Dati, Machine Learning e Sostenibilità

A>RACE

Accenture Strategy & Consulting

AGENDA

Our promise:
to combine technology and human ingenuity.

We leverage the power of change to create 360 ° value for clients, our people and the entire community.

In the world

NYSE
Since 2001

699.000
Professionals

120
Countries

In Italy

9
Centers of innovation

18.000
Professionals in Italy

5
Locations: Milan, Rome, Turin, Naples, Cagliari, and many more offices.

ACCENTURE INDUSTRIES

We have expertise in more than 40 industries across 5 industry groups.

Communications, Media & Technology

- Communications & media
- High tech
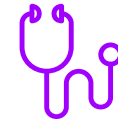- Software & platforms
- Aerospace & Defense

Financial Services

- Banking
- Insurance
- Capital markets

Products

- Consumer goods & services
- Industrial equipment
- Life sciences
- Retail
- Travel
- Mobility

Health & Public Service

- Health
- Public service
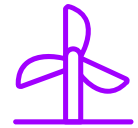
Resources

- Chemicals & natural resources
- Energy
- Utilities

A>RACE IN A NUTSHELL

A>RACE IS THE STRATEGY & CONSULTING CENTER OF EXCELLENCE WHERE DEEP **BUSINESS KNOWLEDGE** AND **CUTTING-EDGE TECHNOLOGIES** CONVERGE TO ACCELERATE THE **SUSTAINABLE INNOVATION**

6 FUNCTIONS & INDUSTRIES

PEOPLE INVOLVED **+150**

MULTI-INDUSTRY CLIENTS **+30**

ONGOING PROJECTS **+60**

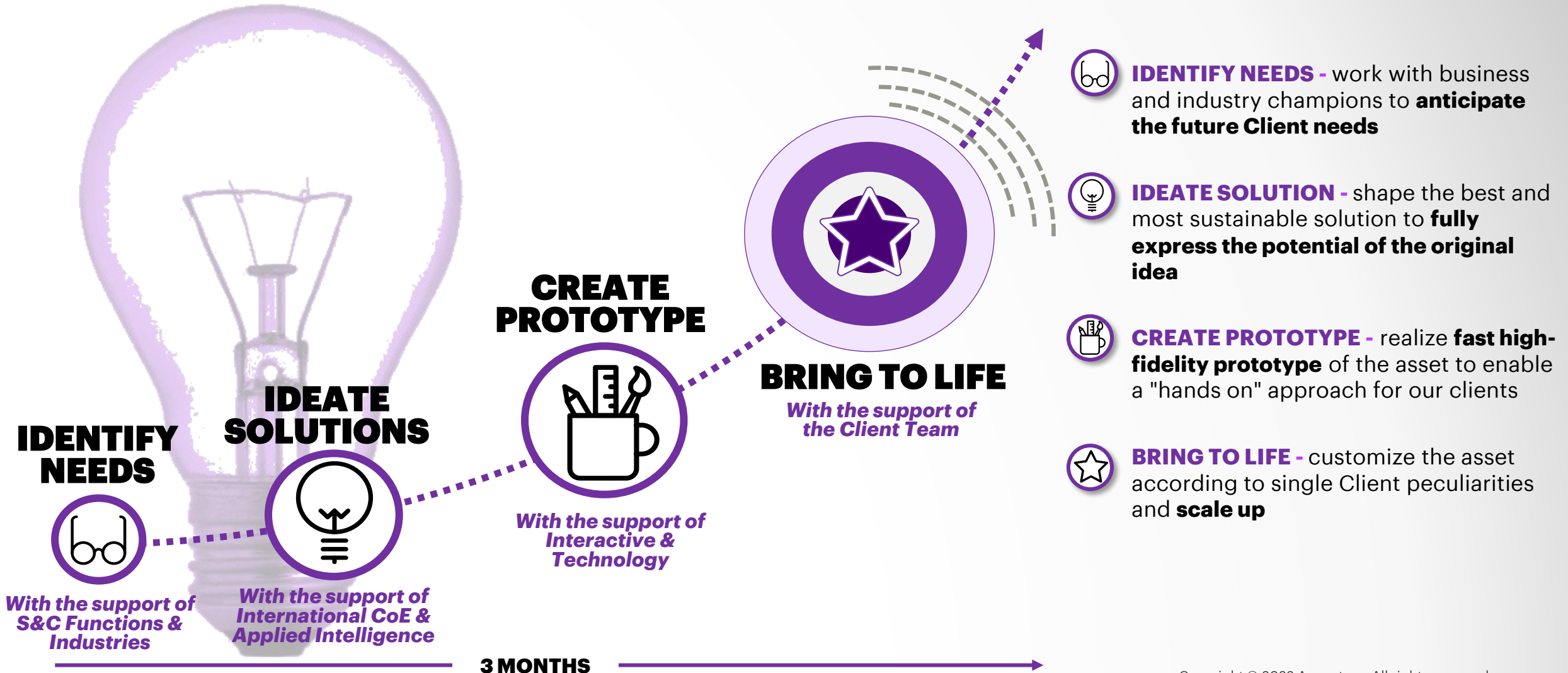# HOW WE REALIZE INNOVATION

We work closely with other Accenture units leveraging our business and technology proficiency and their specific strengths in order to deliver end-to-end experience to our clients, from the strategic shaping to the realization of the idea

IDENTIFY NEEDS - work with business and industry champions to **anticipate the future Client needs**

IDEATE SOLUTION - shape the best and most sustainable solution to **fully express the potential of the original idea**

CREATE PROTOTYPE - realize **fast high-fidelity prototype** of the asset to enable a "hands on" approach for our clients

BRING TO LIFE - customize the asset according to single Client peculiarities and **scale up**

IDENTIFY NEEDS
With the support of S&C Functions & Industries

IDEATE SOLUTIONS
With the support of International CoE & Applied Intelligence

CREATE PROTOTYPE
With the support of Interactive & Technology

BRING TO LIFE
With the support of the Client Team

3 MONTHS

A>RACE ONE SLIDER

>140 INVOLVED RESOURCES

A>RACE CREATE VALUE FOR FS CLIENTS IN MOST SIGNIFICANT ANALYTICAL AREAS DRIVEN BY REGULATION, DATA AND TECHNOLOGICAL EVOLUTION

PEOPLE MANAGEMENT

Growth of **A>RACE people** through:
- Promotion of a **sense of community** ("A>RACE people")
- Development of **specific training** also leveraging on external institutions (F&R academy, SAS training, ..)
- Collaboration with **university** (STEM area) to hire best people

>21 CLIENTS among main financial institutions

PROJECTS currently ongoing **>54**

RESEARCH & DEVELOPMENT
continuous analysis and design of leading-edge solutions

CI&G ANALYTICS   MACHINE LEARNING

COST ANALYTICS

INSURANCE USE CASES (E.G. CLAIMS MANAGEMENT)

PREDICTIVE FORECAST

COMPLIANCE ANALYTICS

REGULATORY ANALYTICS (E.G. IFRS17)   ADVANCED DATA VISUALIZATION

PARTNERSHIP
strengthened through time

Informatica

SAS

Qlik Sense

ORACLE

R Python

Microsoft

TERADATA

Spark

alteryx

MAIN TECHNOLOGIES

A>RACE MAIN ASSETS

RISK

CREDIT RISK ENGINES DEVELOPMENT	AUTOMATED RISK TABLEAU DU BOARD	WEB REPUTATIONAL TP MONITORING	ANALYTICS FOR CREDIT RISK
CREDIT RISK LABS	RISK COVID19 SCORE	INSURANCE WHAT-IF ANALYSIS COVID19	FRAUD AI SCREENING
STRESS TEST ENGINE	INTELLIGENT DIGITAL RISK DASHBOARD	ESG FOR CREDIT RISK	THIRD PARTIES
SENTIMENT ANALYSIS TENANT	CYBER INTELLIGENCE TOOL	WEB CLIENT JOB LOSS	BOOKING FORECASTING
EARLY WARNING ENGINE	LIQUIDITY MANAGEMENT TOOL	RWA WHAT IF ANALYSES & ENGINE	MODEL VALIDATION LAB

COMPLIANCE

NETWORK-BASE TRANSACTIONS MONITORING	ADVANCED ANALYTICS FOR AML & AML PORTAL	GDPR IN A BOX RECORD OF PROCESSING & DPIA
CLIENT SCREENING TOOL	PROMOTERS BEHAVIOURAL ANALYSIS	GDPR IN A BOX DATA DELTION HUB
BRANCH COMPLIANCE INDICATOR (BCI)	DIGITAL AUDIT	PRIVACY DASHBOARD
FRAUD REPORTING X PSD2	ADV. ANALYTICS PRODUCT GOVERNANCE	SUBJECT RIGHTS MANAGEMENT
ADVANCED SELF RISK ASSESSMENT	TABLEAU DATA BREACH	PRIVACY FOLDER TOOL

