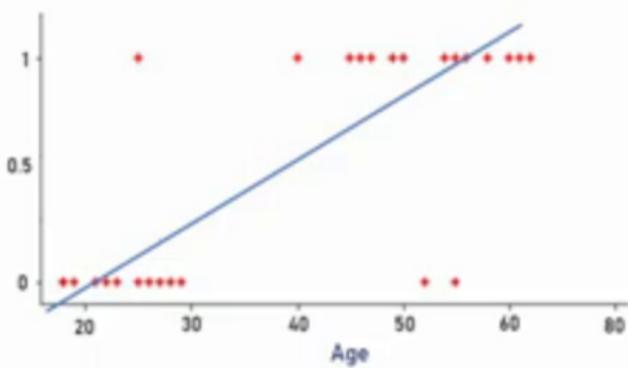
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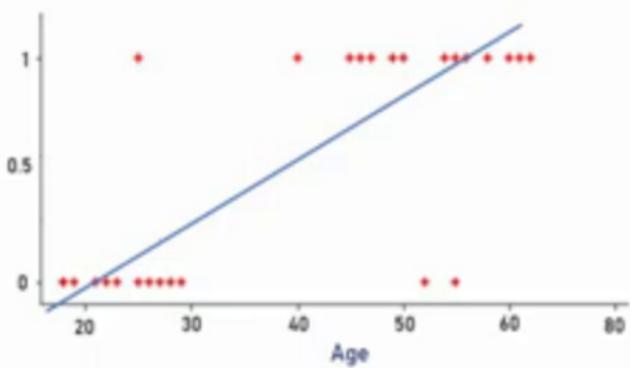
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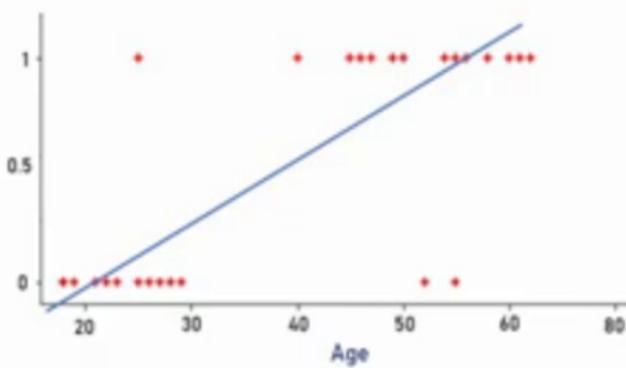
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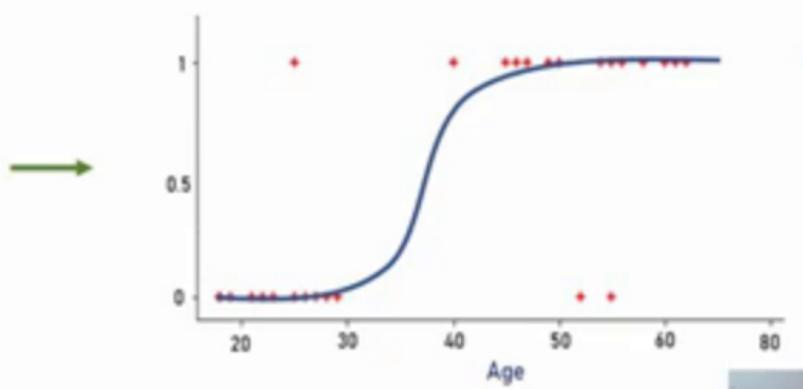
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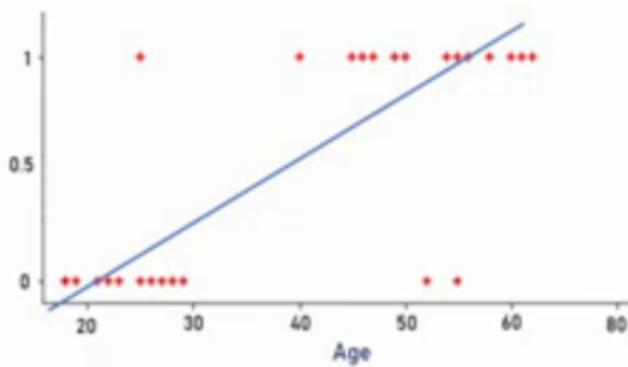
Step 2

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



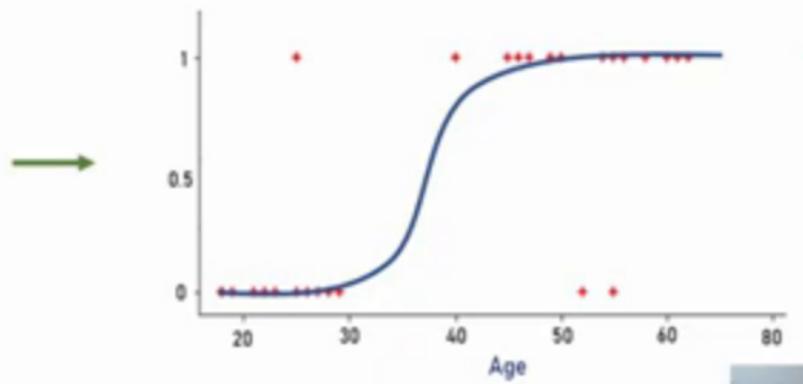
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Step 2

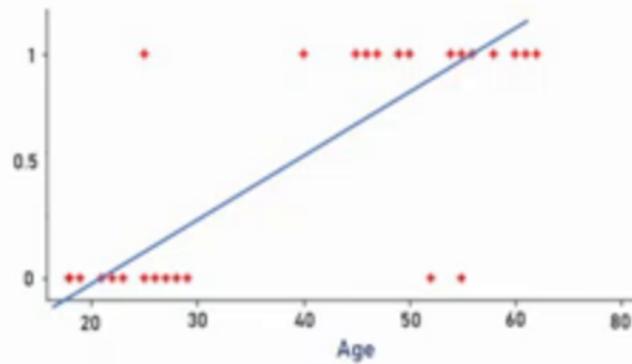
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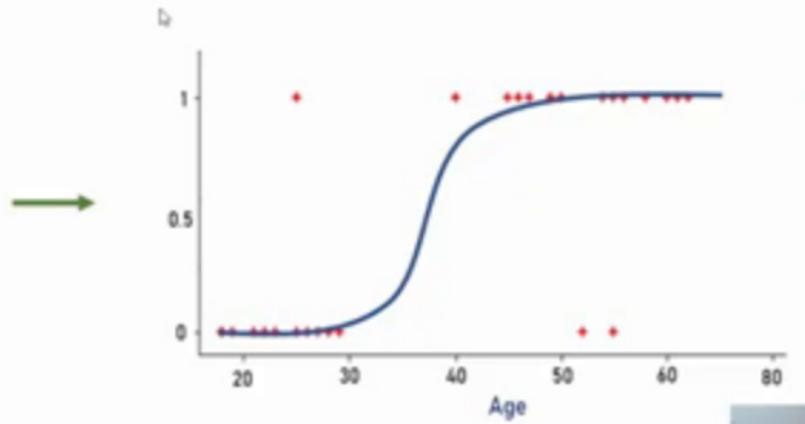
Age



Step 2

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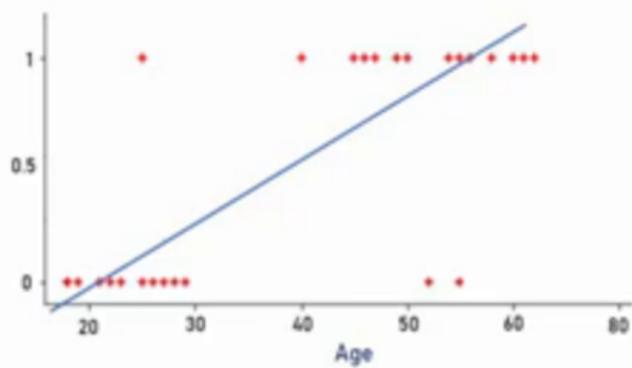
If person will buy insurance



Step 1

$$y = m * x + b$$

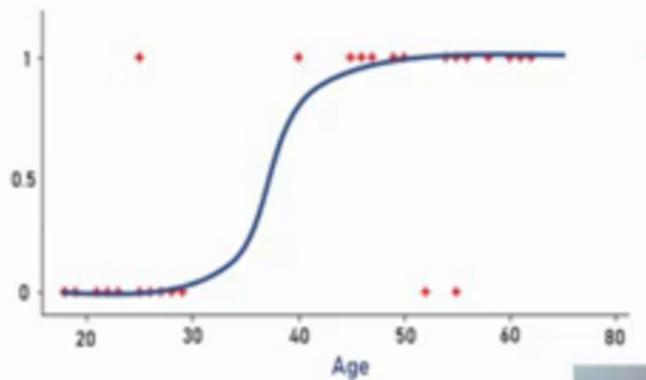
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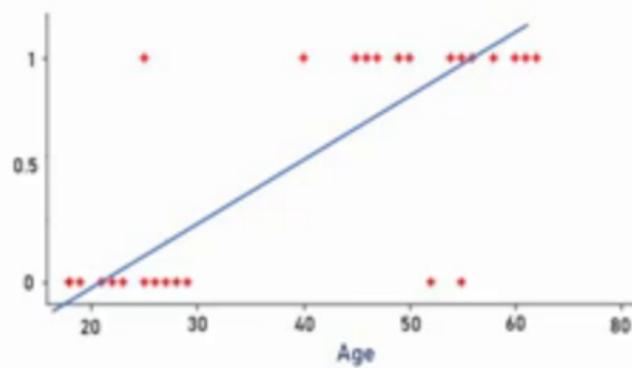
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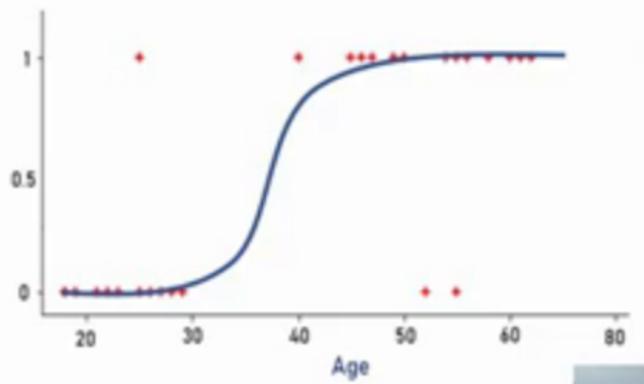
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Step 2

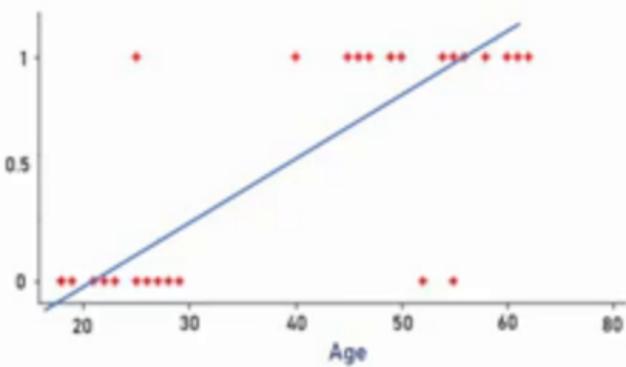
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If person will buy insurance



