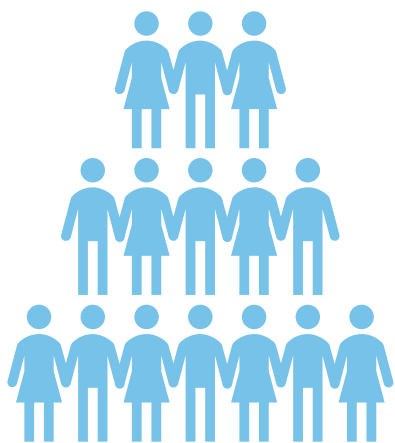




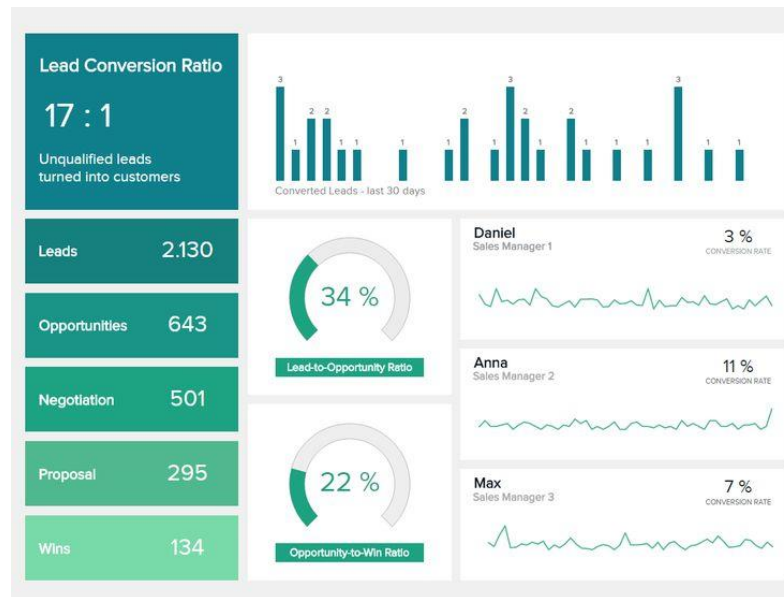
Start-Tech Academy

Introduction



Sales Analytics

What is it?



Hiring

Inventory Management

Budgeting

& more.....



Sales Analytics

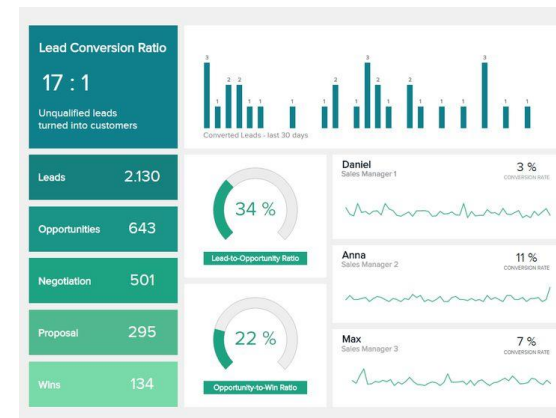
What is it?