A>RACE MAIN ASSETS

CREDIT

NPL ANALYTICS	ESG FOR LOM
REPUTATIONAL WEB CREDIT	CUSTOMER SCORE PRE/POST ASSOCIATION
CODIV SCORE	OUTSOURCING SEGMENTATION
CALENDAR PROVISIONING	PORTFOLIO DATA ANALYZER
CREDIT INTELLIGENCE DASHBOARD	CREDIT DATA MODEL

CFO

- IFRS 9 IMPAIRMENT ENGINE & CLASSIFICATION (SPPI TEST)
- REGULATORY REPORTING DATA MODEL
- OWN FUNDS COMPUTATION & REPORTING
- PROCUREMENT ANALYTICS
- IFRS 17

DATA

DATA GOVERNANCE FRAMEWORK	MACHINE LEARNING DATA QUALITY
DATA VISUALIZATION REPORTING BOOK	ANALYTICS AS SERVICE ON CLOUD
DATA LINEAGE & DISCOVERY	
DATA QUALITY BOOK	
DATA MONETIZATION	

CUSTOMER S&S

- ISSUING REPORTING BOOK
- ENERGY CONSUMPTION FORECASTING
- CHURN RATE MODEL
- INTELLIGENT TRANSACTION LABELLING
- MULTI BANK CROSSSELLING

AGENDA

O1   **ACCENTURE & A>RACE OVERVIEW**

O2   **ANALYTICS & ML**

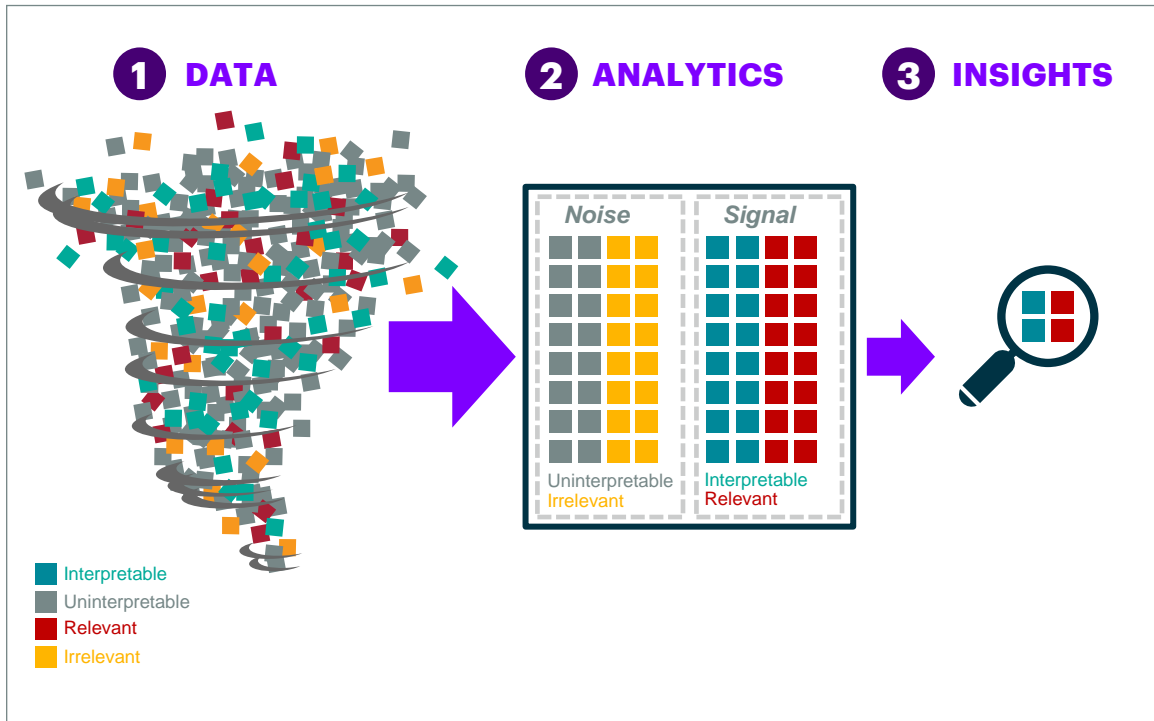**O3**   **USE CASES ESG**

O4   **WEB CREDIT REPUTATIONAL**

O5   **MARITIME ANALYTICS FOR SHIPPING**

WHAT IS ANALYTICS?
WHAT DO THEY DO?

In the digital era analytics are crucial tools to exploit the real value of the huge amount of new data available (e.g. Big Data). Analytics allow knowledge and commercial exploit of this new kind of data

1 DATA **2 ANALYTICS** **3 INSIGHTS**

Noise | Signal

Uninterpretable
Irrelevant

Interpretable
Relevant

■ Interpretable
■ Uninterpretable
■ Relevant
■ Irrelevant

1 Client receive and mines **data from various source** (mobile devices, social media, call centre records, retail/web stores, etc..). But **all of this data need to be interpreted**

2 **That's where Analytics comes into play:** through models application and processes engineering analytics **refines the data**, **reshape it** and allow to **use it** in a way it has never been done before

3 The **analysed data** gives the company **Insights** into their business and helps to **take proper decisions** according to **spotted evidences**

Data + Analytics = Insight

ANALYTICS
OVERVIEW

Analytics include different field and applications. From **simple statistical analysis** to **complex relationships between the data**
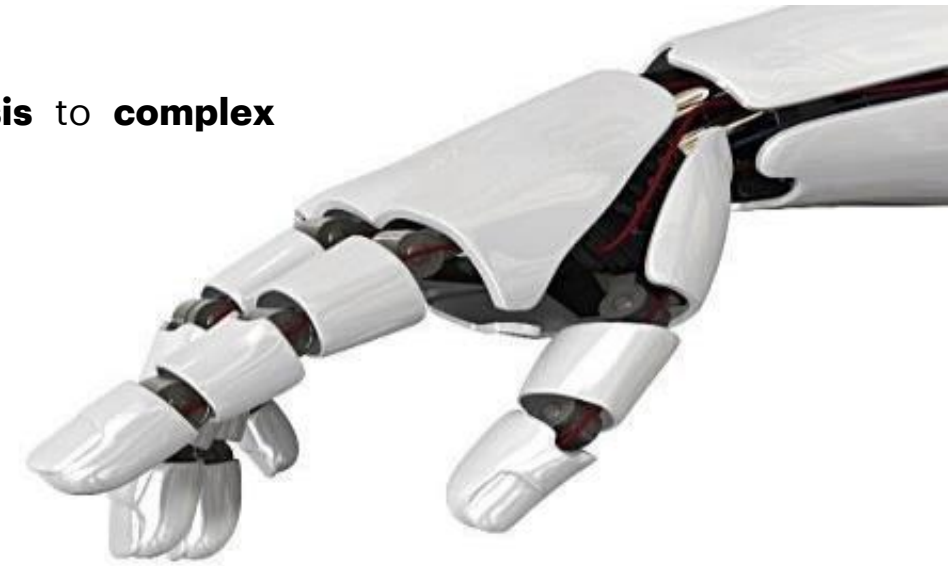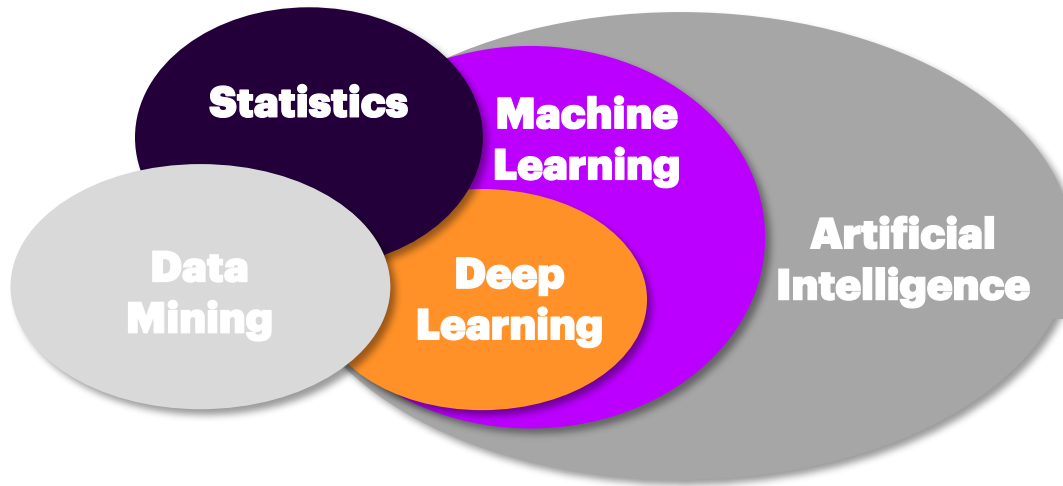
Artificial Intelligence