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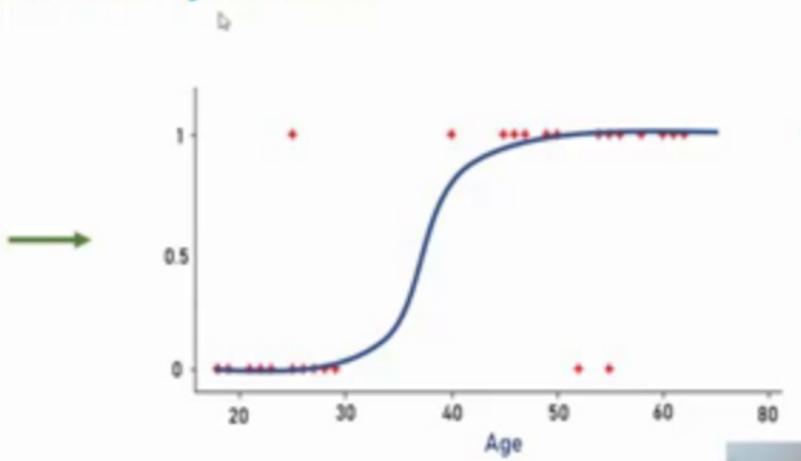
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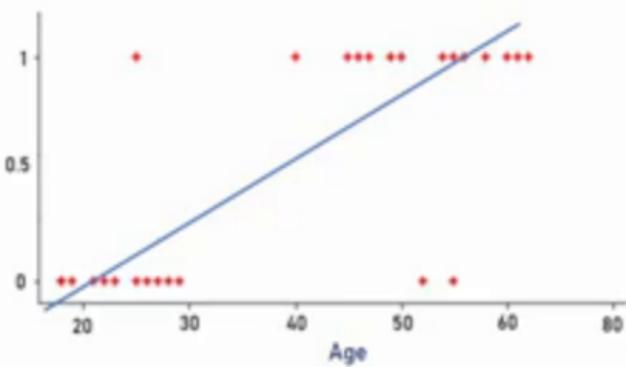
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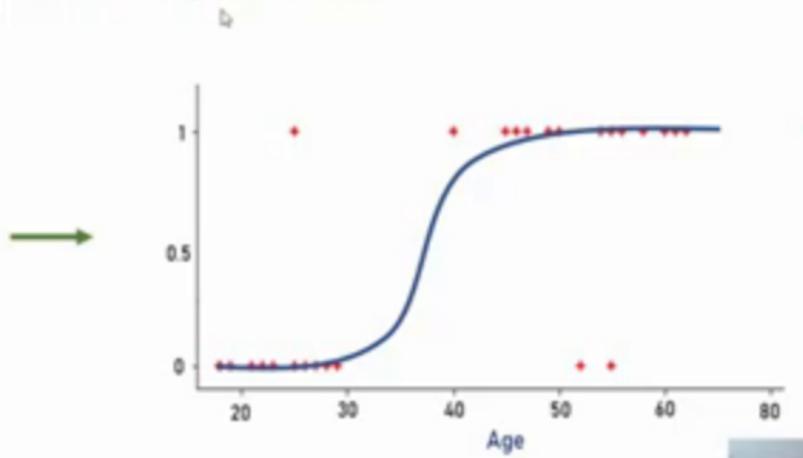
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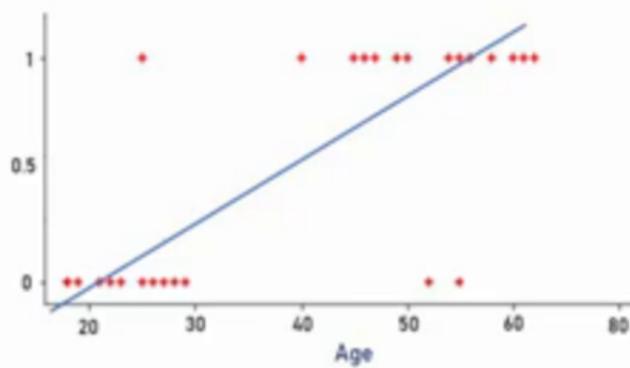
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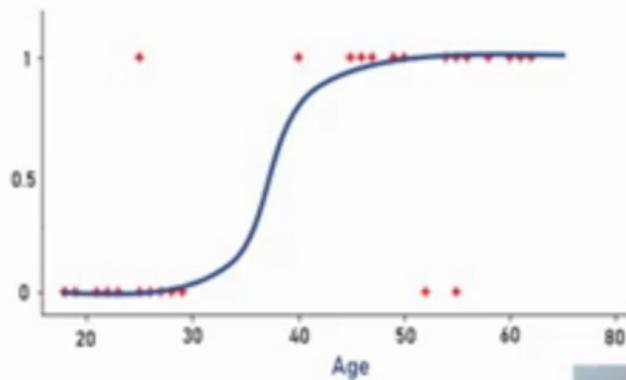
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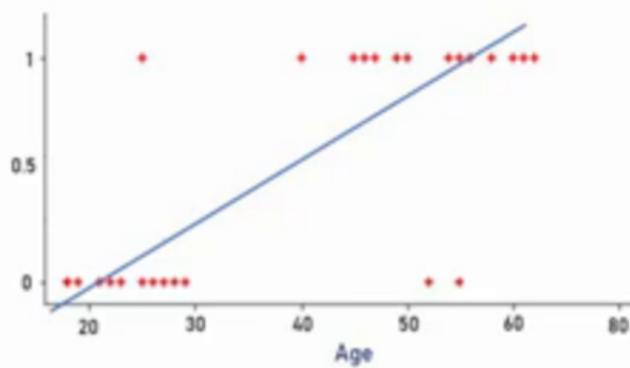
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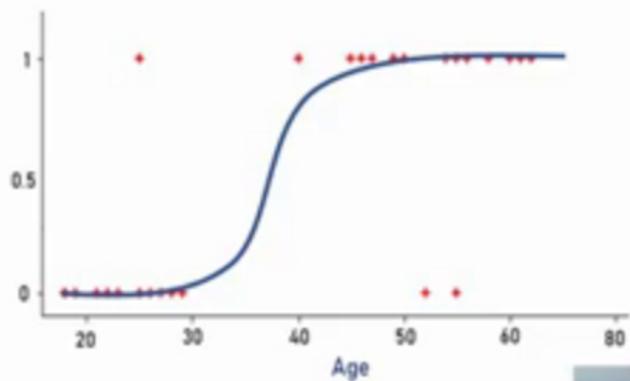
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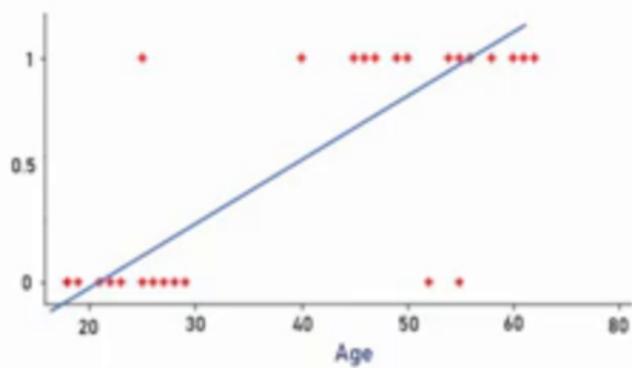
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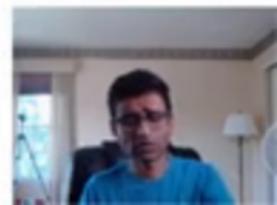
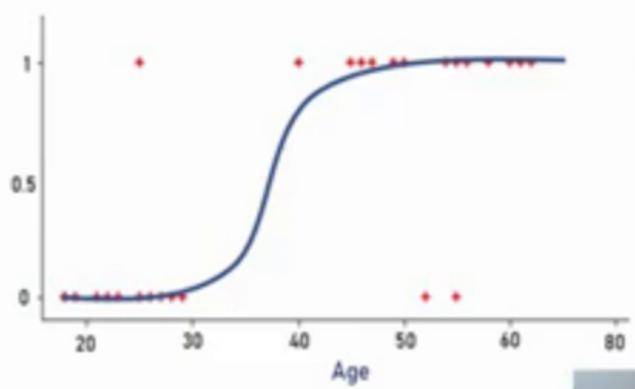
Age



Step 2

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

If person will buy insurance



$$y = 0.042 * x - 1.53$$

Age



$$y = 0.042 * x - 1.53$$

↳ Age



24	50
25	54

model.coef_ indicates value of m in $y = m \cdot x + b$ equation

In [67]: model.coef_

Out[67]: array([[0.04150133]])

model.intercept_ indicates value of b in $y = m \cdot x + b$ equation

In [68]: model.intercept_

Out[68]: array([-1.52726963])

Lets defined sigmoid function now and do the math with hand

```
In [43]: import math
def sigmoid(x):
    return 1 / (1 + math.exp(-x))
```

```
In [75]: def prediction_function(age):
    z = 0.042 * age - 1.53 # 0.04150133 ~ 0.042 and -1.52726963 ~ -1.53
    y = sigmoid(z)
    return y
```

```
In [76]: age = 35
prediction_function(age)
```

Out[76]: 0.4850044983805899

0.485 is less than 0.5 which means person with 35 age will not buy insurance





24	50
25	54

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    return y
```

```
In [76]: age = 35  
prediction_function(age)
```

Out[76]: 0.4850044983805899

0.485 is less than 0.5 which means person with 35 age will not buy insurance

model.coef_ indicates value of m in $y = m \cdot x + b$ equation

```
In [67]: model.coef_
Out[67]: array([0.04150133])
```

model.intercept_ indicates value of b in $y = m \cdot x + b$ equation

```
In [68]: model.intercept_
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    return 1 / (1 + math.exp(-x))
```

```
In [75]: def prediction_function(age):
    z = 0.042 * age - 1.53 # 0.04150133 ~ 0.042 and -1.52726963 ~ -1.53
    y = sigmoid(z)
    return y
```

