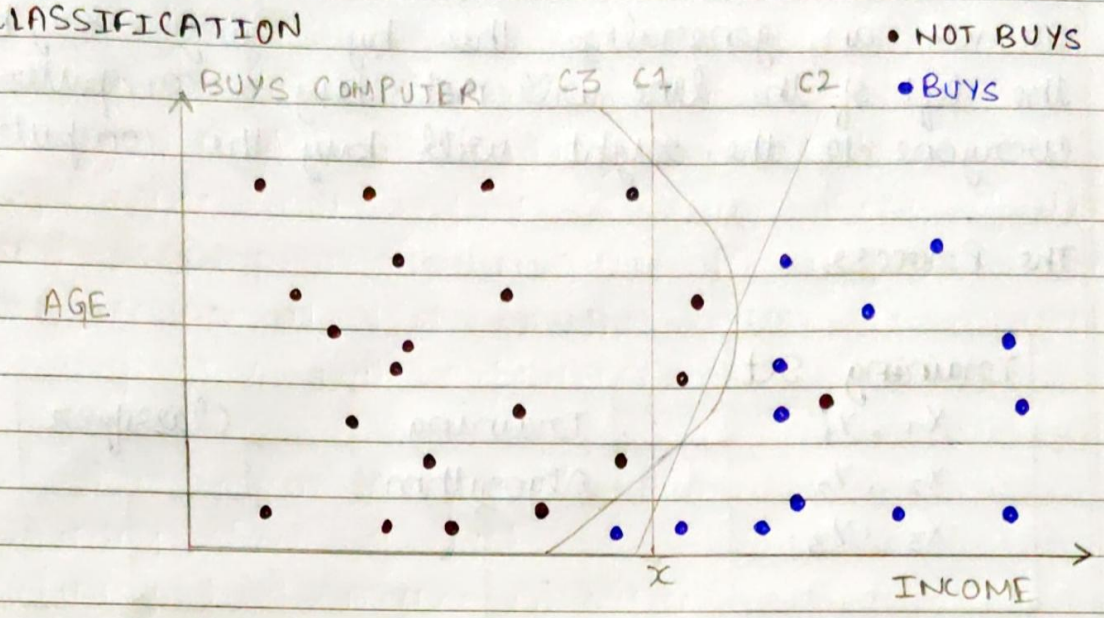
WEEK 1 - LECTURE 2

Supervised Learning

CLASSIFICATION



Above is the customer data who buys or not buys the computer.
The goal is to come up with a function that takes age and income as input parameters and tells us wheater customer will buy the computer or not.

In case of C1, function would be:
If income is less than x, then person will not buy the computer and if it is greater than x, then person will buy the computer.

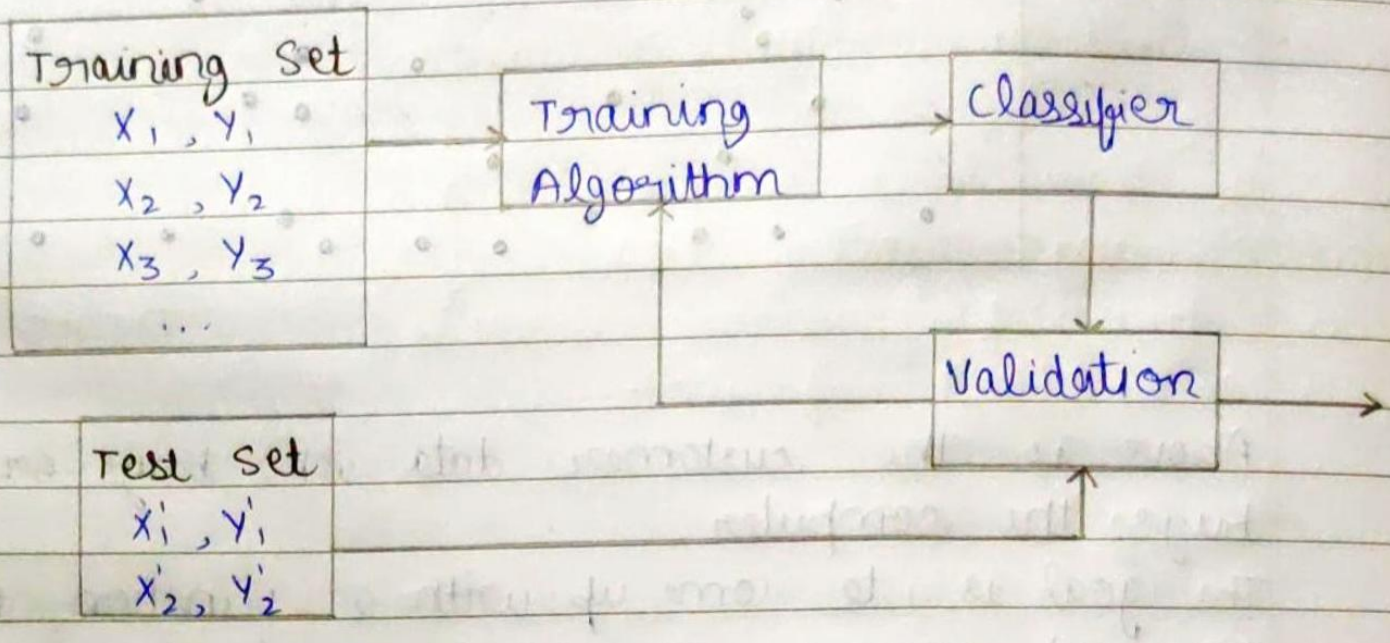
In case of C2, the performance measure improves. The older the person, income threshold is more and younger the person, income threshold is less