Machine Learning

Deep Learning

Artificial intelligence is a branch of information technology that **enable computers to simulate human behaviour** (e.g. RPA)

Machine Learning is the practice of **using algorithms (statistical methods) to parse data, learn from it**, and then **make a prediction** (e.g. Decision Trees, K-means)

Deep Learning is composed of **algorithms** that **permit** software **to train itself to perform tasks by using a cascade of multiple layers of nonlinear processing units for feature extraction and transformation. Each successive layer uses the output from the previous layer as input** (e.g. Neural network)

TRADITIONAL ANALYTICS
SOME EXAMPLE

Nowadays the most used and common kind of analytics are the traditional ones. Even with new advanced analytics available this type of analytics will still be used in the future

TRADITIONAL ANALYTICS ARE THE BASE OF CONSCIOUS DECISION MAKING

REPORTING

With reporting we refer to "classic" reports (e.g. table, pie-chart) that describe an event. There are two main types of report: static and dynamic.

DASHBOARD

Dashboards are management tool used to get a synthetic overview of a particular subject. The main difference to «Reporting» is that dashboard enables users to interactive navigate the content and monitor KPIs
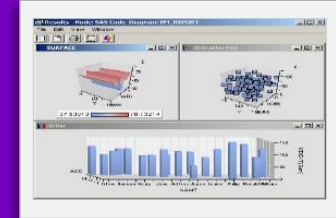
STATISTICAL ANALYSIS

Allows the creation of models and simulations starting from sample data sets, combining different statistical techniques (e.g. Correlation, Standard Deviation, Outliers identification)

TRADITIONAL ANALYTICS
REPORTING

A report is an analytical representation of information, mainly in numerical/tabular form

AT A GLANCE

- *A report is an analytical representation of information, mainly in numerical/tabular form*

- *A report is a document (pdf, excel, doc, web page) which aim is to provide information in a synthetic tabular or graphical way*

TECHNOLOGIES
Oracle Hyperion Planning
SAP Business Object
IBM Cognos

MAIN FEATURES

- *The template and the number of views of certain data are fixed and defined in the design stage. Thus the business user can navigate (drill down/up) a fixed number of view*

- *We differentiate two types of reports:*
  - ✓ *Static (e.g. pdf)*
  - ✓ *Dynamic (e.g. web page)*

USE CASE

- *Descriptive analysis*
- *Synthetic view of business phenomena*

TRADITIONAL ANALYTICS
DASHBOARDING

In a different way from reporting, dashboards are web applications that enable business users to navigate data interactively

AT A GLANCE

- *Dashboards are web applications or tool that enable business users to navigate data. Users can demand, through user-friendly interface, ad hoc view of a particular set of data, drill-down and focus on interesting details as well as calculate high level KPIs*

TECHNOLOGIES
Qlick, Microsoft Power BI, QuickSight (AWS), Shiny, Plotly

MAIN FEATURES

- *Make synthetic information (Key Performance Indicator) available to business users to describe specific subject areas*
- *Give the possibility to analyze data from synthesis data to maximum level of detail (drill down, drill-up)*

USE CASE

- *Summary/detailed analysis*
- *KPI processing*
- *Top management view (CFO, CRO)*
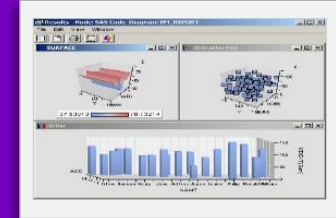- *Simulations and scenarios analysis*

TRADITIONAL ANALYTICS
DESCRIPTIVE STATISTICS

Statistical Analysis tools enable the definition of statistical models and simulations and the application of aggregation and clusterization logics

AT A GLANCE

- *Statistical Analysis tool allow the user to create statistical models, both descriptive and predictive, define simulation of future trends and optimization of patterns and strategies*

TECHNOLOGIES
Excel, R, Python, SAS

MAIN FEATURES

- *Analyze the relations between data in order to create a representative sample of the population*
- *Elaborate statistical models on data in order to understand trends and correlations*
- *Define aggregation and clusterization logics*
- *Application of statistical techniques, like Regression, Correlation, Standard Deviation and Outliers identification*

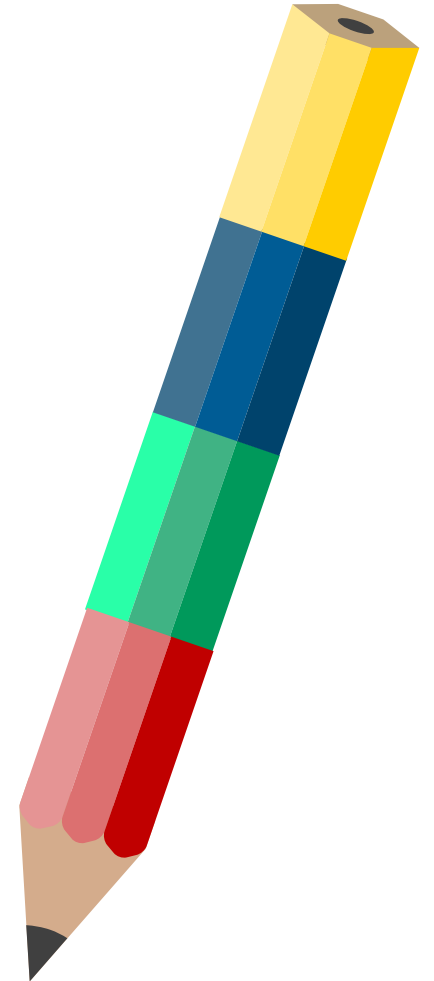### USE CASE

- *Internal statistical information (e.g. mean, distribution)*
- *Evaluation of marketing campaign results*
- *Calibration of scenarios or controls*

HANDS ON SMARTPHONE
MENTIMETER ACCESS CODE: 9125 6070

"Simulations and scenarios analysis" is an example of:

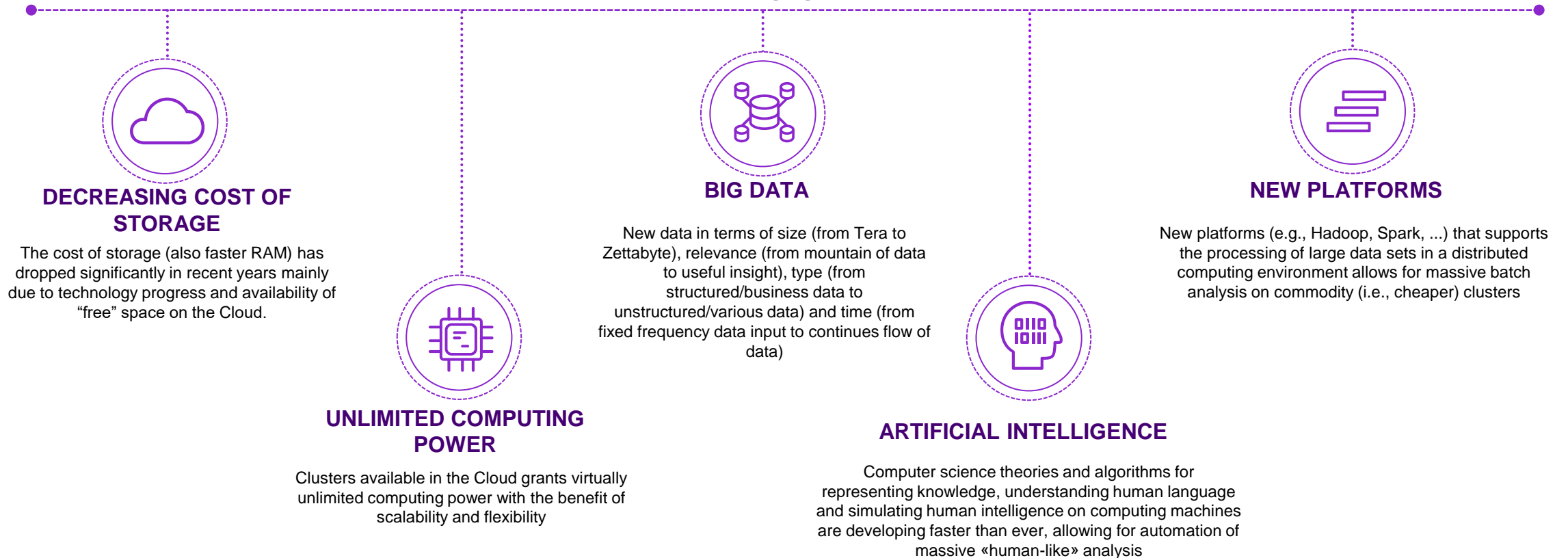| Dashboarding	Reporting	Descriptive statistics
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ADVANCED ANALYTICS AND AI
NEW TECHNOLOGIES AND ENABLERS