```
In [76]: age = 35
prediction_function(age)
Out[76]: 0.4850044983805899
```

0.485 is less than 0.5 which means person with 35 age will not buy insurance



b₂

$$y = 0.042 * x - 1.53$$

↑
Age



b_r

$$y = 0.042 * x - 1.53$$

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

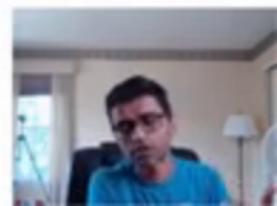
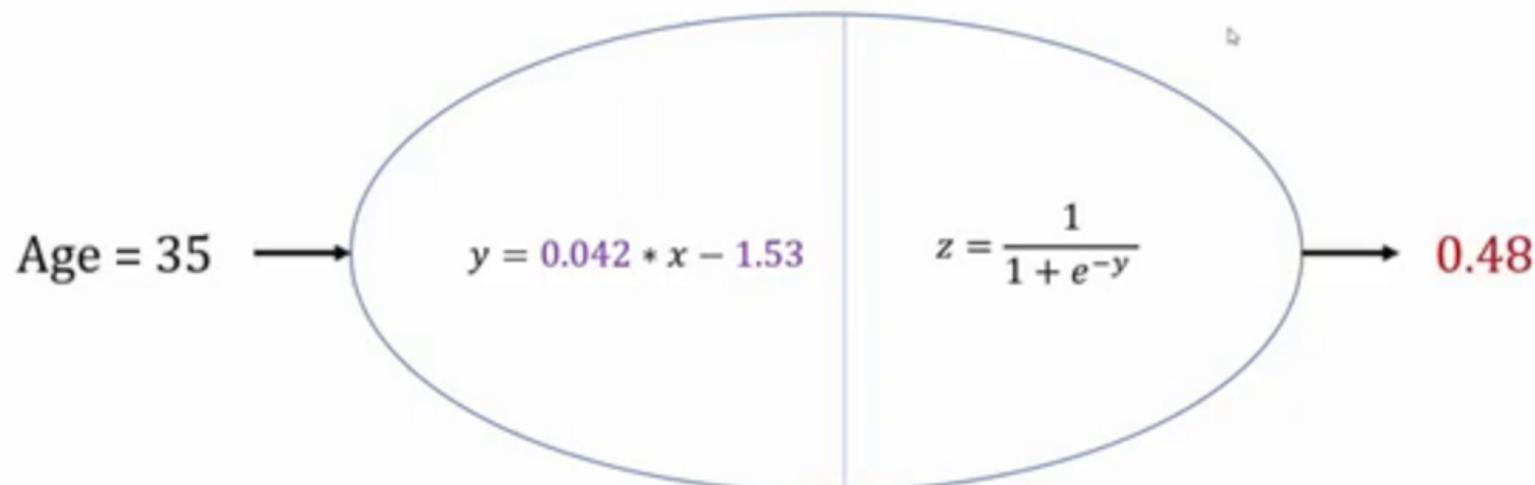
b_r

$$y = 0.042 * x - 1.53$$

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

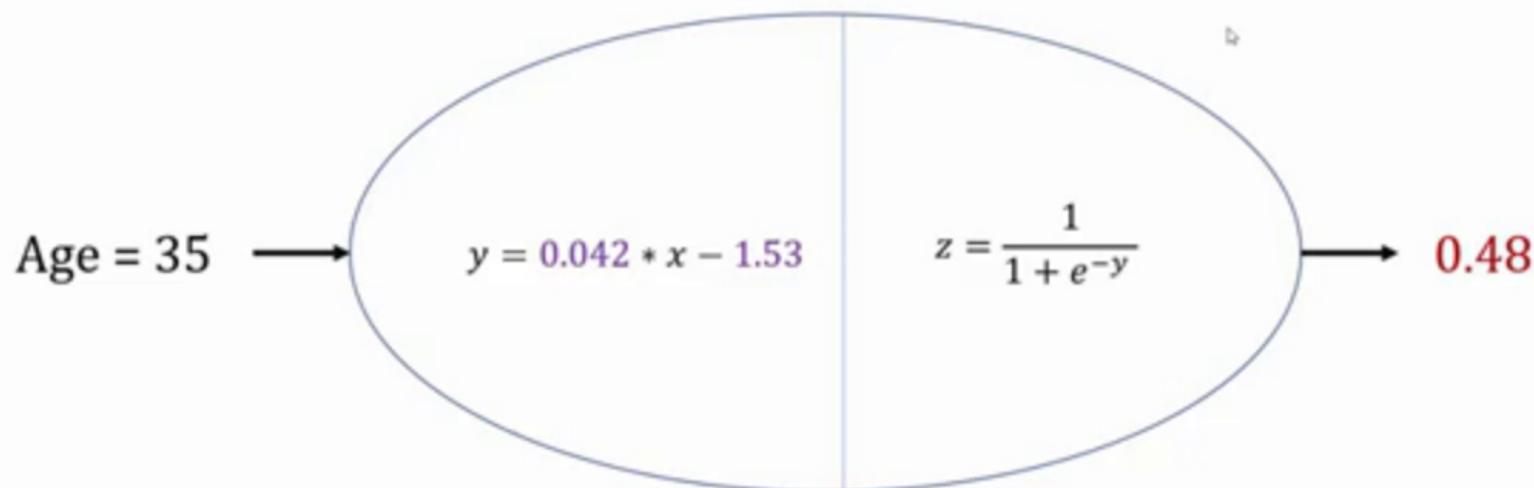
value < 0.5 = person will not buy insurance

