



# SNS COLLEGE OF TECHNOLOGY

Coimbatore - 35



23BAT615 – Artificial Intelligence for Managers

Unit III – Unboxing AI & Its Applications



Presented by

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*Design Thinker*

Redesigning Common Mind & Business Towards Excellence

**1<sup>st</sup>** Indian  
Institution  
to Implement  
& Patent  
Design  
Thinking  
FrameWork

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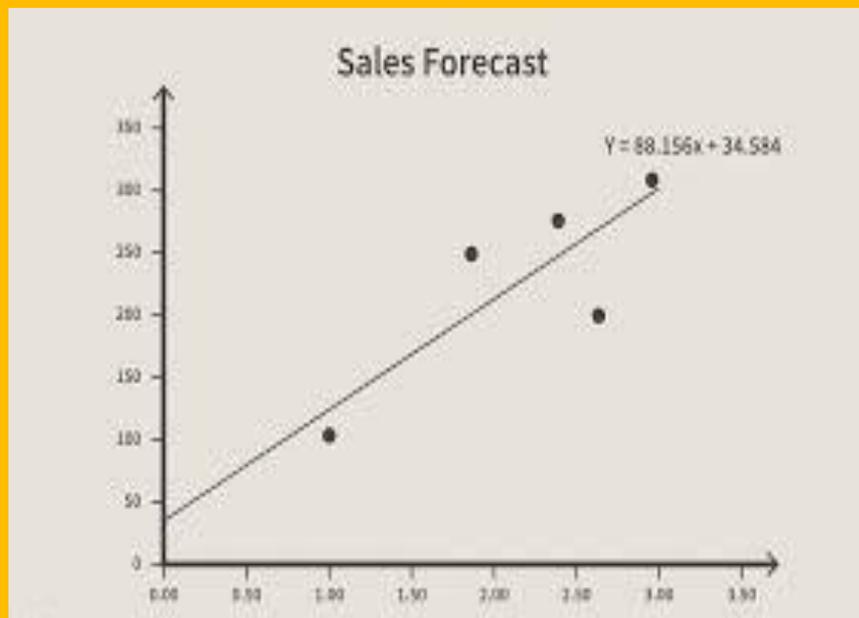
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Build an Entrepreneurial Mindset through our Design Thinking FrameWork



# Guess the Topic!!!

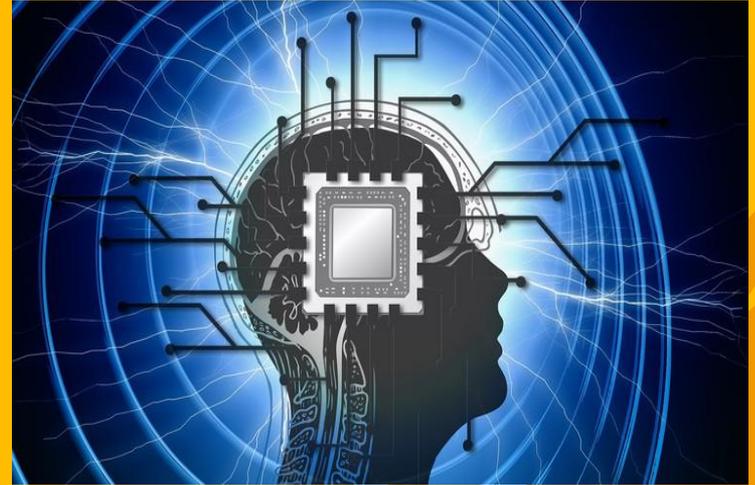
Linear Regression





# Recap

- Reason to study Reinforcement Learning
- Reinforcement Learning
- Reinforcement Learning in ML
- Model-based and Model-free Reinforcement Learning
- Example for Reinforcement Learning