The **digital revolution** brings disruptive factors that are changing the way we approach to the data analysis
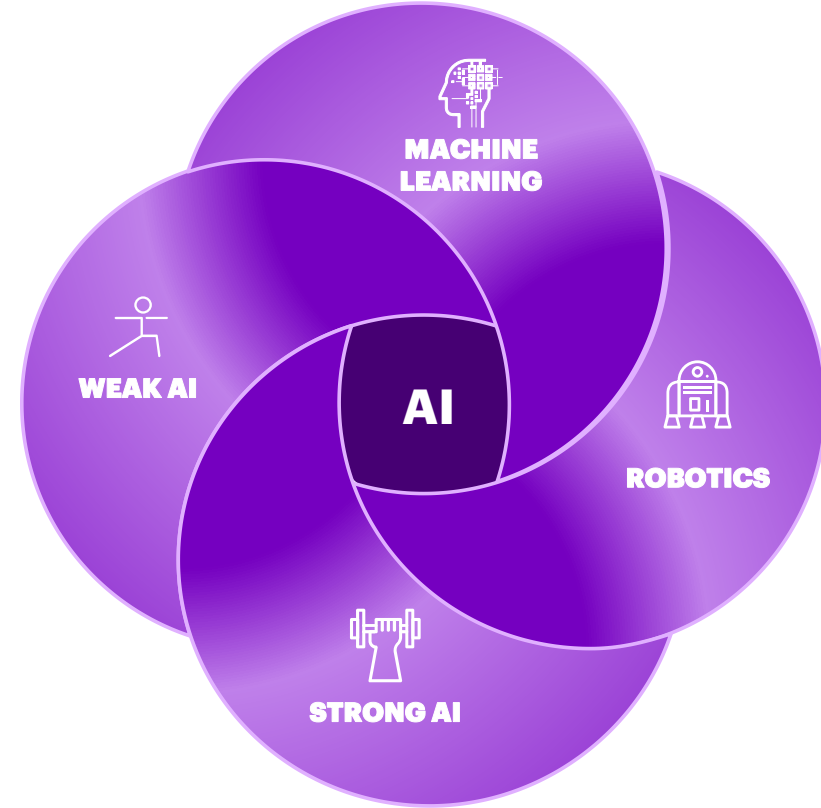These main trends have catalyzed the development of what we call "advanced analytics"

THE DIGITAL (R)EVOLUTION

DECREASING COST OF STORAGE

The cost of storage (also faster RAM) has dropped significantly in recent years mainly due to technology progress and availability of "free" space on the Cloud.

UNLIMITED COMPUTING POWER

Clusters available in the Cloud grants virtually unlimited computing power with the benefit of scalability and flexibility

BIG DATA

New data in terms of size (from Tera to Zettabyte), relevance (from mountain of data to useful insight), type (from structured/business data to unstructured/various data) and time (from fixed frequency data input to continues flow of data)

ARTIFICIAL INTELLIGENCE

Computer science theories and algorithms for representing knowledge, understanding human language and simulating human intelligence on computing machines are developing faster than ever, allowing for automation of massive «human-like» analysis

NEW PLATFORMS

New platforms (e.g., Hadoop, Spark, ...) that supports the processing of large data sets in a distributed computing environment allows for massive batch analysis on commodity (i.e., cheaper) clusters

ARTIFICIAL INTELLIGENCE:

THE CAPABILITY OF A MACHINE TO IMITATE INTELLIGENT HUMAN BEHAVIOR*
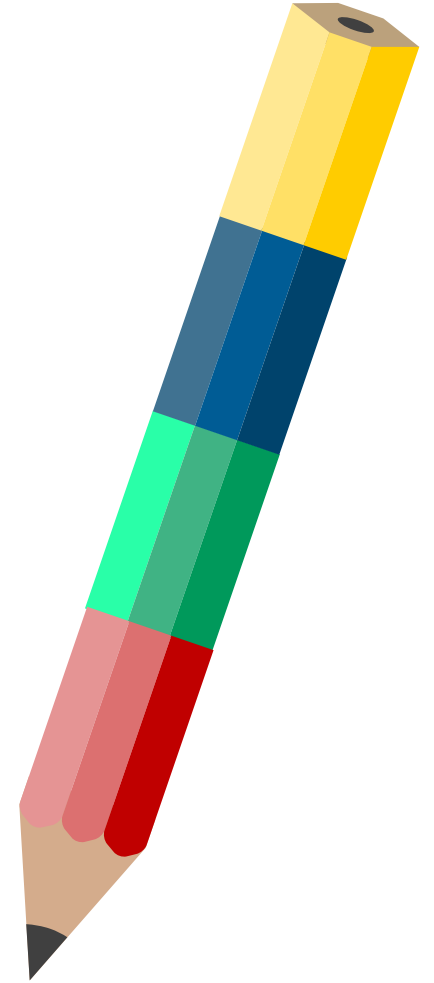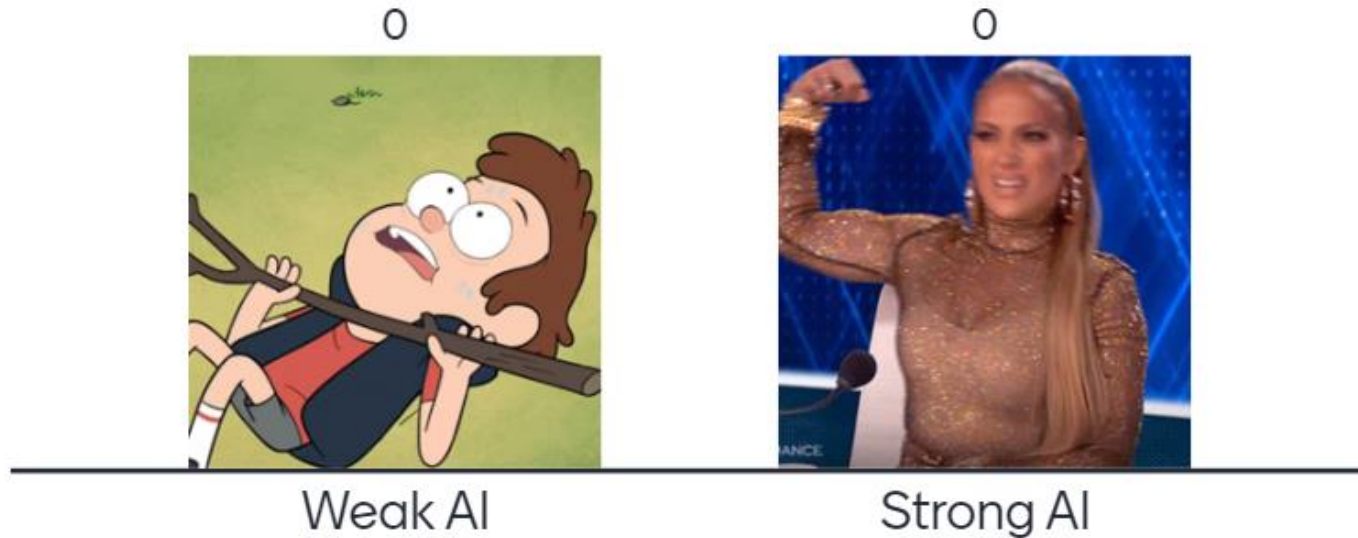
MACHINE LEARNING

WEAK AI

AI

ROBOTICS

STRONG AI

... GOOD QUALITY DATA ARE ALWAYS

FOUNDAMENTAL TO THE

APPLICATION OF AI

20

HANDS ON SMARTPHONE

Is Image recognition of your smartphone:

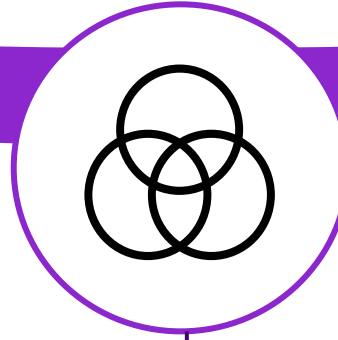| 0	0
Weak AI	Strong AI

MACHINE LEARNING
KEY FACTORS
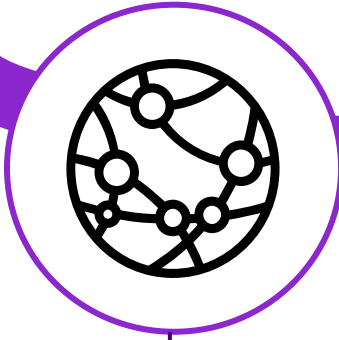
HUGE AMOUNT OF DATA

Machine Learning is typically used with a huge amount of data due to the fact that it uses the **computational power** *of computer in order to reiterate algorithm and process data*

COMPLEX RELATION

Machine Learning is used in order to model **complex phenomena** *and is not suitable for simple relationships*
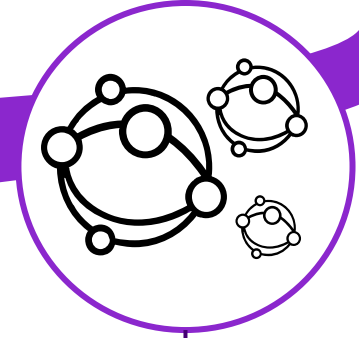
NOT RULE BASED

As a huge amount of data computer and complex relation modeler, Machine Learning is able to **discover in data complex relations otherwise not identifiable**

ADVANCED ANALYTICS
DIFFERENT AI ALGORITHMS

There are **three types of AI algorithms**, which **differ in their approach**, **the type of data they input and output**, and **the type of task or problem that they are intended to solve**

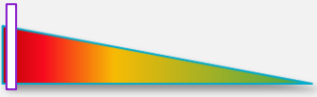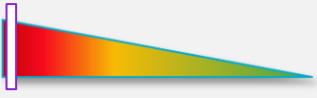|	Description	Algorithms	Examples
Supervised learning	It **builds a mathematical model** of a set of data that contains both the **inputs** and the **desired outputs**	**CLASSIFICATION** is used when the outputs are restricted to a **limited set of values** (e.g. e-mail spam filters) **REGRESSION** is used when the outputs may have any **numerical value within a range** (e.g. Probability of default of counterparties)	
Unsupervised learning	It takes a set of data that **contains only inputs**, and **finds structure in the data**, **like grouping or clustering of data points**: it minimizes the total intra-cluster variance and maximizes the between-group variance	**CLUSTERING** consists in **classifying information** in **homogeneous groups**, not known a priori (e.g. Fraud Detection, Market Segmentation)	
Reinforcement learning	The machine **learns by interacting with its environment**. The agent **receives rewards by performing correctly and penalties for performing incorrectly**. The agent learns without intervention from a human by **maximizing its reward and minimizing its penalty**	**NEXT BEST ACTION** selects the **next step** by an agent, **based on the analysis of the environment in which he operates** (e.g. **Robotics**, **self-driving devices**)	

HANDS ON SMARTPHONE

Which of these is not Artificial Intelligence

0	0	0
Logistic Regression	Descriptive Statistics	Neural Network
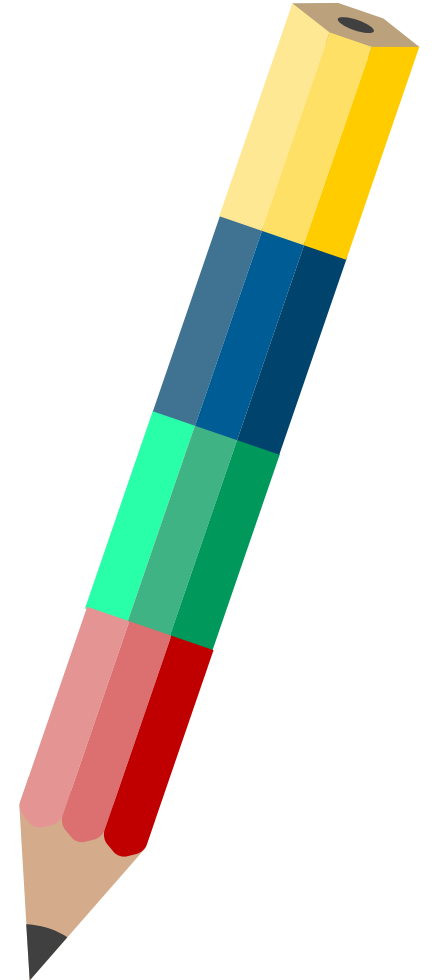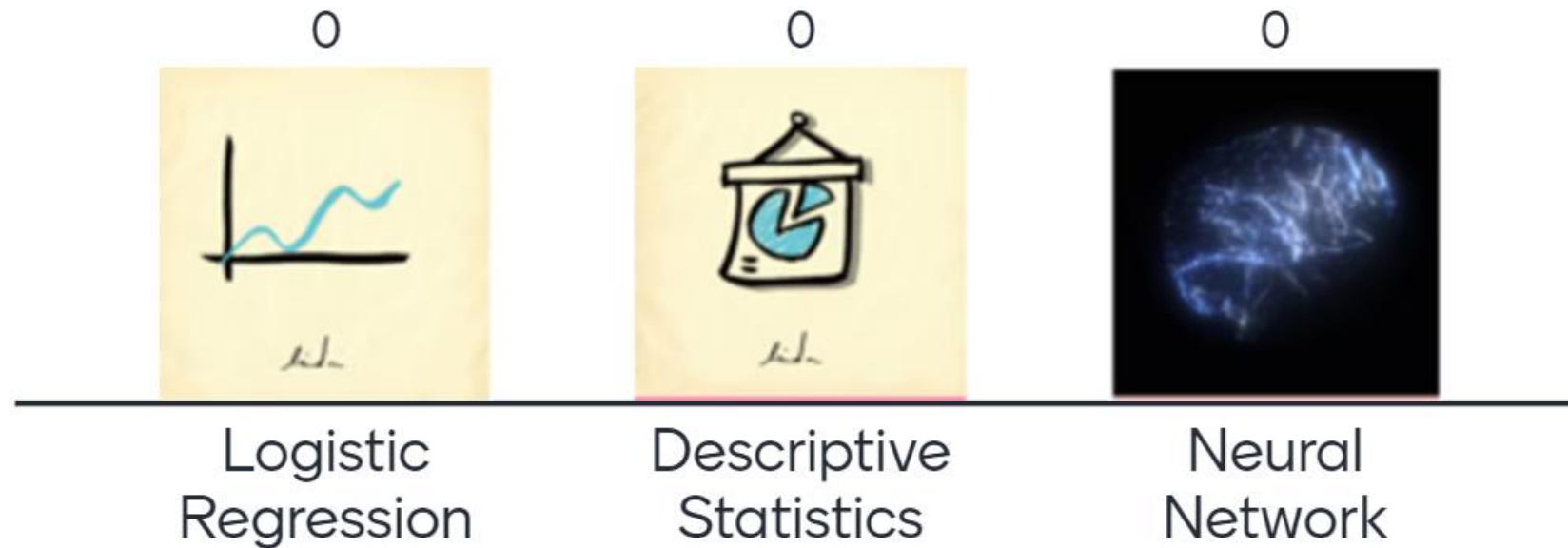
MACHINE LEARNING
NEURAL NETWORK