value >= 0.5 = person **will** buy insurance



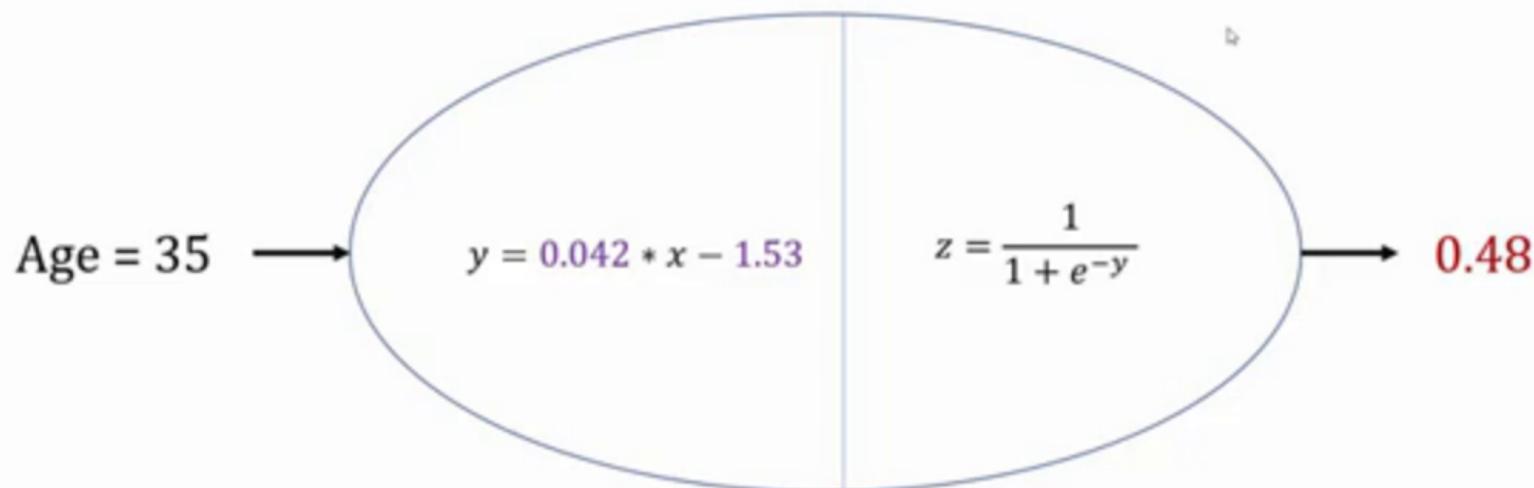
value < 0.5 = person will not buy insurance

value >= 0.5 = person **will** buy insurance



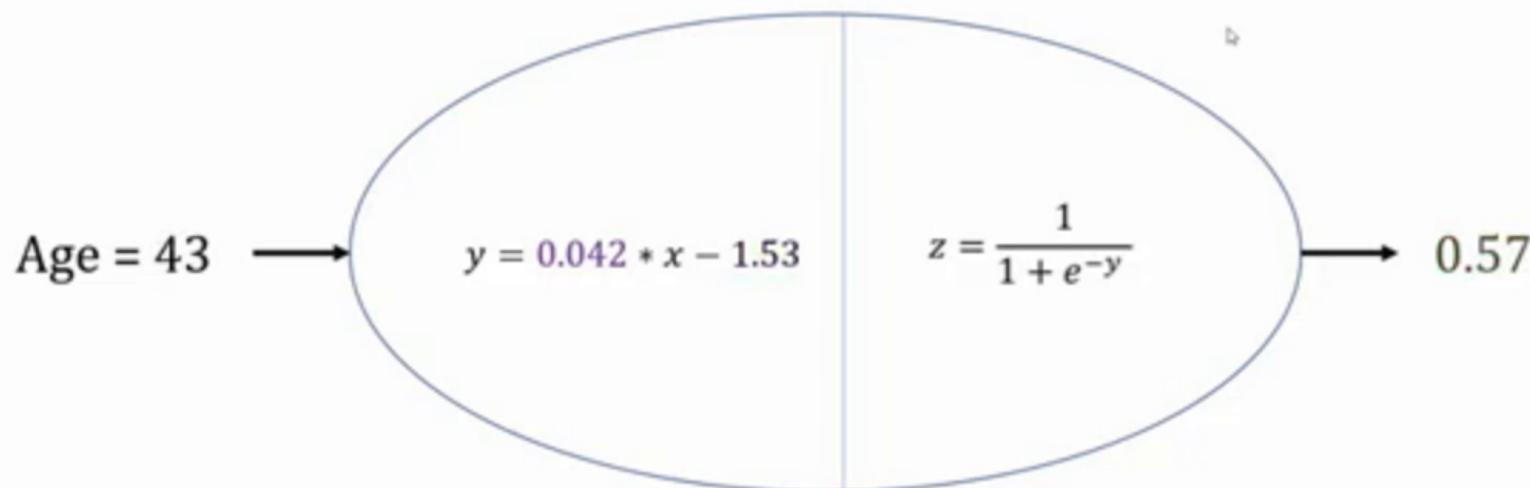
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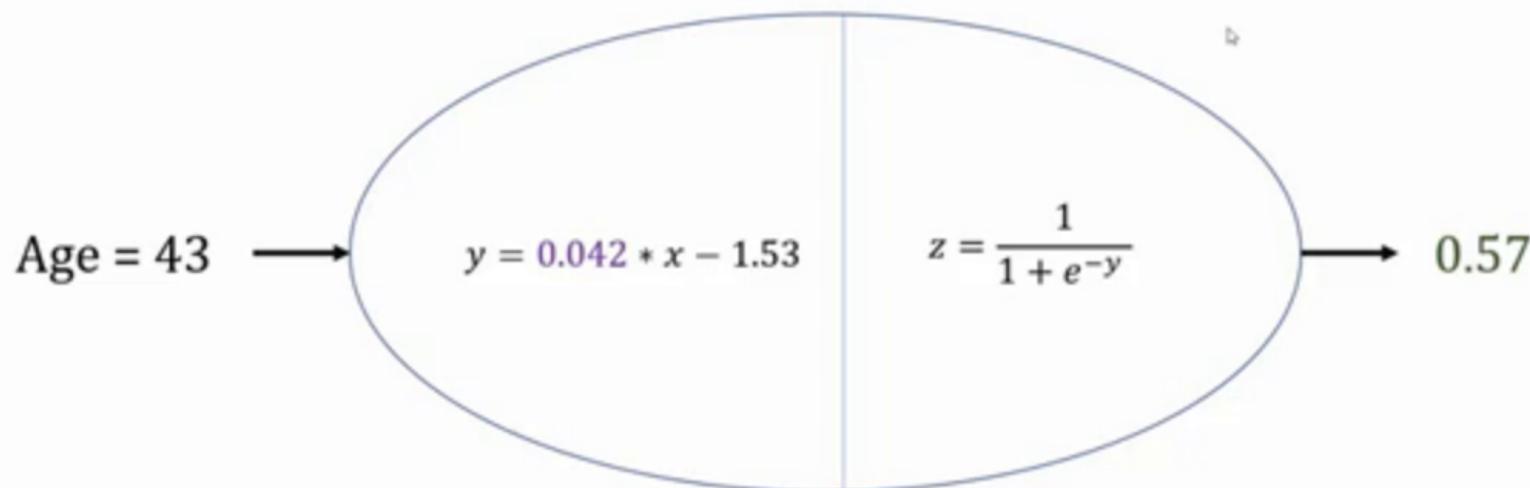
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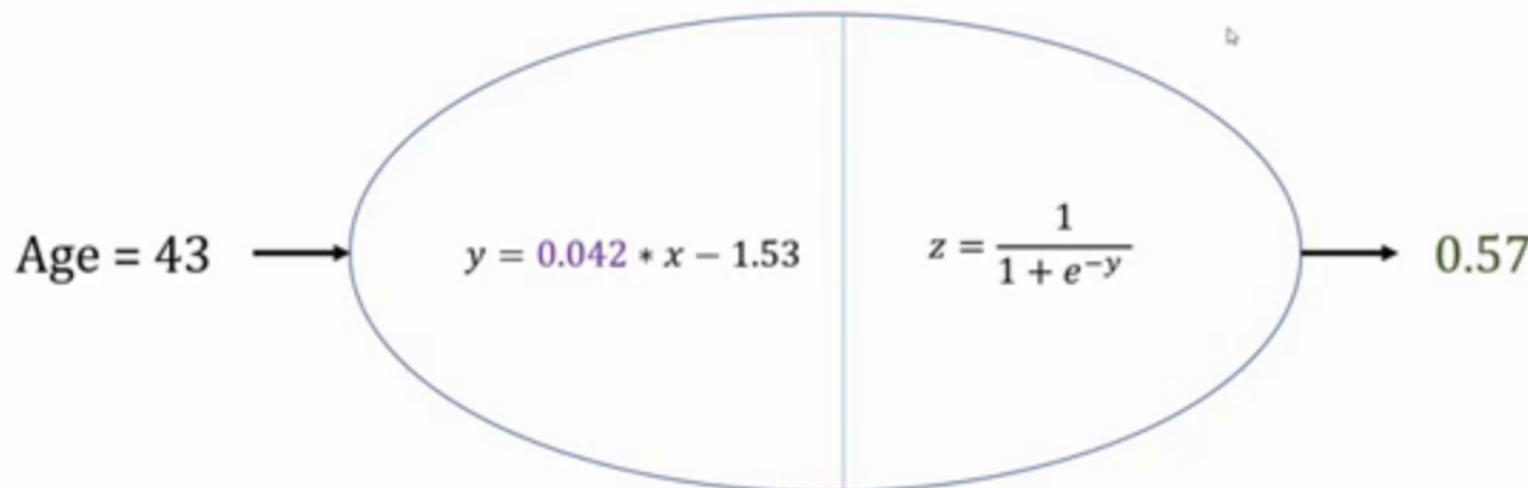
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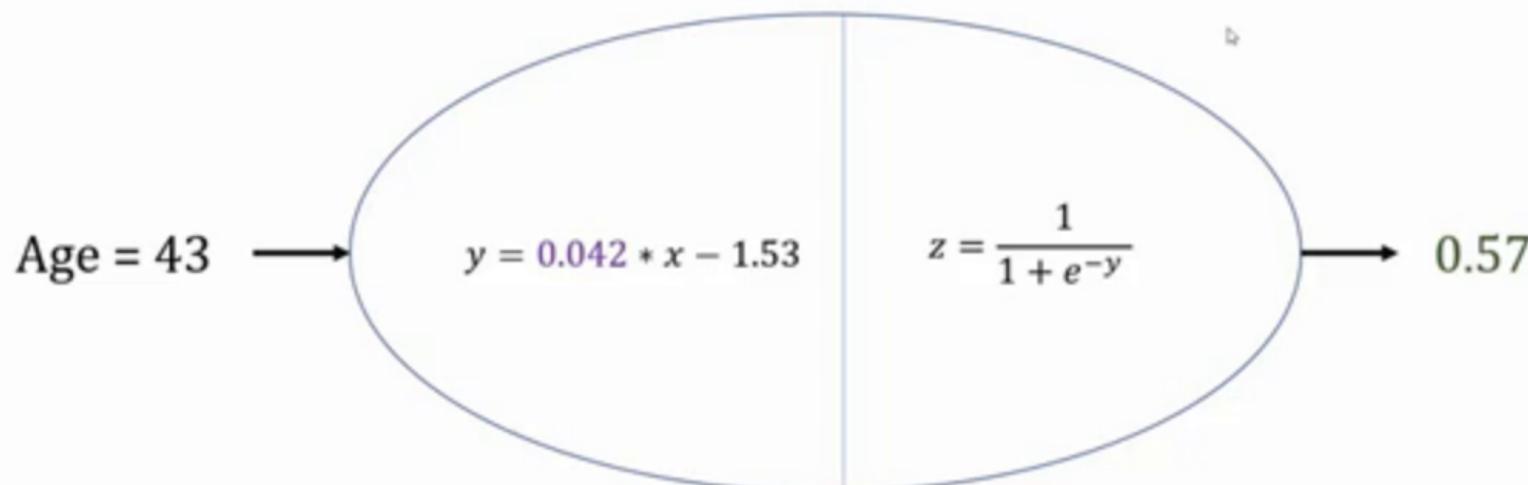
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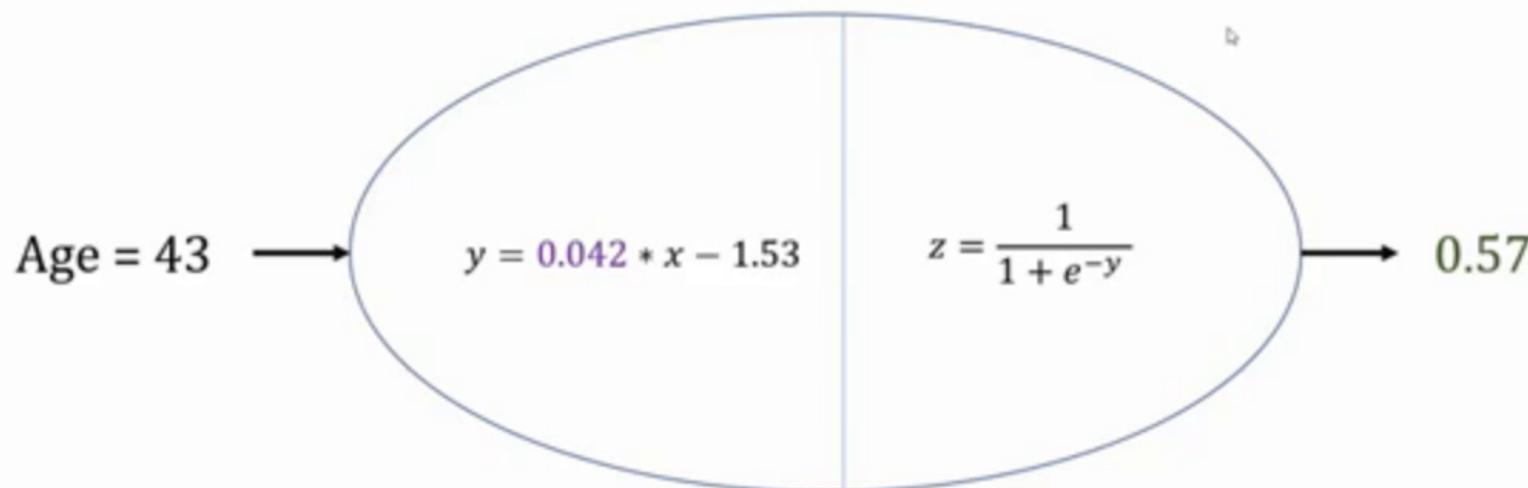