Data



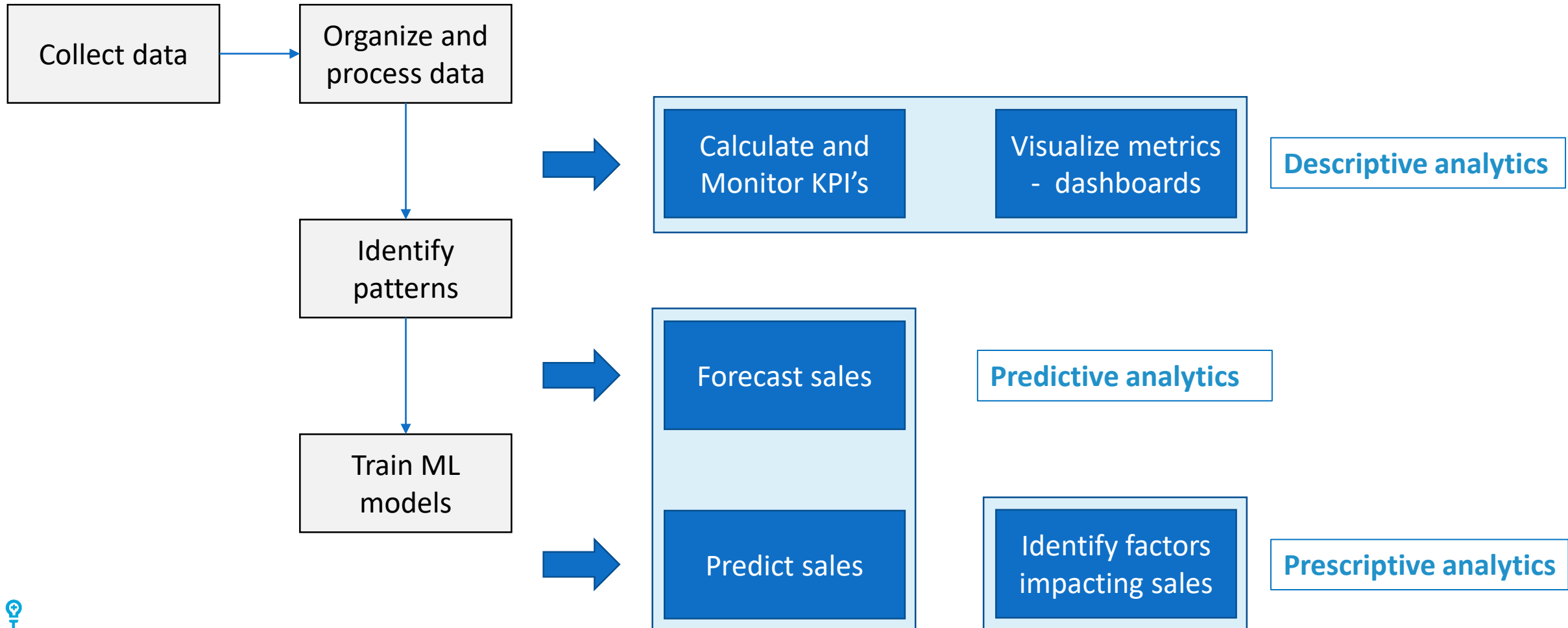
Information



Insights



Sales Analytics



Sales KPIs

Sales process

KPI	Definition	Calculation
Conversion rate	The percentage of leads or opportunities that are converted into paying customers	Converted/ Leads
Sales cycle length	The average length of time it takes to complete a sales process from start to finish	Avg(Sales close time- sales start time)
Lead response time	The amount of time it takes for the sales team to respond to a new lead	First contact time – lead gen time



Sales KPIs

Salesperson specific

KPI	Definition	Calculation
Sales volume	The total amount of money generated by a salesperson in a given period of time	Amount of money generated/ unit time
Win rate	The percentage of sales opportunities that a salesperson successfully closes	Closed sales/ total opportunities
Quota attainment	The percentage of a salesperson's assigned quota that they have achieved	Sales/ Target



Sales KPIs

Marketing

KPI	Definition	Calculation
Marketing-generated leads	The number of leads that are generated through marketing efforts	Total leads
Cost per lead	The cost of acquiring each new lead, typically calculated as the total marketing spend divided by the number of leads generated	Total leads/ Total marketing spend
Return on investment (ROI)	A measure of the efficiency of marketing efforts, calculated as the profit generated from marketing divided by the cost of the marketing efforts	Profits/ Marketing spends



Sales KPIs

Financial

KPI	Definition	Calculation
Revenue	The total amount of money generated from sales	
Profit	The total amount of money made from sales after taking into account the cost of goods sold and other expenses	Revenue - cost of goods sold and other expenses
Cost of goods sold	The cost of producing or acquiring the products or services that are being sold	
Gross margin	The difference between the revenue generated from sales and the cost of goods sold, expressed as a percentage	$(\text{Revenue} - \text{cost of goods sold}) / \text{Revenue}$