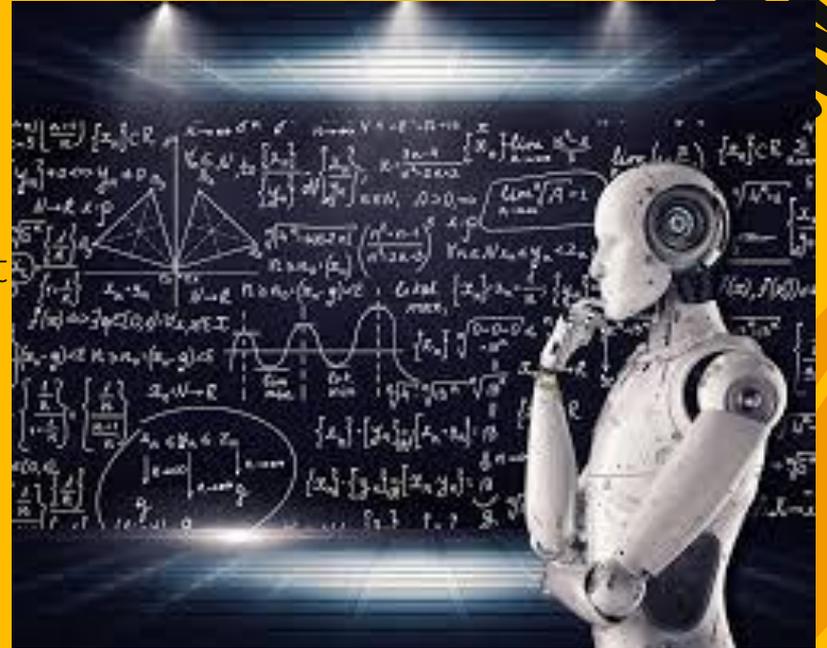




# Discussion about....

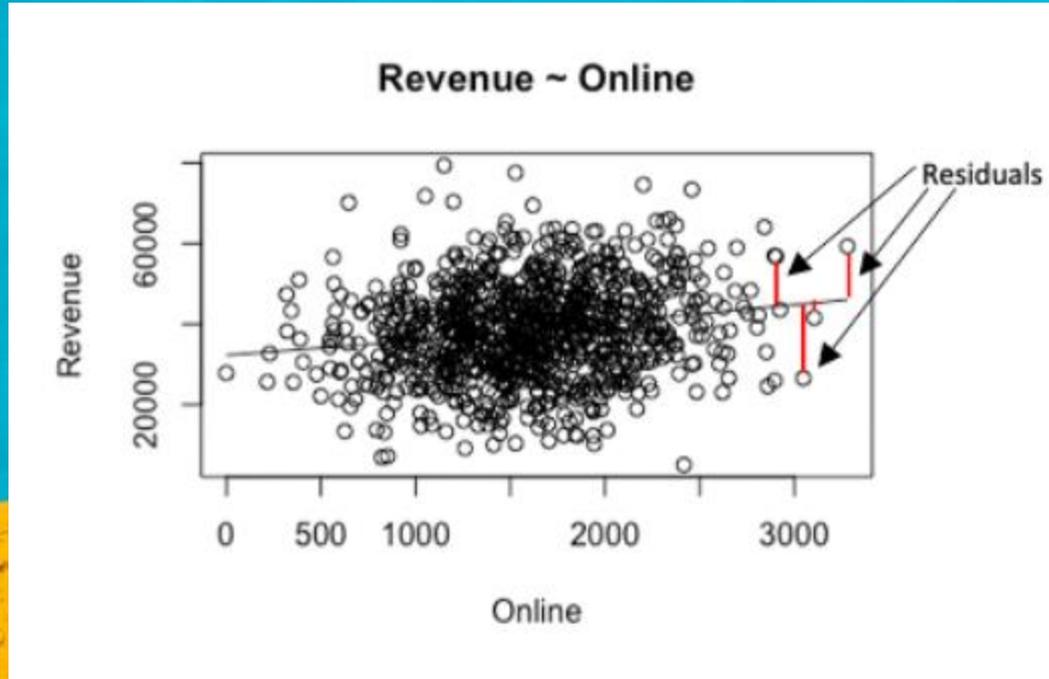
Reason to study Linear Regression

- Linear Regression
- Application of Linear Regression
- Simple linear regression in sales forecast
- Linear regression in Tableau
- Pros and Cons



