Data

Data Science

WHEN it is applied

TRADITIONAL	BIG	BUSINESS INTELLIGENCE	TRADITIONAL METHODS	MACHINE LEARNING
At the beginning of your analysis		After the data has been gathered & organized	After BI reports have been created and discussed	

PAST — NOW — FUTURE

WHY you need it

TRADITIONAL	BIG	BUSINESS INTELLIGENCE	TRADITIONAL METHODS	MACHINE LEARNING
data-driven decisions require well-organized and relevant raw data stored in a digital format		use data to create reports and dashboards to gain business insights	assess potential future scenarios by using advanced statistical methods	utilize artificial intelligence to predict behavior in unprecedented ways
			Predictive Analytics	

WHAT techniques are involved

TRADITIONAL	BIG	BUSINESS INTELLIGENCE	TRADITIONAL METHODS	MACHINE LEARNING
DATA COLLECTION	**DATA COLLECTION**	**ANALYZE THE DATA**	**REGRESSION**	**SUPERVISED LEARNING**
PREPROCESSING	**PREPROCESSING**	**EXTRACT INFO AND PRESENT IT IN THE FORM OF:**	**LOGISTIC REGRESSION**	• SVMs • NNs • deep learning • random forests • bayesian networks
• class labeling *(categorical vs numerical)* • data cleansing • dealing with missing values	• class labeling *(number, text, digital images, digital video data, digital audio data)* • data cleansing • dealing with missing values	• metrics • KPIs • reports • dashboards	**CLUSTERING**	ML **UNSUPERVISED LEARNING** • k-means • deep learning
CASE SPECIFIC • e.g. balancing & shuffling datasets	**CASE SPECIFIC** • text data mining, confidentiality - preserving data mining techniques	16.32	**FACTOR ANALYSIS** **TIME SERIES**	**REINFORCEMENT LEARNING** similiar to supervised learning, but instead of minimizing the loss, one maximizes reward

WHERE

TRADITIONAL	BIG	BUSINESS INTELLIGENCE	TRADITIONAL METHODS	MACHINE LEARNING
BASIC CUSTOMER DATA HISTORICAL STOCK PRICE DATA	SOCIAL MEDIA FINANCIAL TRADING DATA	PRICE OPTIMIZATION INVENTORY MANAGEMENT	USER EXPERIENCE (UX) SALES FORECASTING	FRAUD DETECTION CLIENT RETENTION

HOW using what tools

TRADITIONAL	BIG	BUSINESS INTELLIGENCE	TRADITIONAL METHODS	MACHINE LEARNING
PROGRAMMING LANGUAGES	**PROGRAMMING LANGUAGES**	**PROGRAMMING LANGUAGES**	**PROGRAMMING LANGUAGES**	**PROGRAMMING LANGUAGES**
SQL, MATLAB	Java, Scala	SQL, MATLAB	MATLAB	Java, JavaScript, C, Scala, C++, MATLAB
SOFTWARE Excel, IBM SPSS	**SOFTWARE** hadoop, APACHE HBASE, mongoDB	**SOFTWARE** Excel, Power BI, SAS, Qlik, tableau	**SOFTWARE** Excel, IBM SPSS, EViews, STATA	**SOFTWARE** Microsoft Azure, rapidminer

WHO

TRADITIONAL	BIG	BUSINESS INTELLIGENCE	TRADITIONAL METHODS	MACHINE LEARNING
DATA ARCHITECT DATA ENGINEER DATABASE ADMINISTRATOR	BIG DATA ARCHITECT BIG DATA ENGINEER	BI ANALYST BI CONSULTANT BI DEVELOPER	DATA SCIENTIST DATA ANALYST	DATA SCIENTIST MACHINE LEARNING ENGINEER

ARE YOU AWARE

TRADITIONAL	BIG	BUSINESS INTELLIGENCE	TRADITIONAL METHODS	MACHINE LEARNING
200,000 lines of data is not necessarily big data. It is not just volume that defines a data set as 'big' - variety, variability, velocity, veracity, and other characteristics are determinative as well.		Qualitative analysis tools such as SWOT are not used for quantitative analysis. Hence, they are not part of business intelligence.	Software like Excel, SPSS, and Stata, can be successfully used by data science teams in many companies.	In deep learning, there is still a debate on WHY the algorithms used outperform all conventional methods.