Sales KPIs

Customer related

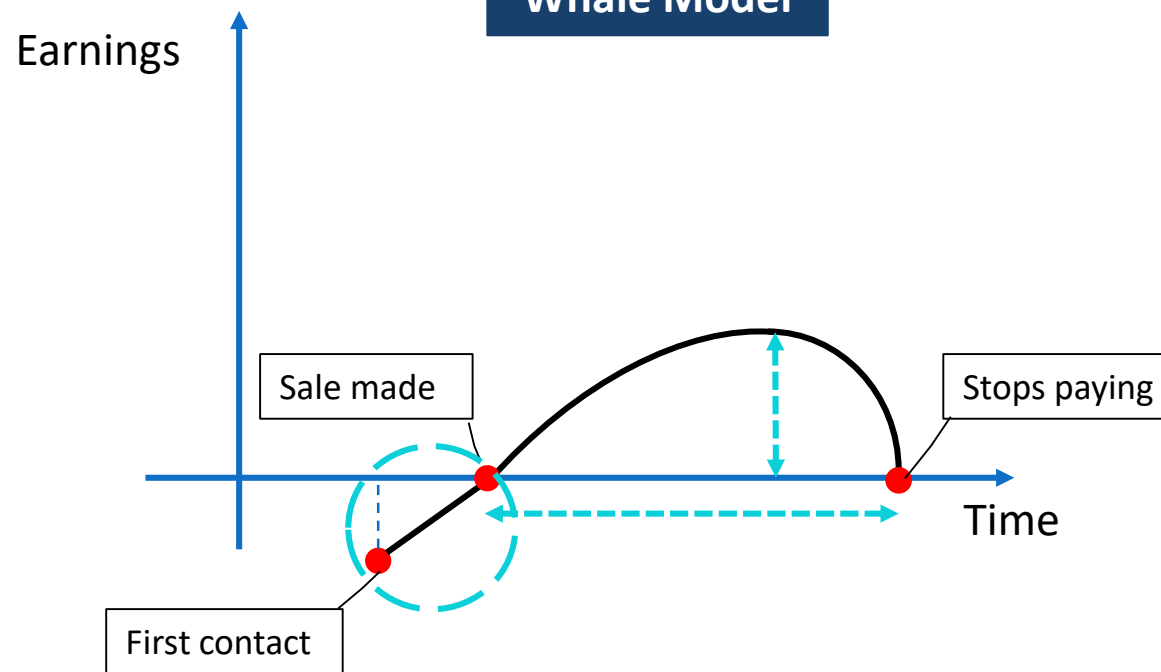
KPI	Definition	Calculation
Customer acquisition rate	The rate at which new customers are acquired over a given period of time	New customers acquired per unit time
Customer retention rate	The percentage of customers who continue to use the company's products or services over time	Continuing customers/ total customers
Customer lifetime value	The estimated value of a customer to the business over the course of their relationship with the company	Net present value of all monetary exchanges
Customer satisfaction	A measure of how happy and satisfied customers are with the products or services they have received	Net promoter score (NPS)



Sales Model

What is it?

Whale Model



1. Reduce acquisition cost

2. Increase earnings per customer

3. Increase customer lifetime



Sales Model

Analytical tools

	Objective	Data question	Analysis
	Reduce acquisition cost	How can my past lead conversion data help me identify which leads are more likely to convert?	• Decision trees • RFM Analysis
	Increase revenue per customer	What products can be pitched to a customer who has previously purchased our products?	• Market Basket Analysis • Price Bundling
	Increase customer lifetime	How can past data help me find which customer is more likely to leave and stop paying us?	Logistic regression
	Sales Forecasting	How can past sales data can help me predict the future sales?	• Time series forecasting • Linear regression