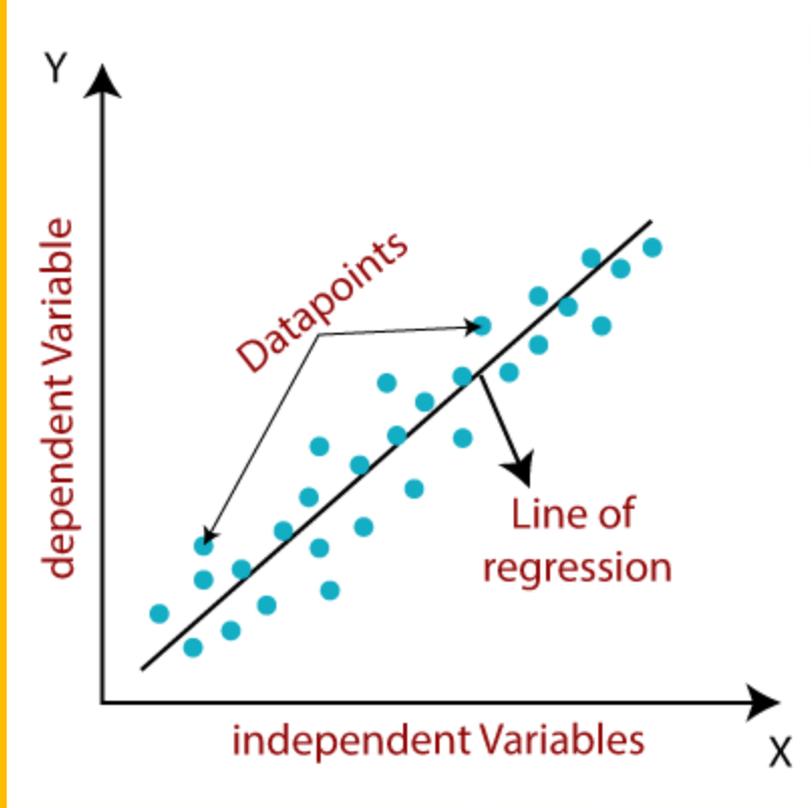
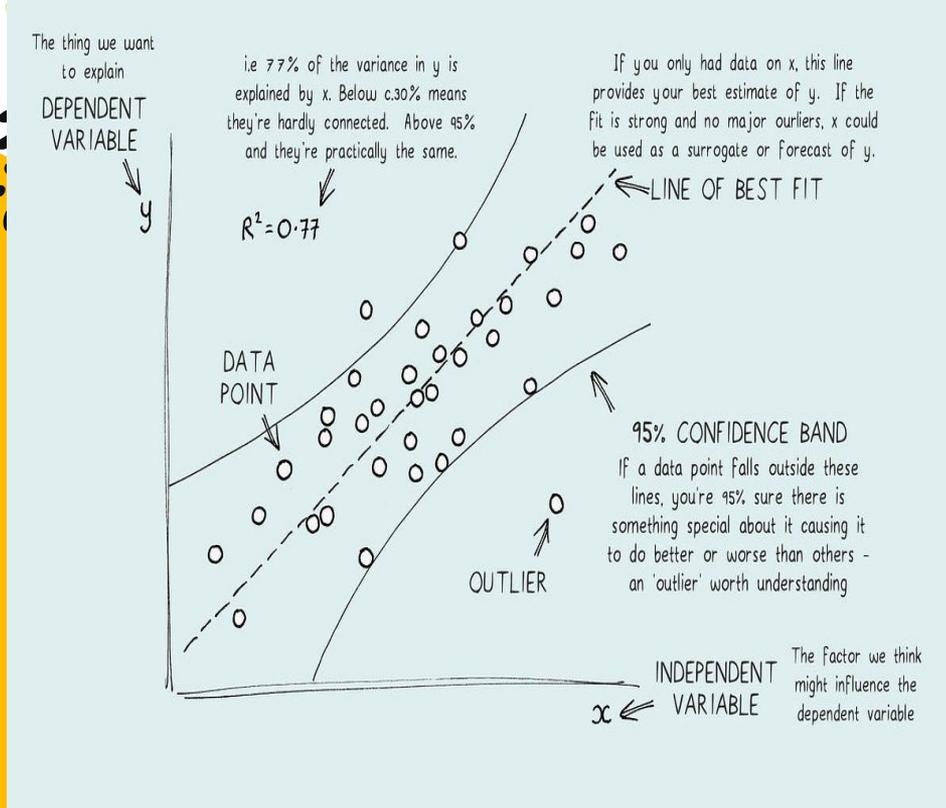


## Reason to study Linear Regression





# Linear Regression





# Application of Linear Regression

Temperature	Yield
50	112
53	118
54	128
55	121
56	125
59	136
62	144
65	142
67	149
71	161
72	167
74	168
75	162
76	171
79	175
80	182
82	180
85	183
87	188
90	200
93	194
94	206
95	207
97	210
100	219