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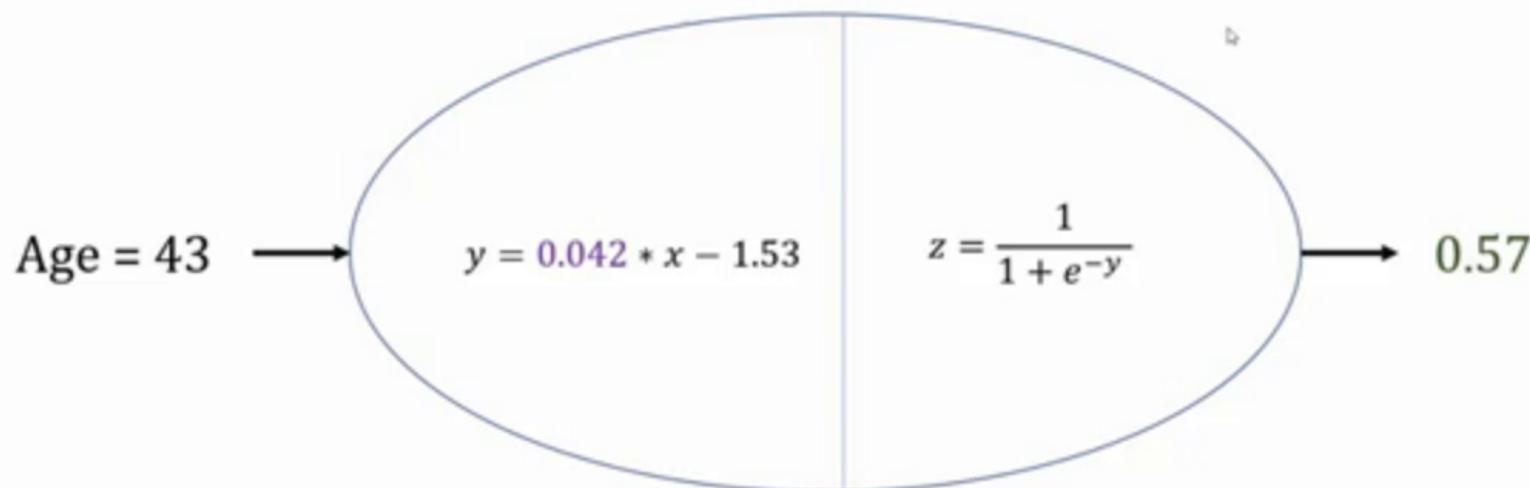
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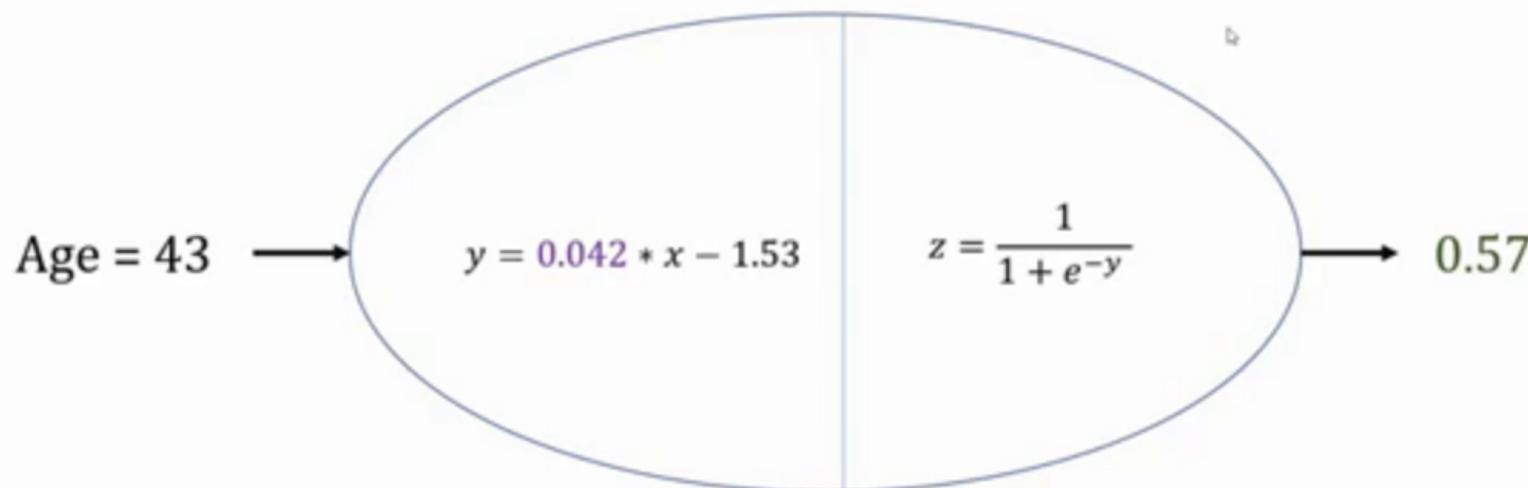
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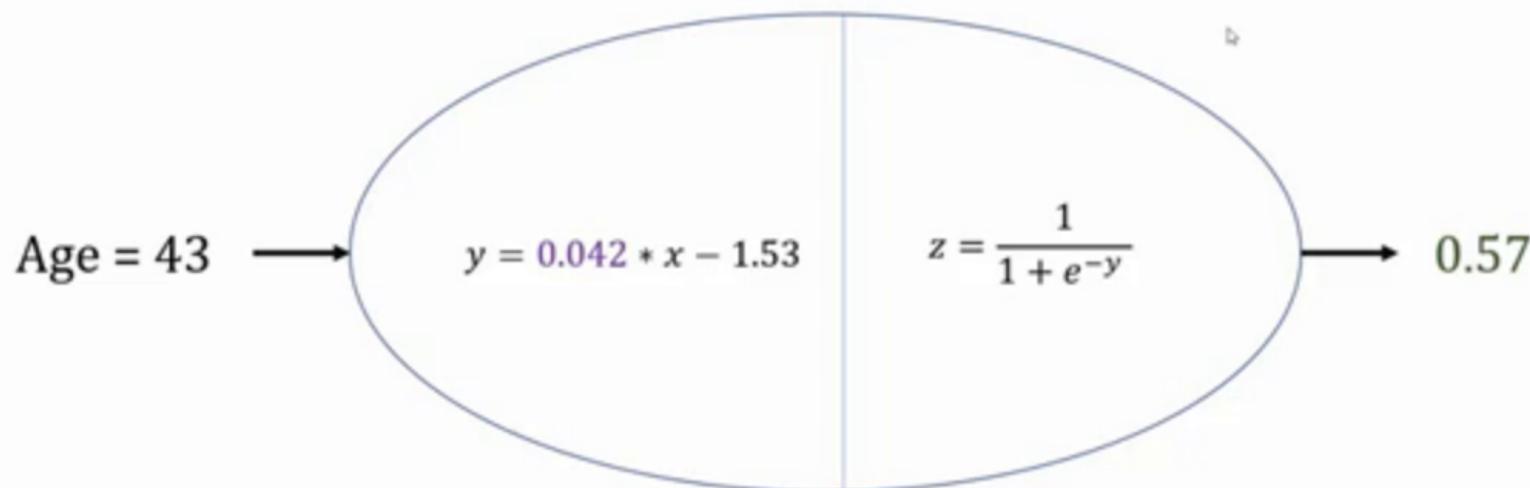
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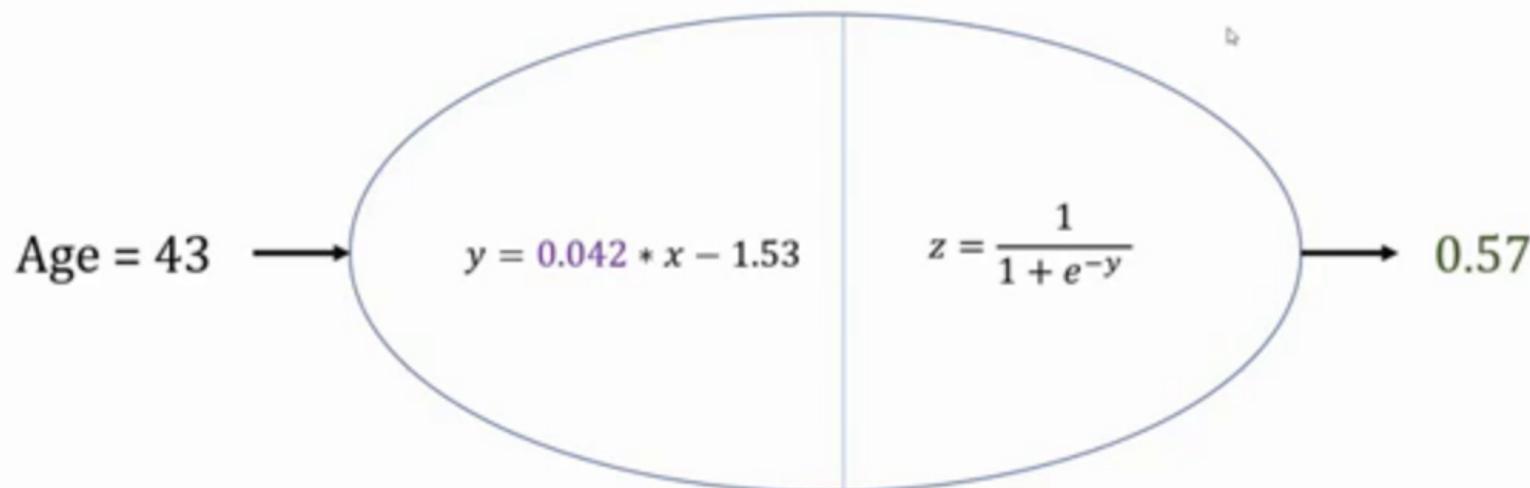
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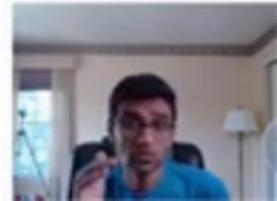
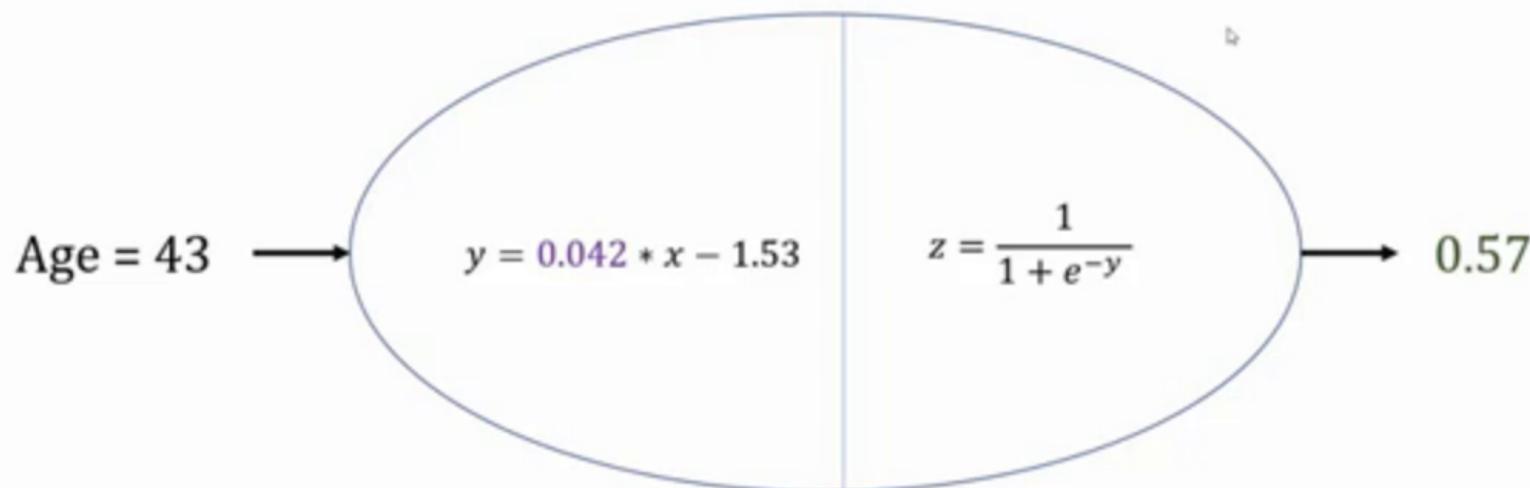