In case of C3, performance measure improves even

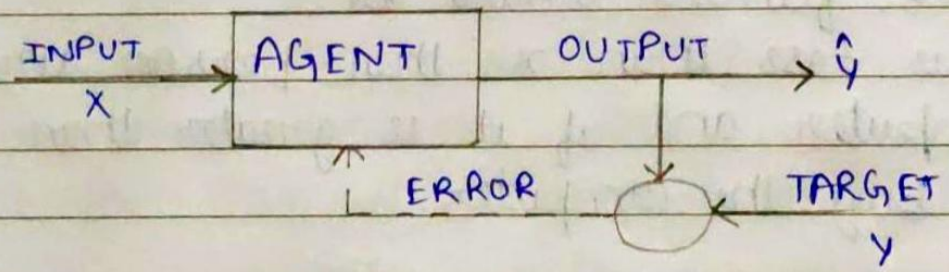
further but at the cost of having a more complex classifier.

So, we can generalize this by saying everything to the left of the line will not buy a computer and everyone to the right will buy the computer.

The Process



What happens inside a training algorithm?

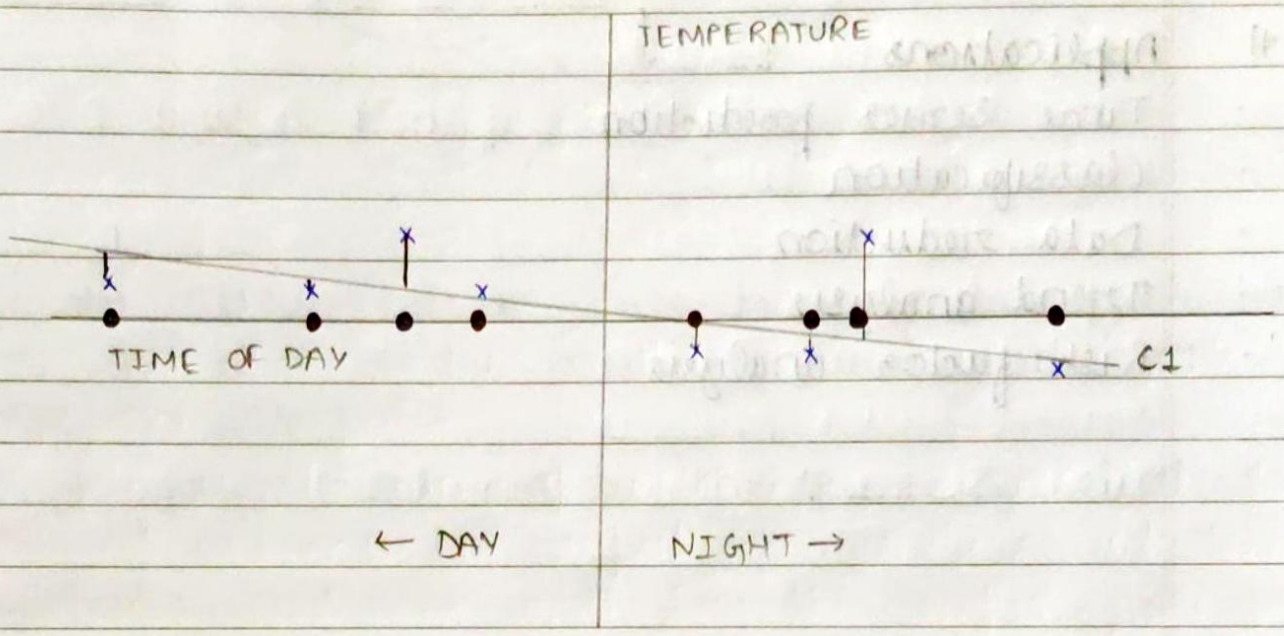


Applications

- Credit card fraud detection
- Sentiment Analysis
- Churn Prediction
- Medical diagnoses

REGRESSION

The output is a continuous value.



The black dots are the input (time of day) and the blue crosses are the output (temperature). The output are continuous values.

C1 is the best fit line as it is nearest to all the blue crosses.

Linear Regression

- Minimize sum squared error
- With sufficient data simple enough
- With many dimensions, challenge is to avoid over fitting
  - Regularization
- Higher order functions?
  - Basic transformations
  - Eg. $(x_1, x_2) \rightarrow (x_1^2, x_2^2, x_1 x_2, x_1, x_2)$

Applications

- Time series prediction
- Classification
- Data reduction
- Trend analysis
- Risk factor analysis