Decision trees

To create segments and identify which segment is more likely to convert

Why

Marketing team leads Sales agents

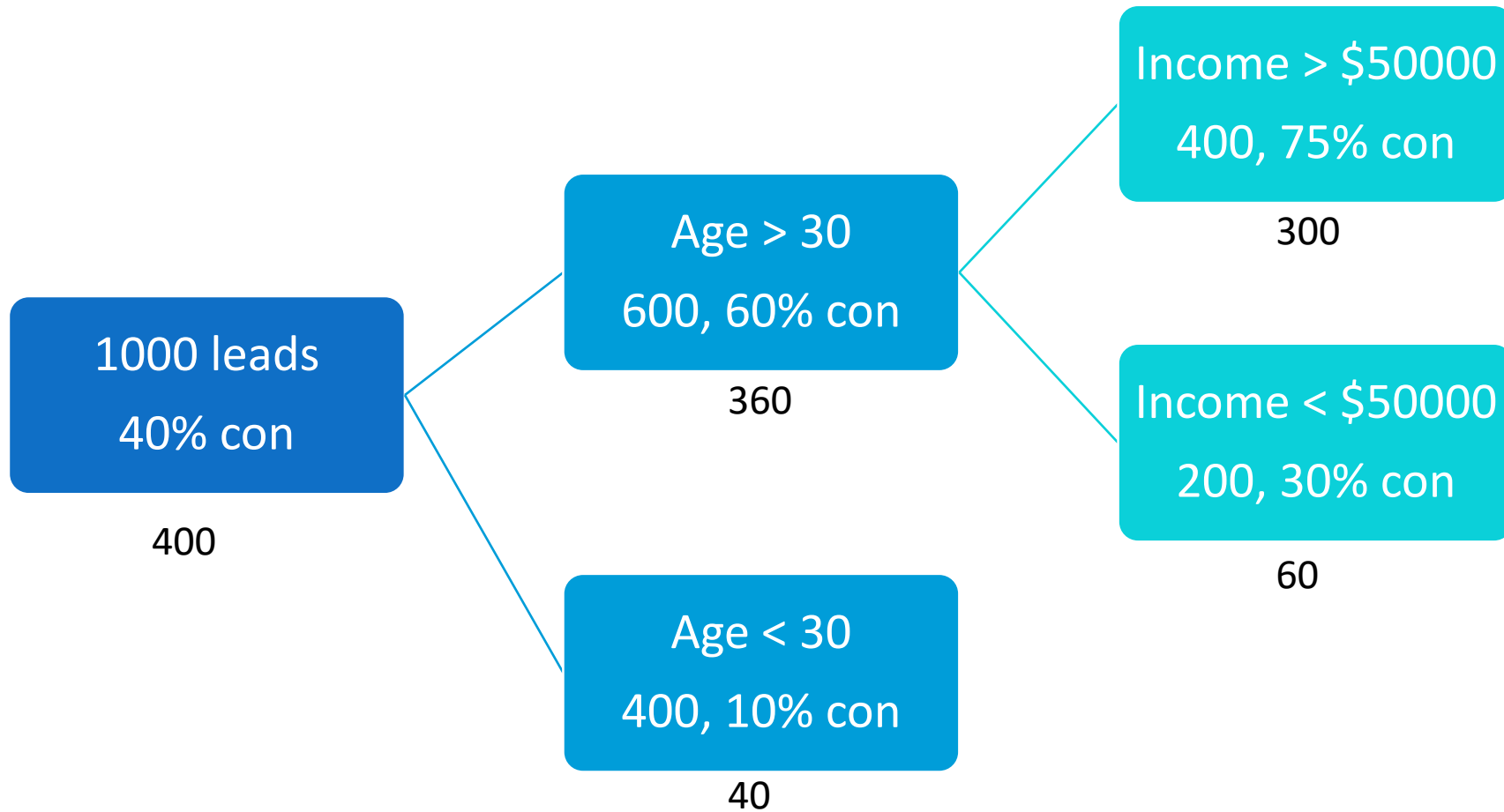
Name	Email	Phone
John	johnw@xyz.com	7878567
Jack	jackr@xyz.com	8651412
Jason	jasonb@xyz.com	9542413



Name	Email	Phone	Job title	Income	Age
John	johnw@xyz.com	7878567	CEO	\$93000	59
Jack	jackr@xyz.com	8651412	Manager	\$46000	42
Jason	jasonb@xyz.com	9542413	Executive	\$28000	28



Decision trees



Old
Contacted 1000
Converted 400

New
Contact only 400
Convert 300



Market Basket Analysis & Lift

Market basket Analysis is used to find products which customers tend to purchase together

What & Why



Market Basket Analysis & Lift

Lift

We need data of all items bought by each customer



Consumer's basket –
list of items bought
by a consumer



Market Basket Analysis – Finding insights from
basket data

$$\text{Lift} = \frac{\text{Actual number of times a combination occurs}}{\text{Predicted number of time the combination occurs if items in combination were independent}}$$



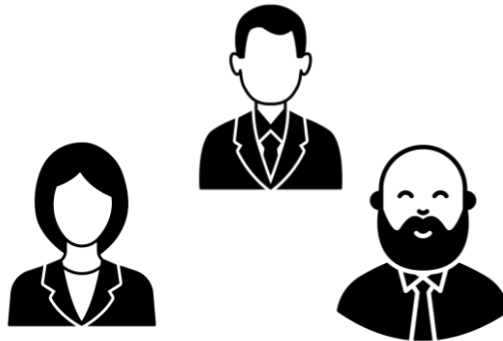
Sales Forecasting

What & Why

Sales forecasting is the process of estimating future sales for a business

Forecast can help in planning for future

Forecast suggests rising demand
– hire more sales agents



Forecast suggests a slump –
Manage costs



Sales Forecasting

What & Why

Time series forecast – Find patterns in historical sales data

Time	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23
Sales	6184	6105	6831	6430	6734	7118	7165	7436	8509	8213	9008	9309	??