Input data →

Let's get the simple linear regression output for independent variable X and target variable Y as shown below:

Regression Statistics				
R Square	0.98	Model is a good fit as R square > 0.7		
	Coefficients	P-value	Lower 95%	Upper 95%
Intercept	13.33	0.00268	5.13	21.52
Temperature	2.04	0.00138	1.93	2.15

Output →

- P value for Temperature is <0.05;
- Hence Temperature is an important factor for predicting Yield and has significant relation with Yield

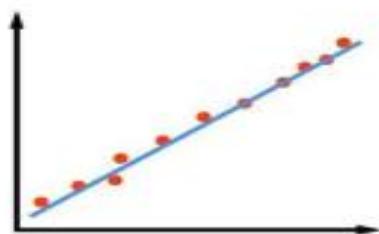
- With one unit increase in Temperature there is 2 times increase in Yield

- Values of coefficients will lie between the range mentioned under upper and lower 95%
- For example, coefficient of Temperature will be between 1.93 and 2.15 with 95% confidence (5% chance of error)

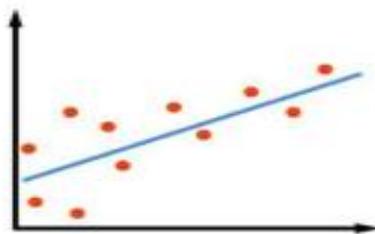
Note : Intercept is not an important statistics for checking the relation between X & Y



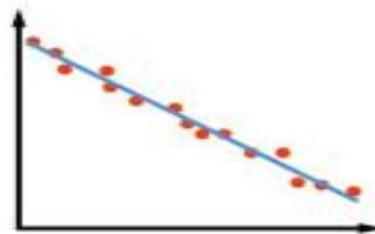
# Simple Linear Regression in Sales Forecast