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$$y = 0.042 * x - 1.53$$

Age

$$y = 0.042 * x_1 + 0.008 * x_2 + 0.2 * x_3 - 1.53$$

Age Income Education

$$y = w_1 * x_1 + w_2 * x_2 + w_3 * x_3 + b$$

$$y = \sum_{i=0}^n w^i x^i + b$$



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Age Income Education

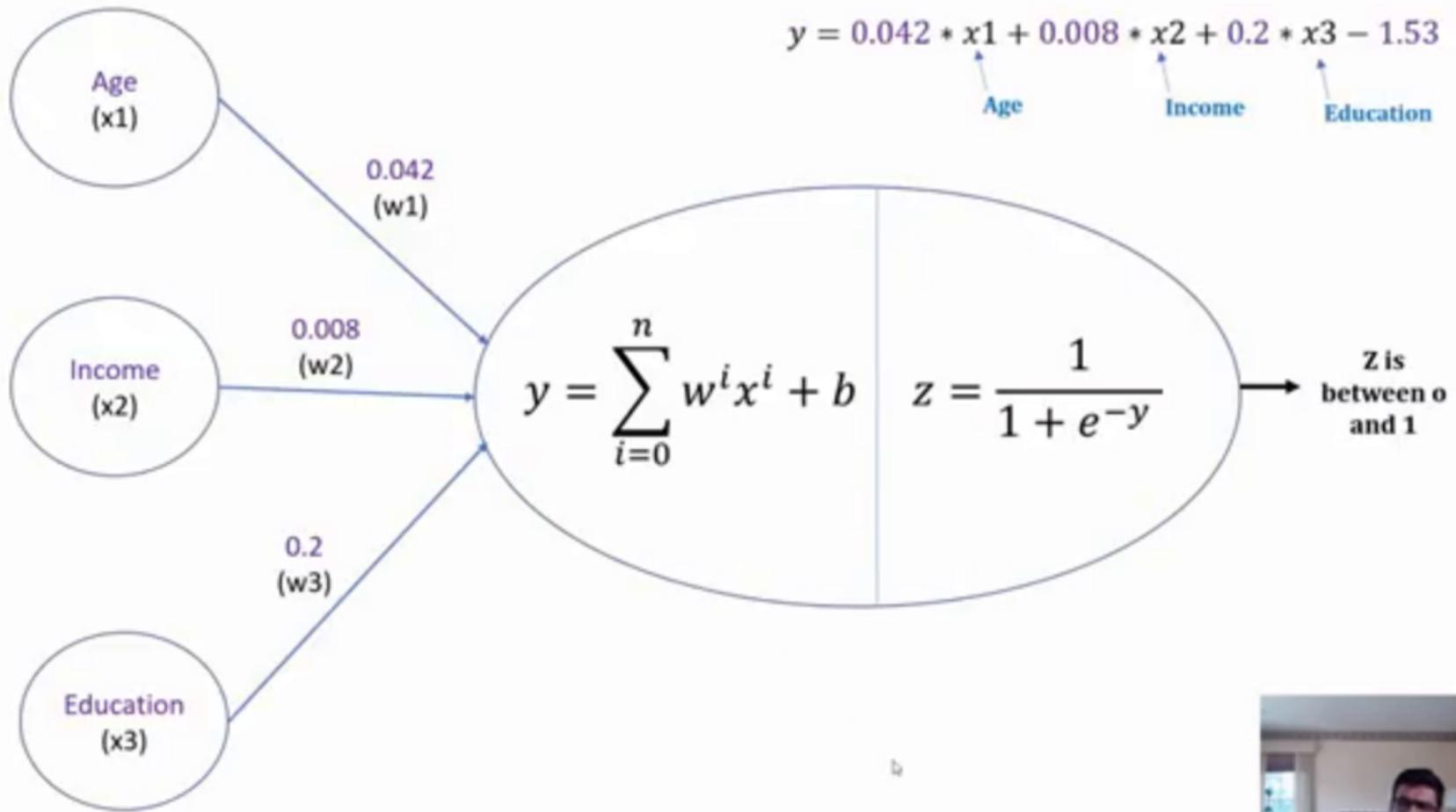
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Age Income Education



b



$$y = 0.042 * x_1 + 0.008 * x_2 + 0.2 * x_3 - 1.53$$

Age

Income

Education

0.042
(w1)

0.008
(w2)

0.2
(w3)

$$y = \sum_{i=0}^n w^i x^i + b$$