Machine Learning models – Relationship of sales with other factors

Advertising spend

Per capita income

Fuel price

Sales



Linear Regression

What & Why

Find relationship between sales and other factors

Advertising spend

Spend on QM

Sale discount?

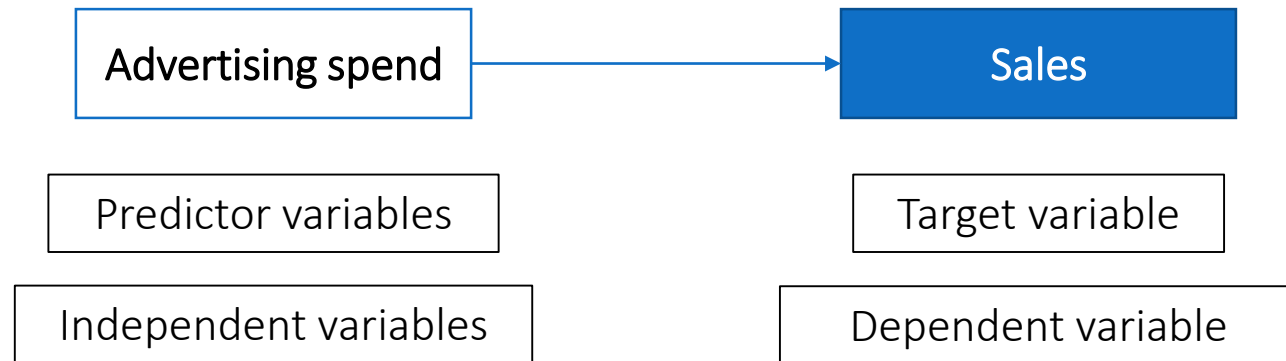
Sales

If I double my ad spend, what happens to sales?



Linear Regression

How



Linear relationship (single predictor variable)

$$y = ax + b$$

$$\text{Sales} = a \times (\text{advertising spend}) + b$$

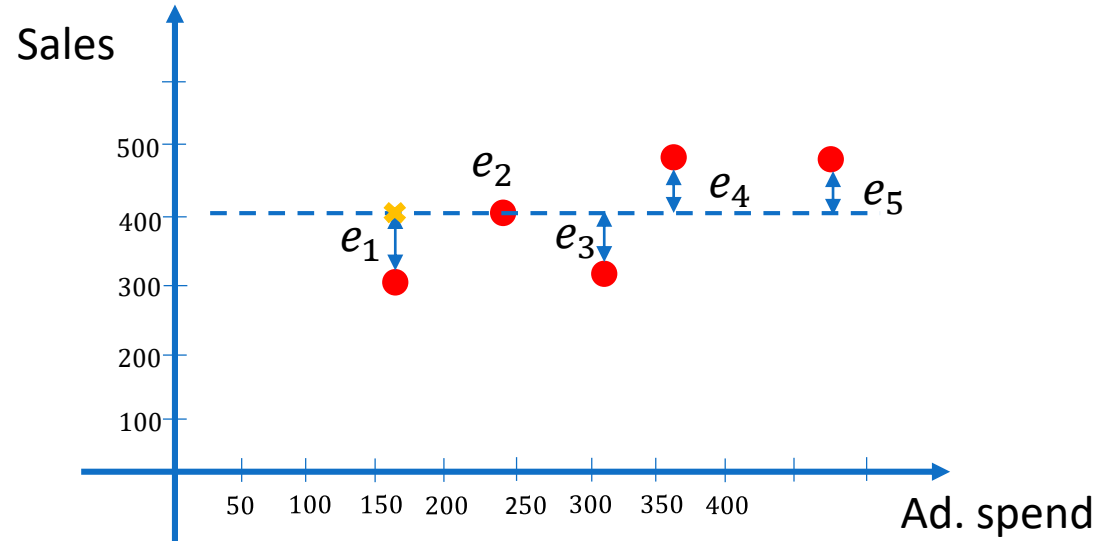
Multiple predictors –

$$y = a_1x_1 + a_2x_2 + a_3x_3 + \dots + a_nx_n + b$$



Linear Regression

How



$$Sales = a \times (advertising\ spend) + b$$

$e_1 + e_2 + e_3 \dots$ Will not work
Minimize $[e_1^2 + e_2^2 + e_3^2 + e_4^2 + e_5^2]$