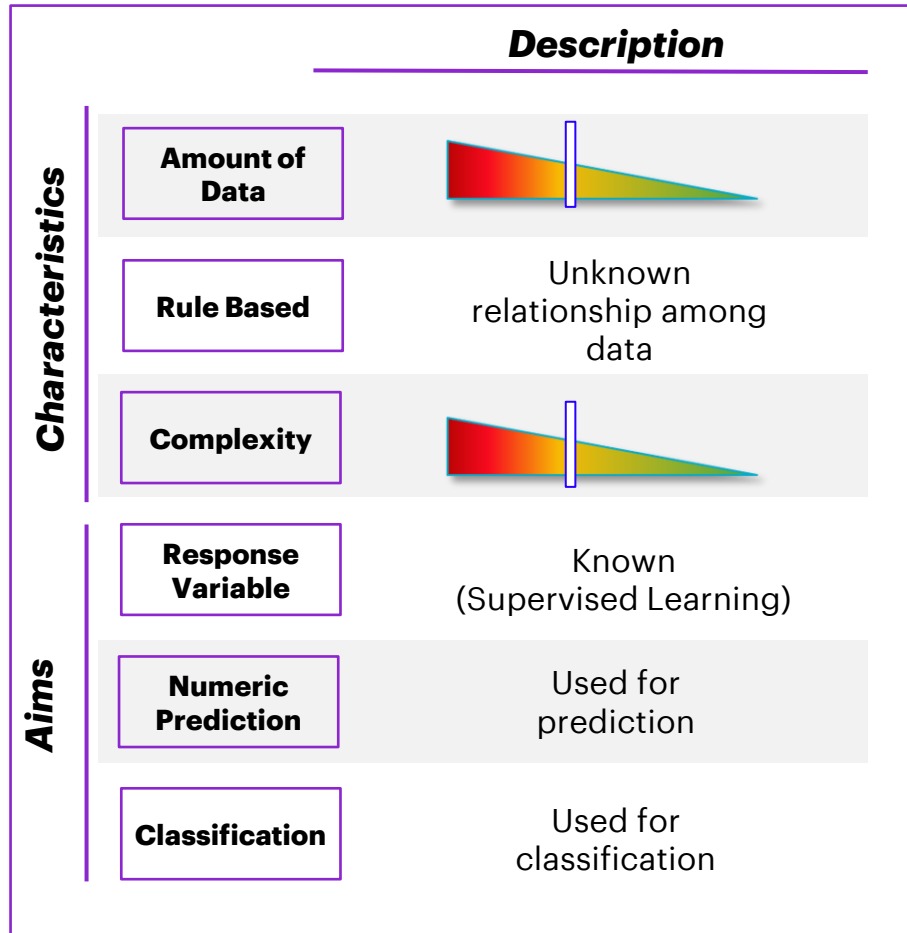|		Description
Characteristics	**Amount of Data**	
	Rule Based	Unknown relationship among data
	Complexity	
Aims	**Response Variable**	Known (Supervised Learning)
	Numeric Prediction	Used for prediction
	Classification	Used for classification

*Inspired to **brain structure**, Neural Networks look for complex patterns in a huge amount of data using **iterative algorithms***
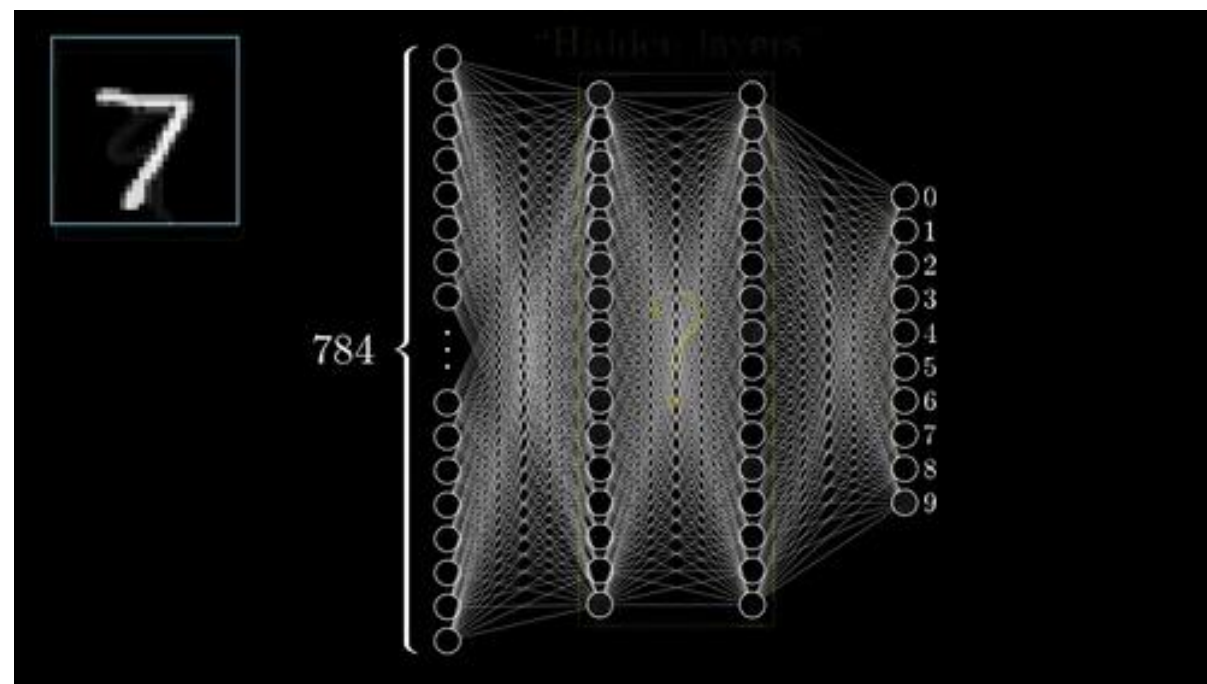
MACHINE LEARNING
DECISION TREE

|	**Description**	
Characteristics		
Amount of Data		
Rule Based	Unknown relationship among data	
Complexity		
Aims		
Response Variable	Known (Supervised Learning)	
Numeric Prediction	Used for prediction	
Classification	Used for classification	

*Inspired to the structure of a tree's branches, **decision tree learning** looks for **classification rules** in data to predict the target value of the observation.*

Examples

- ***Decision Tree**: builds a decision tree looking for features that produce the highest **information gain**;*
- ***Random Forest**: constructs a multitude of decision trees, using a random subset of features.*

Evolution

- ***Bagging**: Fit trees to **boostrapped** resampled versions of the training data and column sampling in RF and then average the predictions;*
- ***Boosting**: Fit trees to **reweighted** versions of the training data. Same concept of averaging trees, but done so that it learns from the errors of the previous trees (**XGBoost**).*

Root Node

For more tutorials: annalyzin.wordpress.com
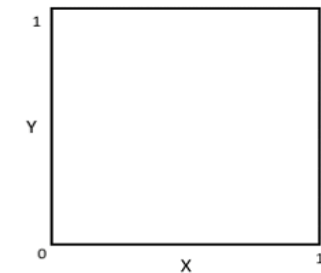
AI + MACHINE LEARNING
TEXT MINING - NATURAL LANGUAGE PROCESSING

NLP Use Cases

- **Spam detection**: *scan emails for language that often indicates spam or phishing*

- **Machine translation:** *replacing words in one language with words of another*

- **Virtual agents and chatbots:** *use speech recognition to recognize patterns in voice commands and natural language generation to respond with appropriate action or helpful comments*

- **Social media sentiment analysis:** *uncovering hidden data insights from social media channels analyzing language used in social media posts, responses, reviews to extract attitudes and emotions in response to products, promotions, and events*

Definition

Text mining is an Artificial Intelligence technology that uses Natural Language Processing (NLP) to transform the unstructured text in documents and databases into normalized, structured data suitable for analysis or to drive Machine Learning algorithms.

NPL

Natural Language Processing refers to the branch of Artificial Intelligence concerned with giving computers the ability to understand text and spoken words in much the same way human beings can.
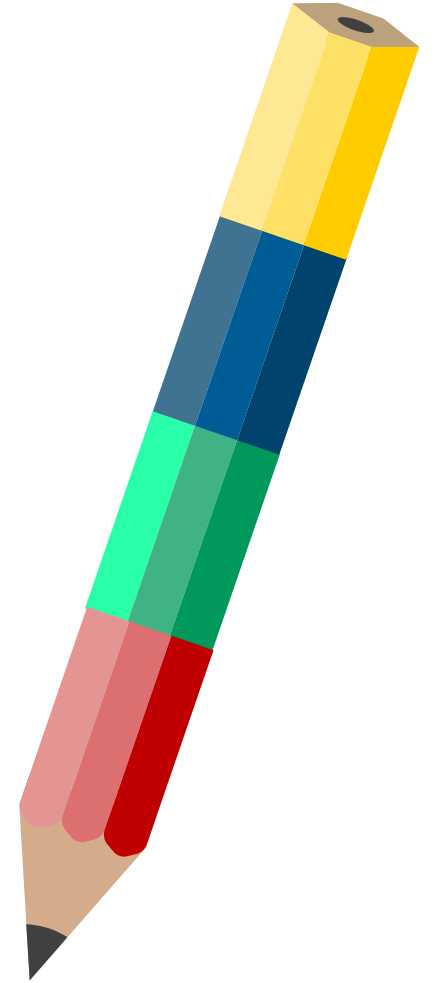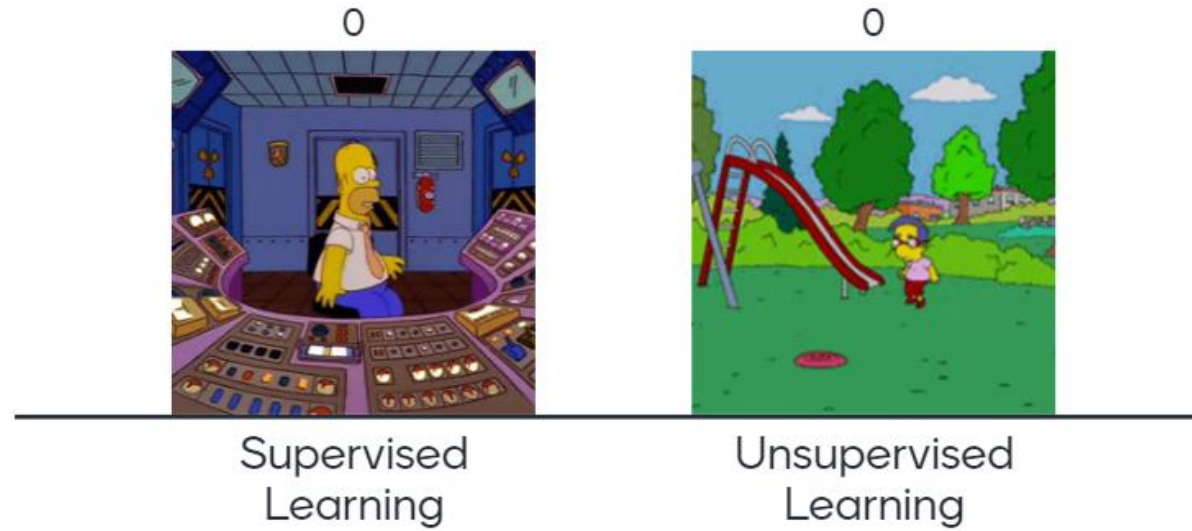
Tool Examples