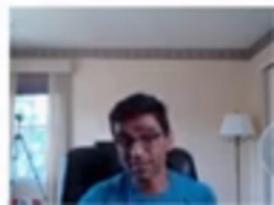
$$z = \frac{1}{1 + e^{-y}}$$

z is
between 0
and 1

Age
(x1)

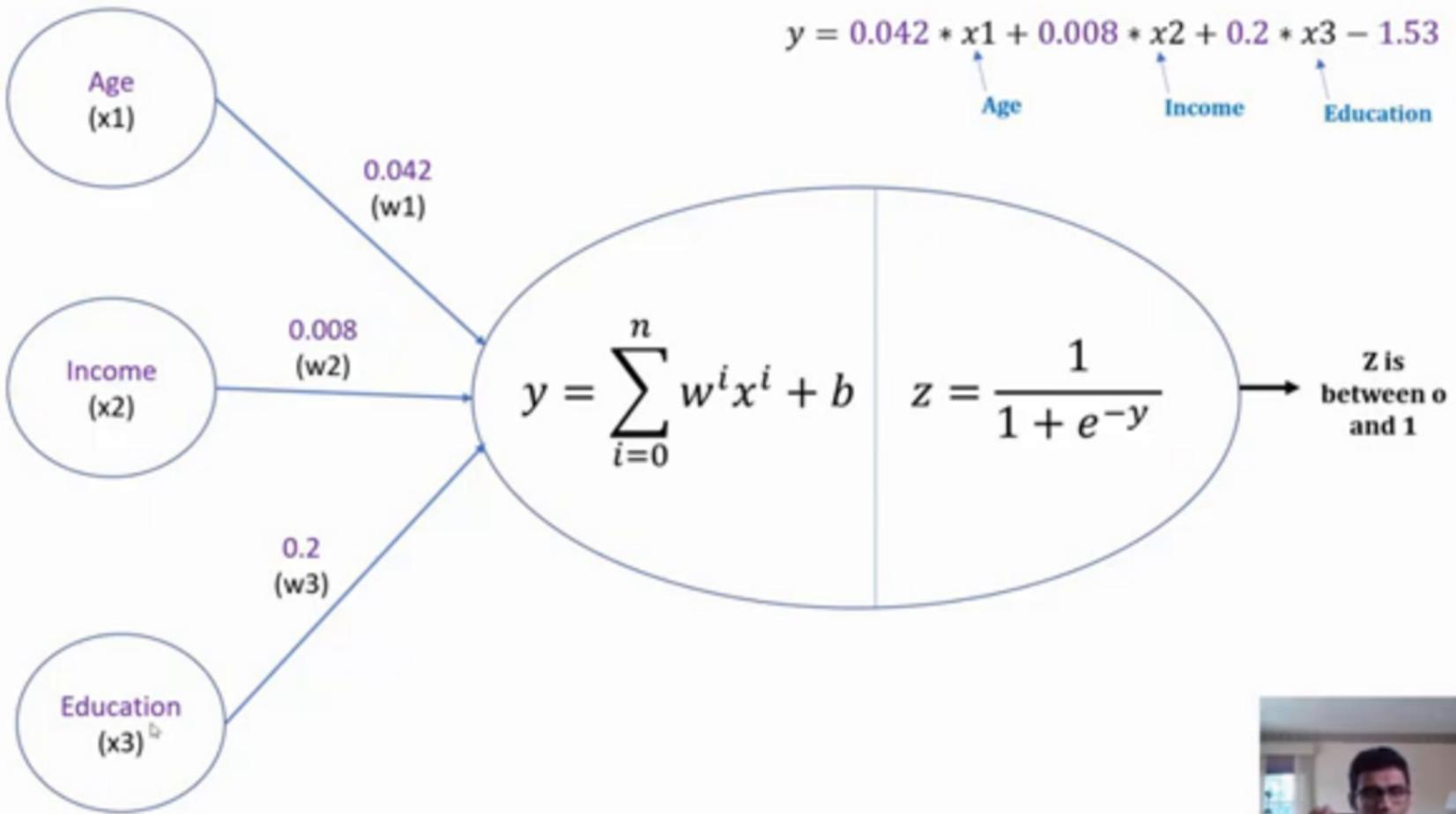
Income
(x2)

Education
(x3)



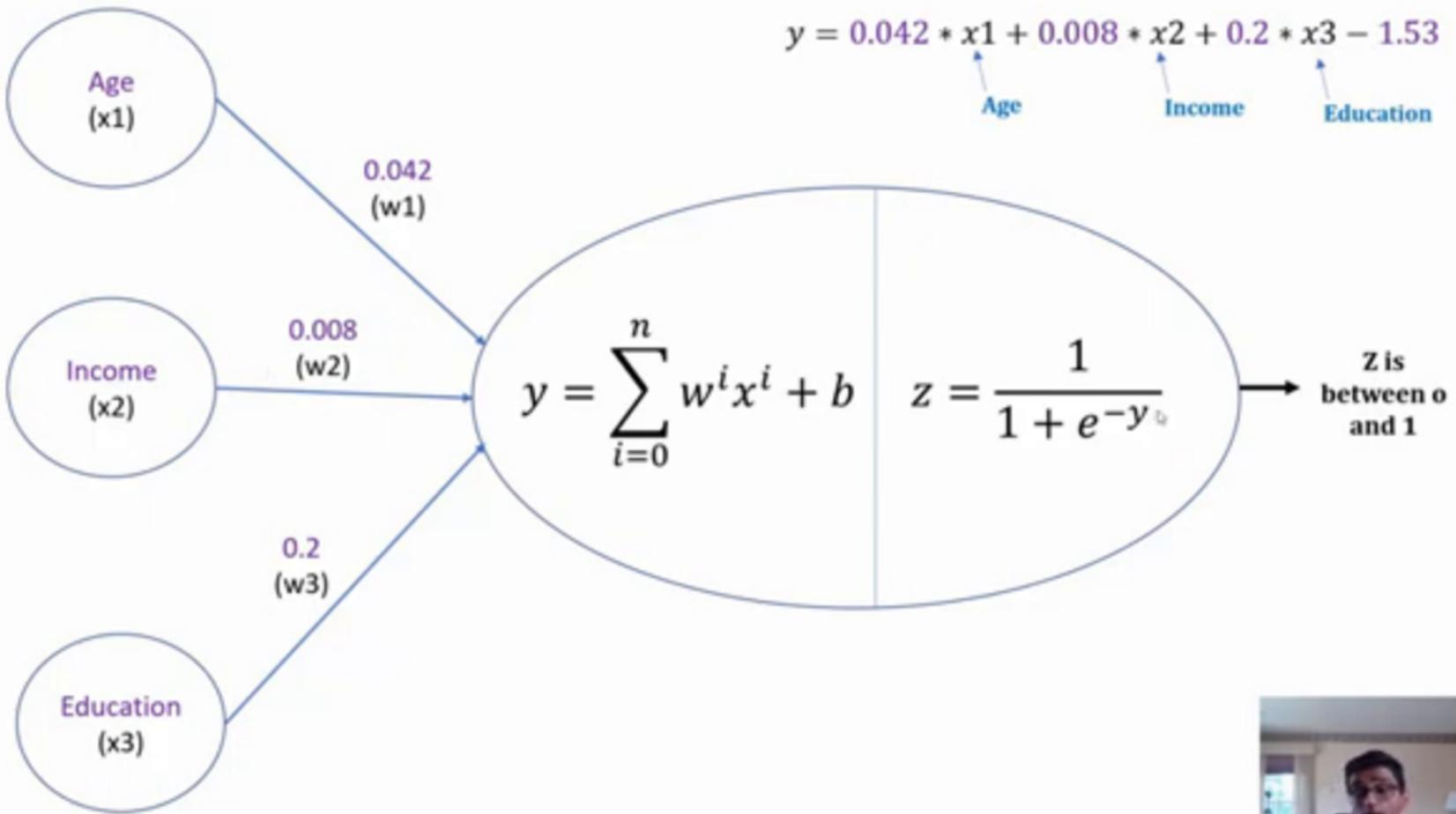
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Age Income Education



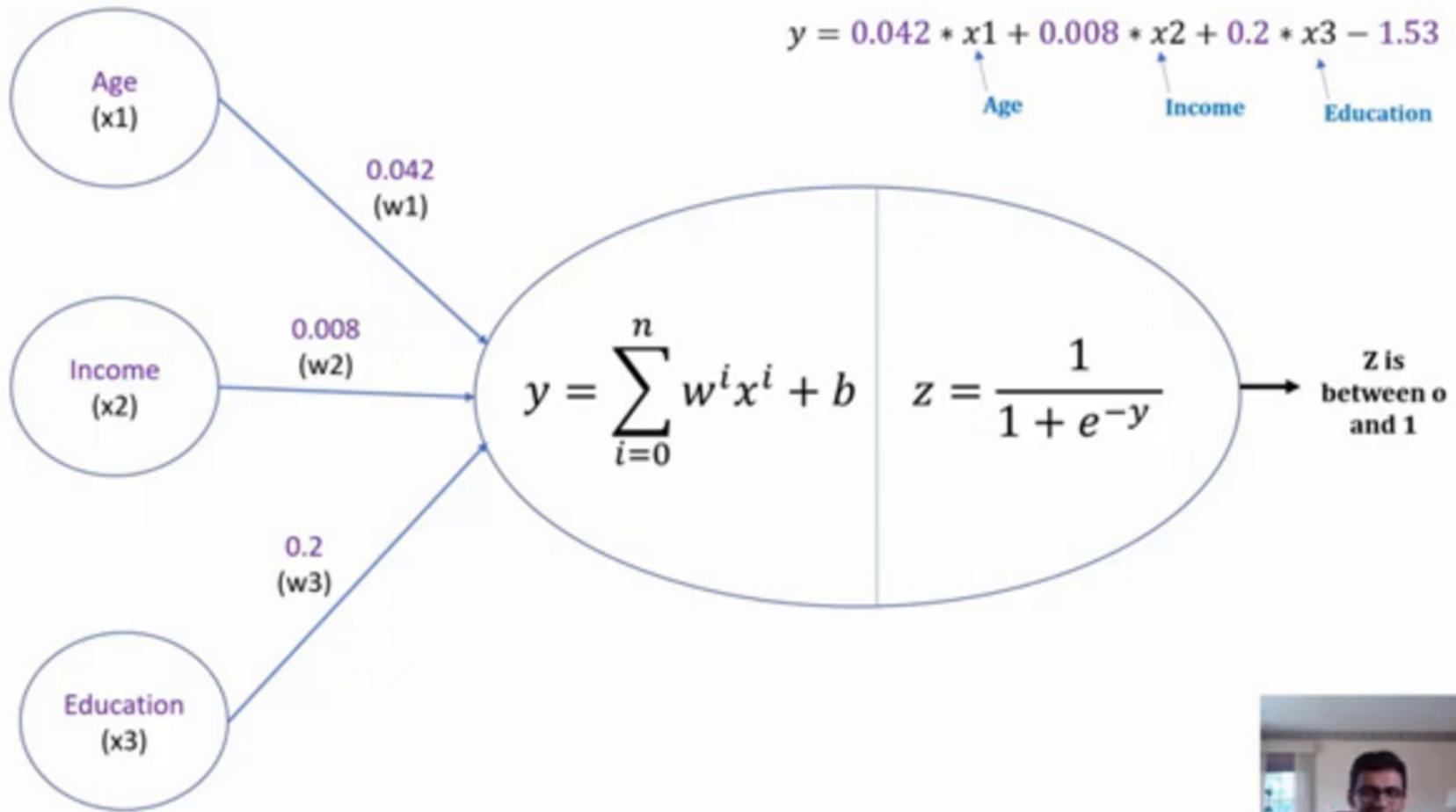
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Age Income Education



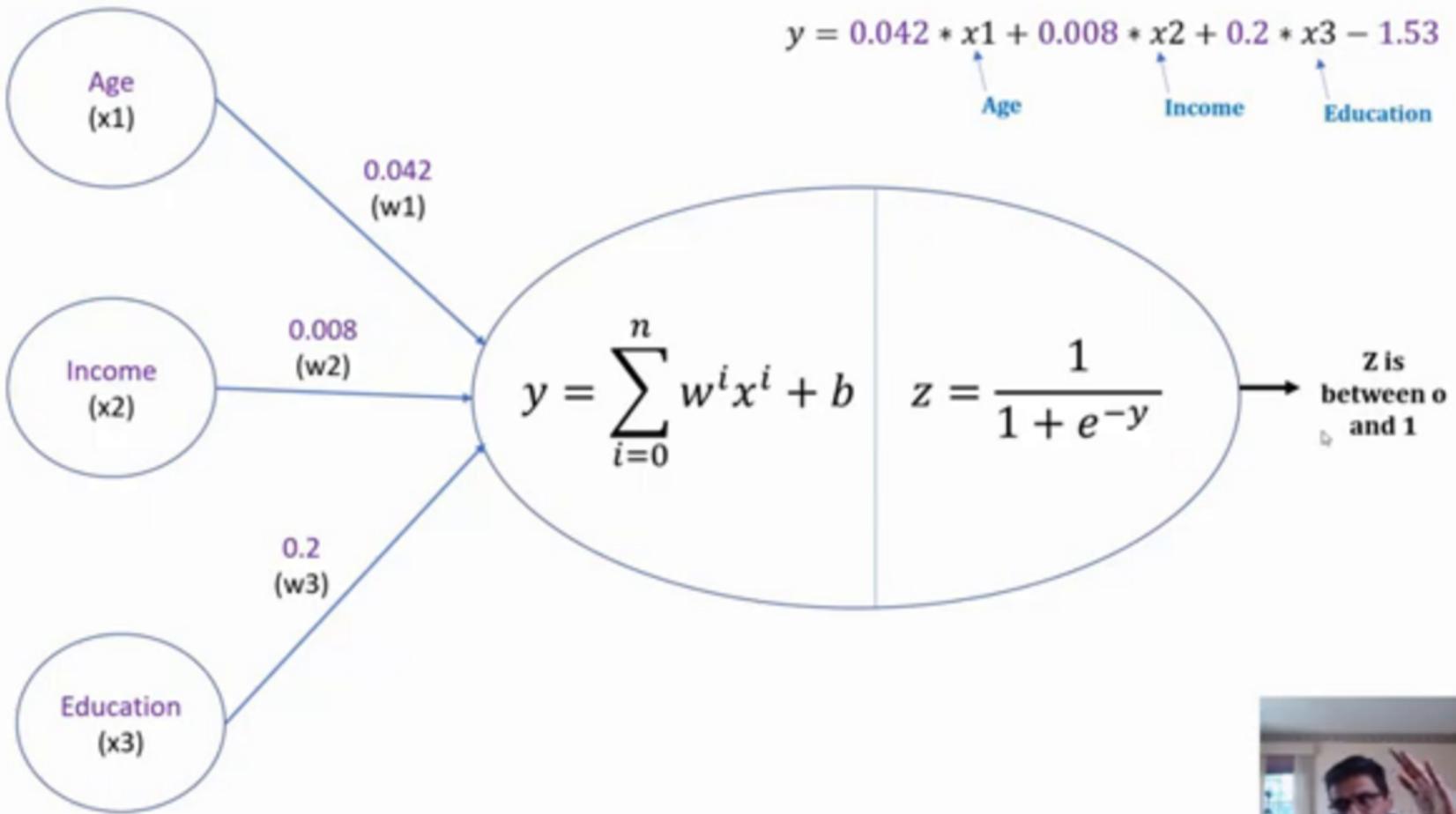
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Age Income Education



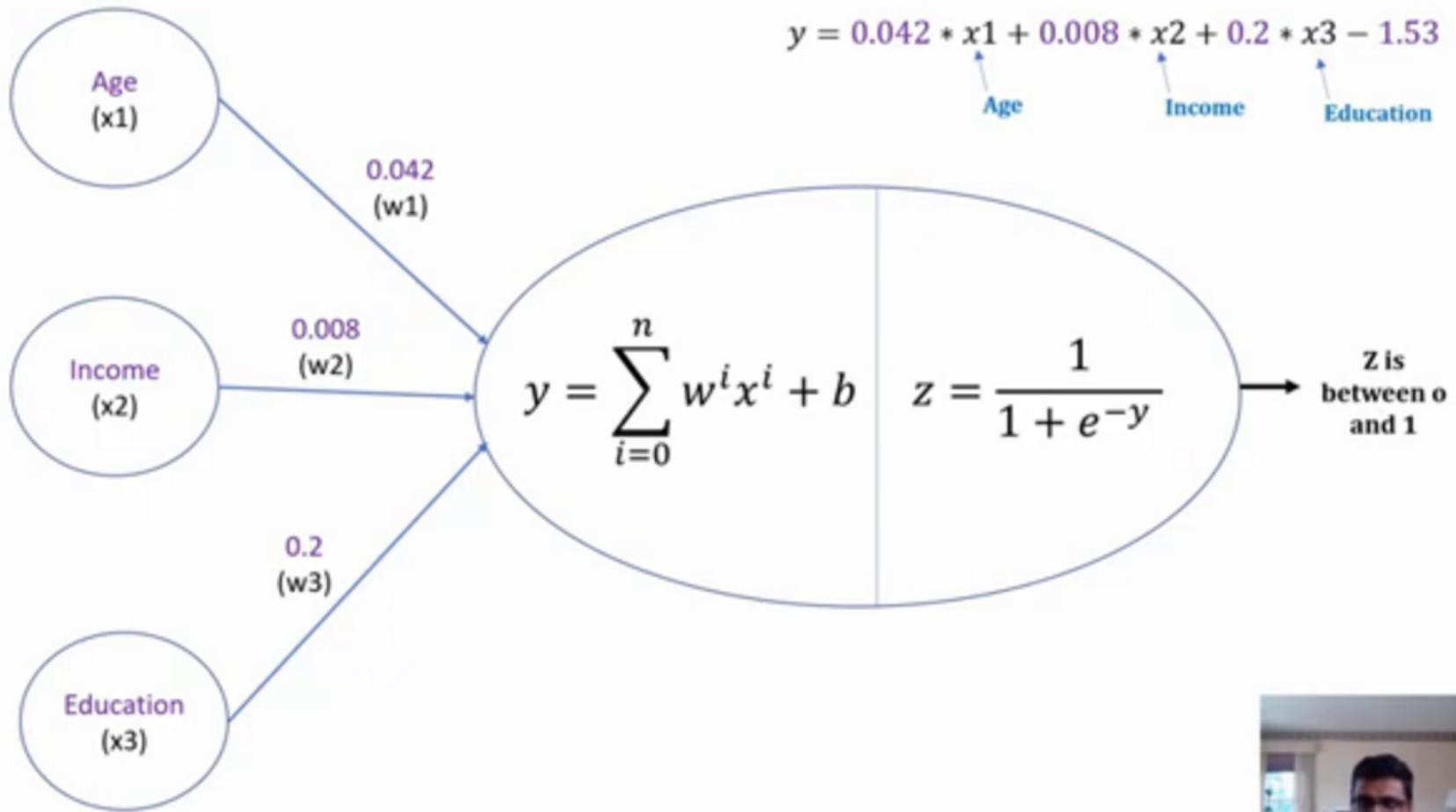