- This is called minimizing sum of squared errors



Linear Regression

Result

	A	B	C	D	E	F	G	H	I
1	SUMMARY OUTPUT								
2									
3	<i>Regression Statistics</i>								
4	Multiple R	0.97012							
5	R Square	0.941133							
6	Adjusted R Squa	0.926416							
7	Standard Error	515.7254							
8	Observations	11							
9									
10	ANOVA								
11		<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
12	Regression	2	34017672.79	17008836	63.94955	1.20086E-05			
13	Residual	8	2127781.758	265972.7					
14	Total	10	36145454.55						
15									
16		<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
17	Intercept	-1642.04	1151.801633	-1.42563	0.191804	-4298.10333	1014.015	-4298.1033	1014.01533
18	Unit Price	9.909374	0.876228512	11.30912	3.36E-06	7.888787251	11.92996	7.88878725	11.9299604
19	Promotion	8.133162	2.624163278	3.099335	0.014681	2.081830676	14.18449	2.08183068	14.1844934
20									

Coefficients – the a’s and b’s of this equation

$$y = a_1x_1 + a_2x_2 + a_3x_3 + \cdots + a_nx_n + b$$

Use these to create the final equation

For eg. - *Sales* = 8 × (*advertising spend*) – 250

Coefficients – the a's and b's of this equation

$$y = a_1x_1 + a_2x_2 + a_3x_3 + \dots + a_nx_n + b$$

Use these to create the final equation

For eg. - *Sales* = 8 × (*advertising spend*) – 250



Help John



John

Sales Analytics Manager at STA Retailers

STA Retailers owns hundreds of grocery stores across the country. John's team invests a large amount of time and effort in analyzing different localities to find a location for new stores . John has recently completed a course in Analytics and Machine Learning, and he thinks that STA can use Machine Learning to use past data to create data-driven process for selecting new store locations.



Retention

What

Increasing customer lifetime by preventing churn

When the customer pays over a period of time, churn impacts sales revenue

Sales team shares responsibility, tries to retain customers

Time Series forecasting to
predict overall churn

ML models to predict
probability of churn

Logistic regression can help predict probability of churn

Pitch alternate options/ offers to the customer to retain the customer



Logistic Regression

What

Uses historical data to train, same as linear regression

Linear Regression –
predicts continuous
variable

Logistic Regression –
predicts categorical
variable

Output of logistic regression corresponds to probability of belonging to one of the categories



Logistic Regression

Example

Avg. Bill Value	Relationship Age	No. of service calls	Churned?
120	34	0	0
90	6	3	1
135	23	1	0
...	...	...	...

Use this data to train our logistic regression model

Avg. Bill Value	Relationship Age	No. of service calls	Churn prob
150	12	2	0.75
80	29	0	0.32



Logistic Regression

Confusion Matrix

	Predicted Positive	Predicted Negative
Actual Positive	True Positive	False Negative
Actual Negative	False Positive	True Negative

True Positive - the model correctly predicted the churn.

False Positive - the model incorrectly predicted the churn.

True Negative - the model correctly predicted the retention.

False Negative - the model incorrectly predicted the retention.

Accuracy = (True positive + True Negative)/ Total cases

	Predicted Positive	Predicted Negative
Actual Positive	63	27
Actual Negative	38	122

Accuracy =
 $(63+122)/250 =$
 $185/250 =$
92.5%



Help John



Tim

Sales Analytics Manager at STA Telecom

STA Telecom provides 4G and 5G services all over India. STA currently offers services including fixed-line broadband, and voice services.

Tim has been tasked to reduce customer attrition. He has recently completed a course in Sales Analytics, and he thinks that STA can use Machine Learning to use past data to create data-driven process for reducing customer churn.