- **Speech recognition**: *converting voice data into text data; application that follows voice commands or answers spoken questions;*

- **Sentiment analysis:** *extract subjective qualities (attitudes, emotions, sarcasm, suspicion) from text;*

- **Word sense disambiguation:** *selection of the meaning of a word with multiple meanings through a process of semantic analysis that determine the word that makes the most sense in the given context*

HANDS ON SMARTPHONE

Natural Language Processing is:

	0		0

Supervised Learning

Unsupervised Learning

AGENDA

O1   AACCENTURE & A>RACE OVERVIEW

O2   ANALYTICS & ML

O3   USE CASES ESG

O4   WEB CREDIT REPUTATIONAL

O5   MARITIME ANALYTICS FOR SHIPPING

ESG - OVERVIEW

ENVIRONMENTAL

Criteria which assesses companies' operational impact on the environment (i.e. gas emissions, waste and pollution)

SOCIAL

Criteria which examines how a company relates to and creates value for stakeholders (i.e. inequality, health and safety)

GOVERNANCE

Criteria which refers to a company's leadership, policies, and business ethics (i.e. board composition and tax strategy)

MAIN DRIVERS FOR THE CHANGE

IMPROVED PERFOMANCES

Companies adopting an ESG strategy have higher economic results

COMPANIES' SOCIAL REPUTATION

This represents a social and market value, which increases the level of consensus and helps to enhance the companies' social reputation

TRANSPARENCY

ESG factors enables more transparency towards stakeholders

ESG – REGULATORY LANDSCAPE
KEY MILESTONES

THE RISING AWARENESS OF THE RELEVANCE OF ESG FACTORS FOR THE GLOBAL ECONOMIC AND FINANCIAL STABILITY, TOGETHER WITH ENVIRONMENTAL RISKS ARE PUSHING PRESSURE AND THE REGULATORY LANDSCAPE IS EVOLVING BECOMING INCREASINGLY URGENT

2000s - EMERGENCE OF ESG APPROACH

❖ **ESG approach** is designed to broaden to a holistic view of Environmental, Social and Governance factors that are beginning to be integrated at different levels

2015 – «2030 AGENDA» & «PARIS AGREEMENT»

❖ **2030 Agenda for Sustainable Development** is an action plan about commitments to people and planet, and is embodied in the 17 SDGs
❖ **Paris Agreement** is the first universal and legally binding agreement on climate change

2021 – «Final EBA Report on incorporation of ESG into risk management and supervision»

❖ The EBA encourages institutions to integrate ESG risks into their business plans, risk management, internal control framework and decision-making processes.

CRISP
CLIMATE RISK INNOVATION SUSTAINABILITY PLATFORM

ADVANCED ANALYTICS SOLUTION

- Analytics tool to analyse the **ESG performance** of companies through the use of **5 scores** with distinct objectives:
    - SDG Index
    - Sustainability Index
    - Green Reputation Index
   - Location Industry Index
    - Smart Working Index

COMPANY ESG SCORING

- Sustainability is measured taking account of **Company's size**, **sector climate impacts** and membership to high energy consumption sectors (**ETS**)
- Performances are compared with target fixed by **PNIEC** and established to achieve climate neutrality

DASHBOARDING

- Development of a **dynamic dashboard** to visualize and monitor company's ESG score, **compare** it with other peer companies, analyze news trend and perform **scenarios simulations**
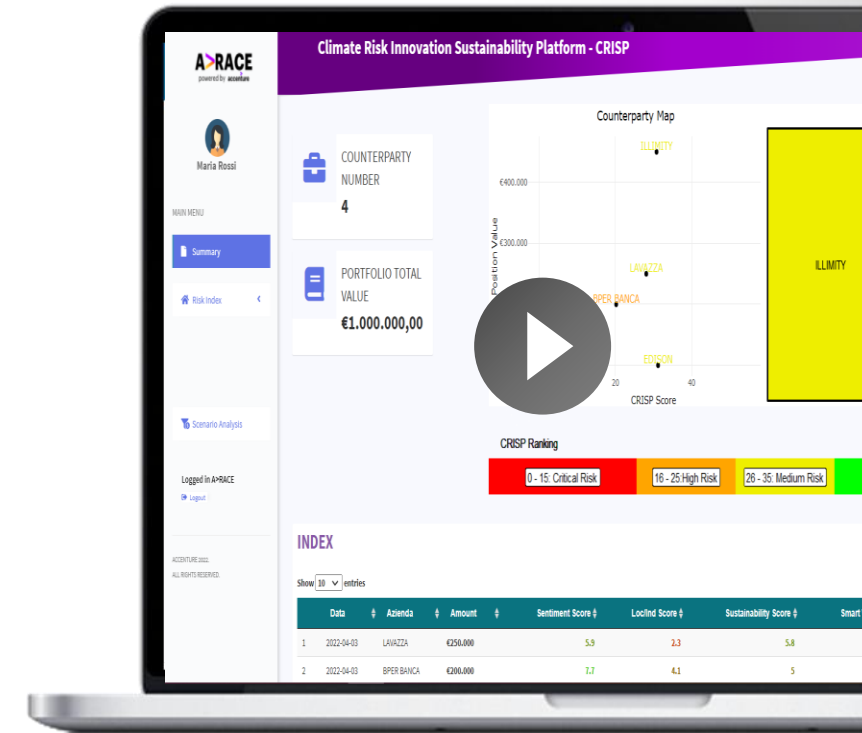
ESG WEB REPUTATIONAL
ADVANCED ANALYTICS USE CASE

NEWS GATHERING & CLASSIFICATION

- Automatic external data collection to analyze the gathered news with **Advanced analytics techniques**
- Use of **NLP** and **Sentiment algorithms** to identify **ESG** relative **news**

COMPANY ESG SCORING

- Application of **ESG dictionaries** to calculate the **polarity** on the single news extracted for each company
- Aggregation of the metrics regarding Environmental, Social & Governance into an **overall evaluation**

DASHBOARDING

- Development of a **dynamic dashboard** to visualize and monitor company's ESG reputation, **compare** it with other peer companies, analyze news trend and perform **scenarios simulations**