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Age Income Education



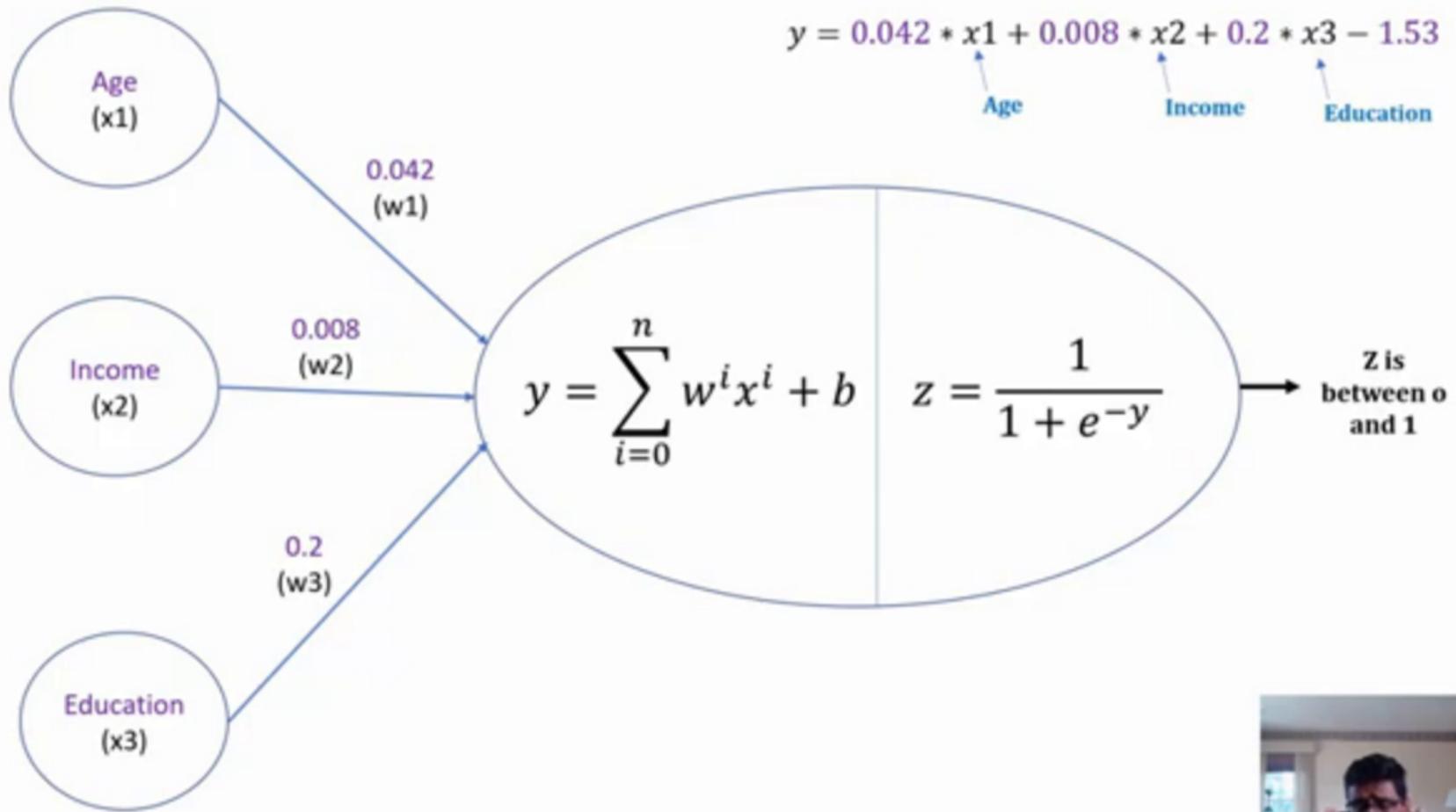
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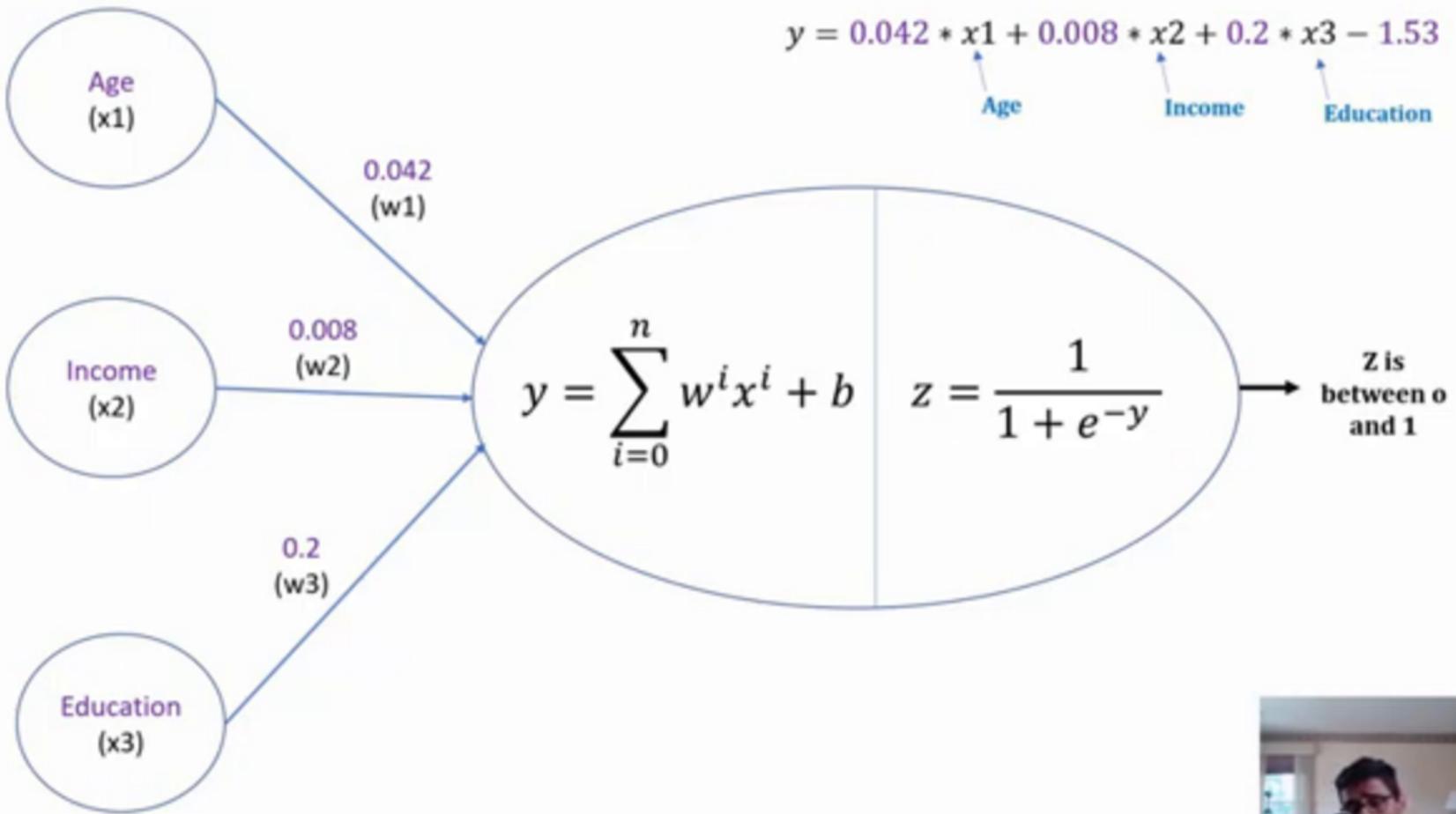
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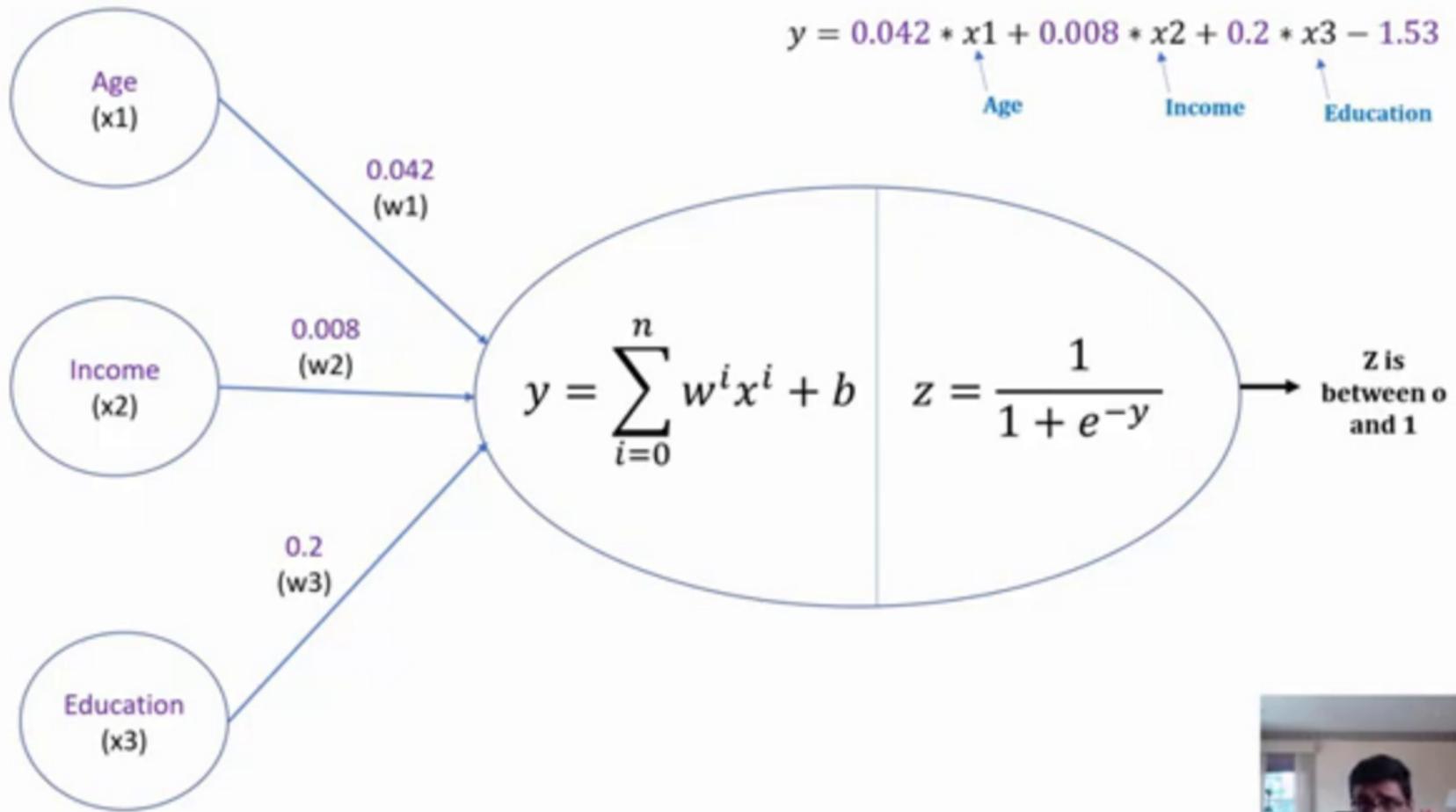
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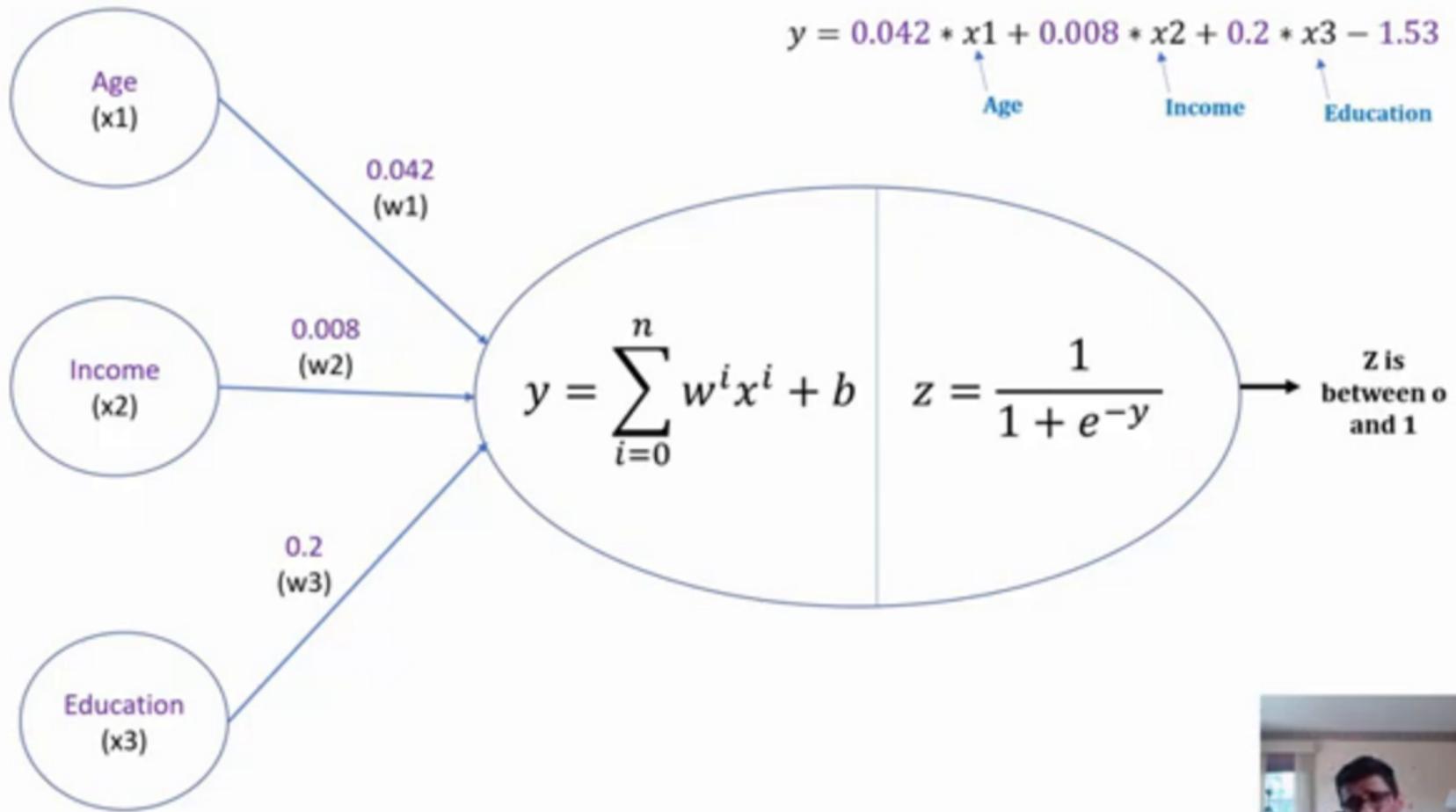
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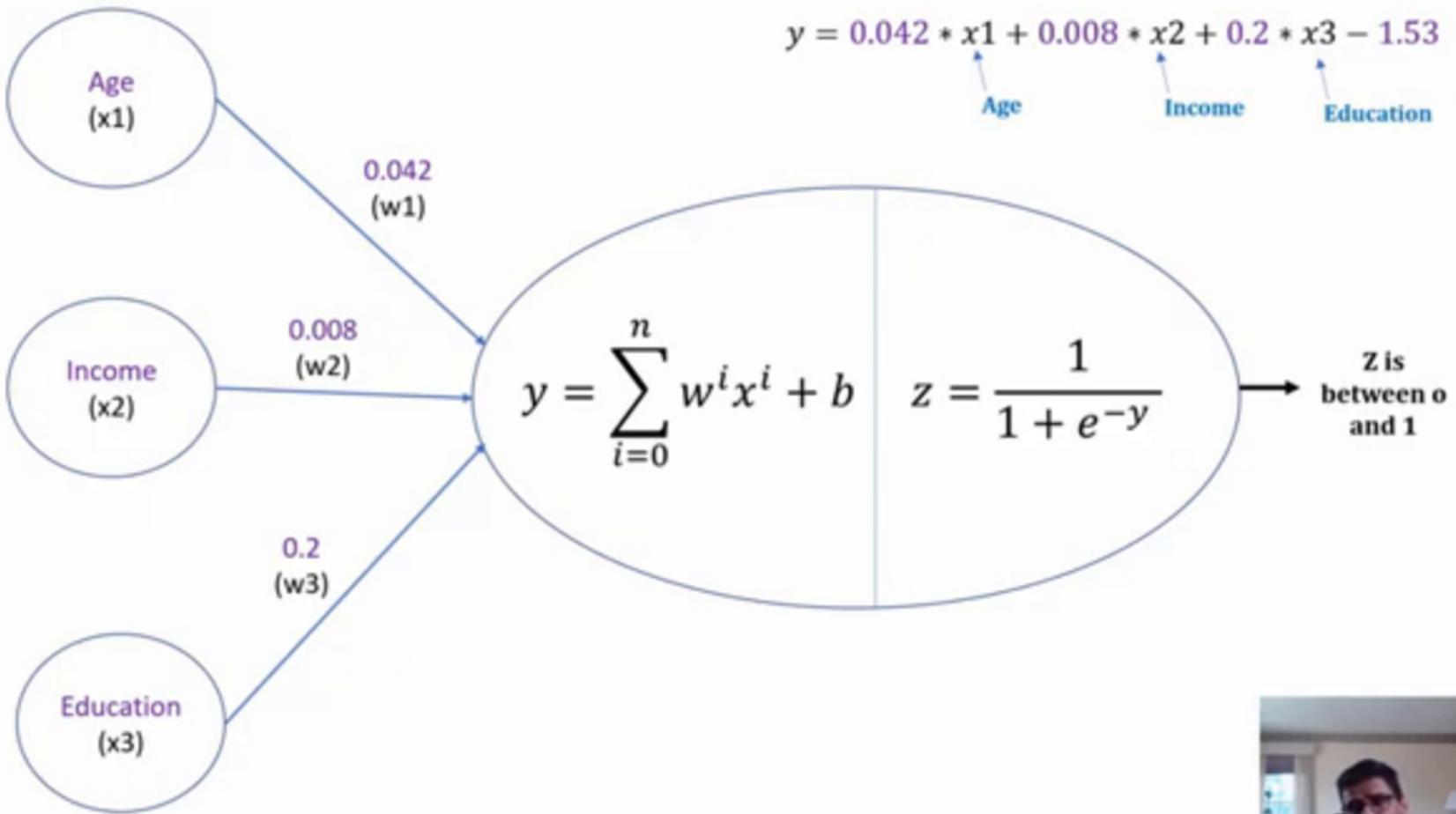
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