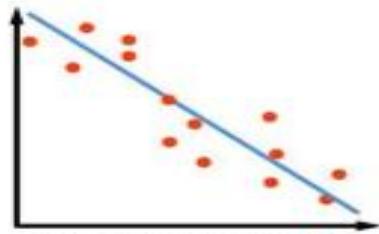
**STRONG POSITIVE CORRELATION**



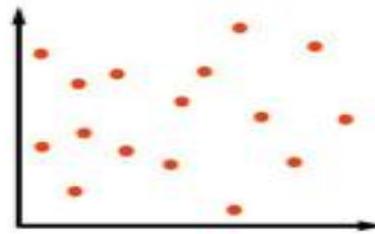
**WEAK POSITIVE CORRELATION**



**STRONG NEGATIVE CORRELATION**



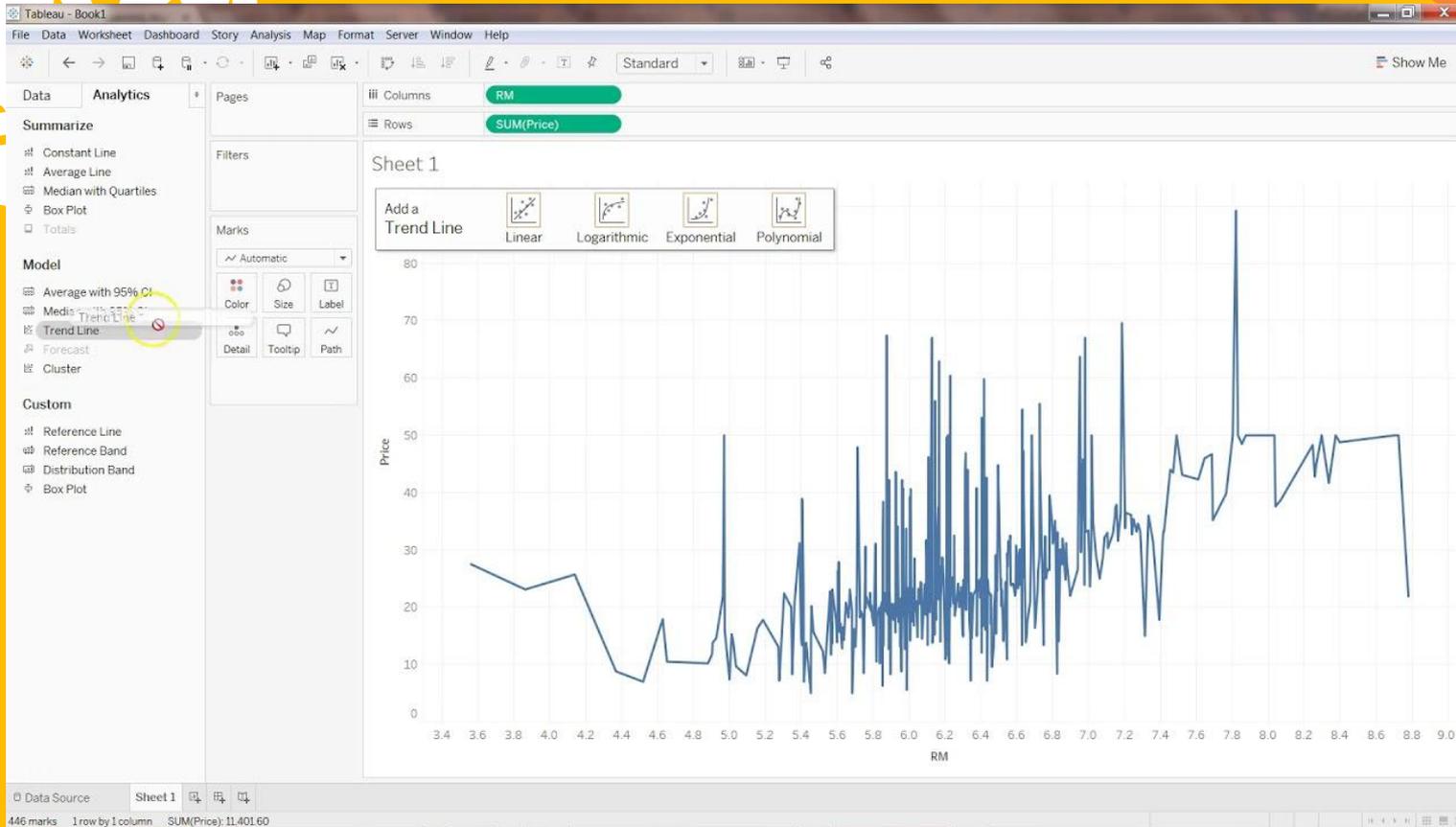
**WEAK NEGATIVE CORRELATION**



**NO CORRELATION**



# Linear Regression in Tableau





# Linear Regression Pros and Cons

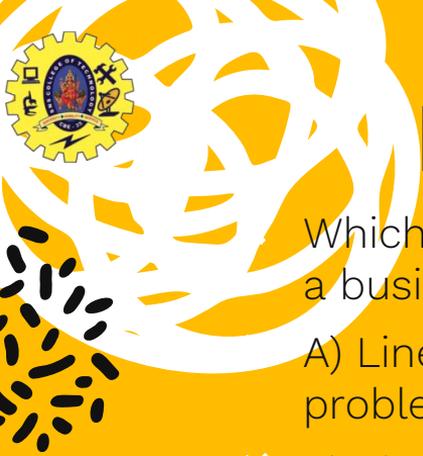


## PROS

- + Simple to implement and easier to interpret the output coefficients
- + Less complex than other algorithms for situations where the linear relationship between dependent and independent variables is known
- + Overfitting problem can be avoided by using dimensionality reduction techniques, regularisation (L1 and L2) techniques, and cross-validation

## CONS

- Outliers can have huge effects on the regression and boundaries are linear in this technique
- It is assumed that dependent & independent variables have a straight line relationship. It assumes that attributes are independent of one another
- It also looks at the mean of the dependent & independent variables and so it doesn't fully describe inter-variable relation



# Knowledge Check

Which of the following best describes how linear regression can be used in a business context?

- A) Linear regression helps in identifying the cause of a particular business problem.
- ✗ B) Linear regression is used to forecast future business trends by modeling the relationship between a dependent variable and one or more independent variables.
- ✗ C) Linear regression is primarily used to classify business data into different categories.
- ✗ D) Linear regression helps in calculating the exact profit a company will make in the next quarter.
- ✗ **Answer: B) Linear regression is used to forecast future business trends by modeling the relationship between a dependent variable and one or more independent variables.**



# Summary

- Reason to study Linear Regression
  - Linear Regression
  - Application of Linear Regression
  - Simple linear regression in sales forecast
  - Linear regression in Tableau
  - Pros and Cons





# References

- <https://u-next.com/blogs/business-analytics/popular-applications-of-linear-regression-for-businesses/>





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# Thanks!