ESG - USE CASE

SUSTAINABILITY

TERRITORIAL

WEB REPUTATIONAL
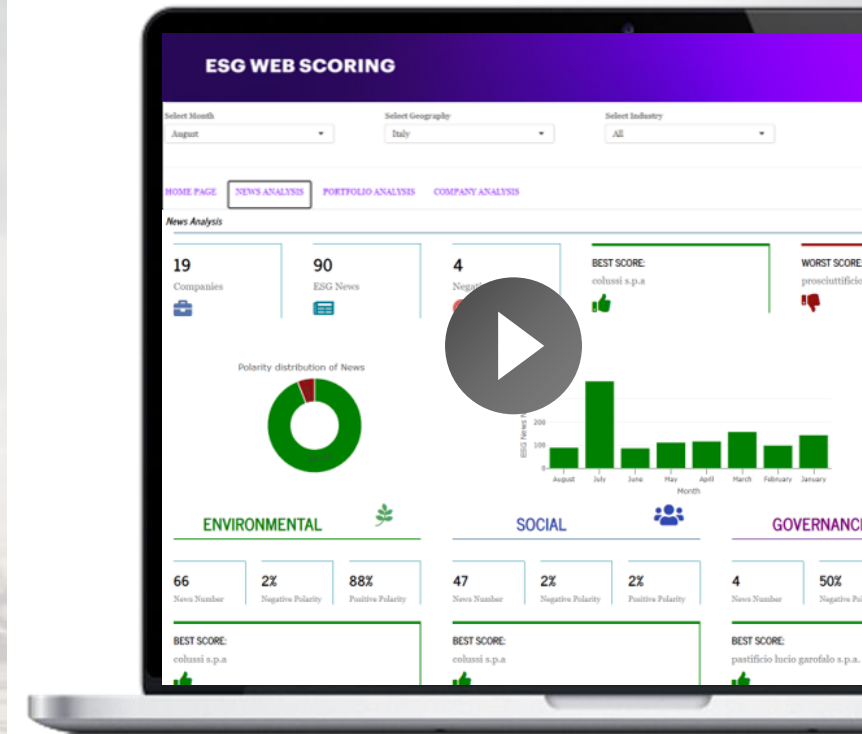
ESG INDICATORS CAN BE ADAPTED TO DIFFERENT SECTORAL AND INDUSTRIAL CONTEXTS, RESULTING IN DIFFERENT USE CASES

	USE CASE	
BANKING	**CREDIT RISK EVALUATION**	Use risk indicators to assess the credit risk exposure of the portfolio
	STRESS TESTING	Run stress test scenarios by varying the severity of climatic phenomena, so that this risk can also be integrated into merit assessments
	LENDING APPROVAL PROCESS	Integrating indices to assess more accurately the pricing to be applied for the granting of a given credit
	FINANCIAL MANAGEMENT	Consider indices to assess the exposures of the investment portfolio (both bank portfolio and client portfolio for financial advice purposes)
INSURANCE	**UNDERWRITING PRICING**	Using climate risk indices to more accurately assess the pricing of insurance policies
	FINANCIAL MANAGEMENT	Considering indices to assess investment portfolio exposures
NON FINANCIAL	**STRATEGIC PLANNING**	Use climate risk indicators to assess the validity of any strategic choices (e.g. physical expansion in a given territory, production logistics management, etc.)
	PRICING	Use information for more accurate pricing of your portfolio (e.g. Immobiliare.it for more accurate property valuation)

AGENDA

O1   **ACCENTURE & A>RACE OVERVIEW**

O2   **ANALYTICS & ML**

O3   **USE CASES ESG**

O4   **WEB CREDIT REPUTATIONAL**

O5   **MARITIME ANALYTICS FOR SHIPPING**

WEB CREDIT REPUTATIONAL
DEMO

ADVANCED ANALYTICS SOLUTION

Use of an **Advanced Analytics solution** able to acquire and process **external data** (e.g. news, social insight) analyzing data with **Text Mining and Sentiment algorithms**

NATURAL LANGUAGE PROCESSING

Application of *Natural Language Processing* algorithms to **identify insights** that can **valuate Companies soundness** and **reputation** through the sentiment reputation score based on **news/ social insight and historical trend**

DYNAMIC DASHBOARD

Definition of a **dynamic dashboard for the analysis phase** with 2 section, executive summary with overall information and measures, and detailed section with the scores for each company
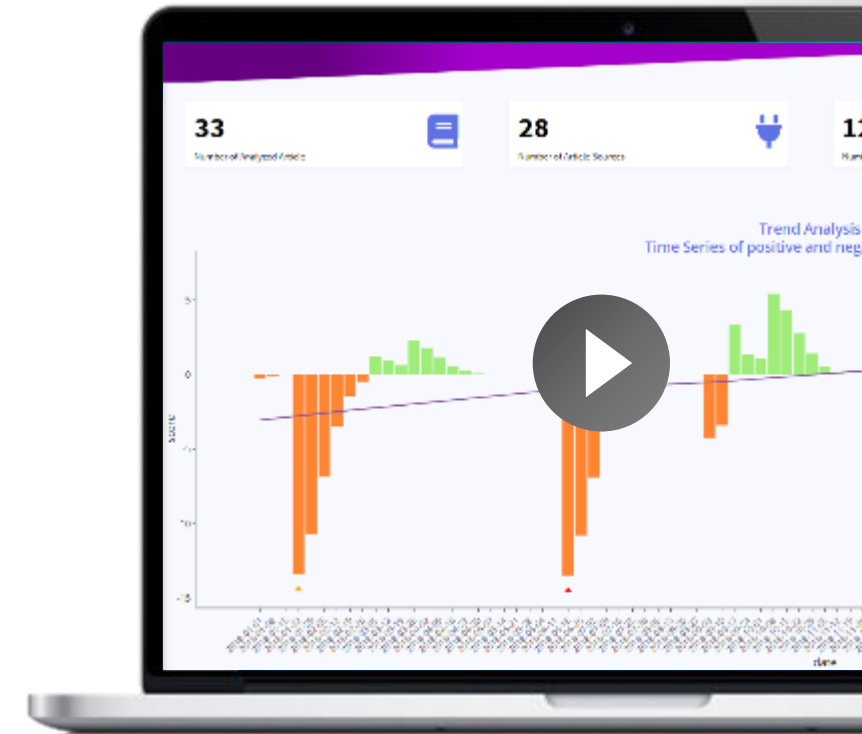
AGENDA

01   ACCENTURE & A>RACE OVERVIEW

02   ANALYTICS & ML

03   USE CASES ESG

04   WEB CREDIT REPUTATIONAL

05   MARITIME ANALYTICS FOR SHIPPING

MARITIME ANALYTICS FOR SHIPPING
DEMO

SHIP TRACKING & ILLICIT SCORING

- Use of **AIS data publicy** available to track shipping and routes of ships worldwide to identify **suspicious activities** and violations of **Financial Sanctions**

- Definition of a **scoring model** based on **21 Key Risk Indicators** to assign each ship an Illicit Scoring Values based on **behavioral data**

21 Key Risk Indicators

STS Transfer (5)

Flag/IMO (5)

AIS (4)

Port Calls (2)

Cyber security (3)

Shipping goods (2)
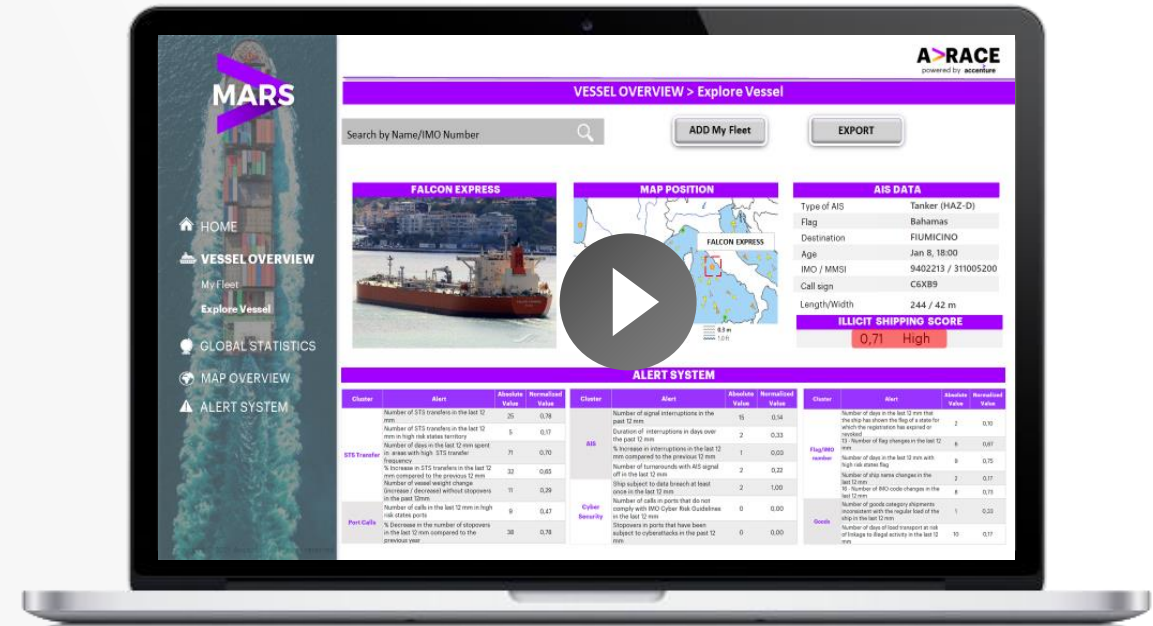
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