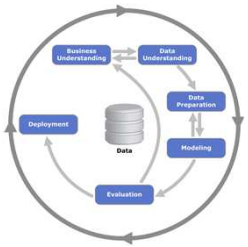
Machine Learning EZ

(Unsupervised and Supervised Learning)

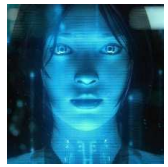


sas

W3COMPUTING
A DEVELOPER REFERENCE WEBSITE





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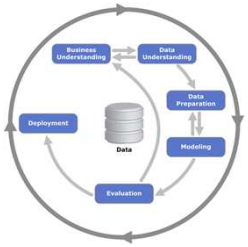

CBDA CERTIFIED IIBA

ISO International Organization for Standardization

ANSI American National Standards Institute

sas

OMG OBJECT MANAGEMENT GROUP

INCOSE International Council on Systems Engineering

IEEE

PMI Project Management Institute

Scaled Agile Framework

IIBA International Institute of Business Analysis

UNIFIED MODELING LANGUAGE

W3COMPUTING A DEVELOPER REFERENCE WEBSITE

Requirements Development Management (RDM) for

Business Data Analytics

(The Language of Data)

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Requirements Agenda

Business Data Analytics "The Language of Data"

01-FOUNDATION

- **LAB-Introductions (Name, Job Title, Objectives)**
- Dashboards and Robots (Data Mining & Machine Learning)
- Requirements and Testing (Four Quadrants)
- What are Structured Language Requirements? (Structured English and Structured Query Language)
- Why Should You Care? (Primary Source of Project Problems)
- How Do They Work? (Discreet Intellectual Property Inventory)
- Types of Requirements (Product, Project, DATA)
- Natural Language Processing (Morphology, Semantics, Syntax and Linguistics)
- OMG-SBVR (Semantics of Business Vocabulary & Rules)
- IEEE-EARS (Easy Approach to Requirements Syntax)
- INCOSE (Rules for Writing Requirements) & QVscribe
- Waterfall and Agile (Assembly Methods)

02-ELICIT

- **LAB-Vision/Scope (Seek to Understand)**

Elicitation Techniques:

- Document Analysis (Low Hanging Fruit)
- Interface Analysis (Navigation & Functionality)
- Benchmarking (Actual Data)
- Brainstorming (Every Idea is a Good Idea until it becomes a Bad Idea)
- Prototyping (Minimum Viable Product)
- Reverse Engineering (Begin with the End in Mind)
- Interview (Thinking Questions)
- Workshop (Group Interviews)
- Observation (What do you See?)
- Survey Questionnaire (Paper equals proof)

03-ANALYZE

- What are Models? (Pictures of Language)
- **LAB-The Language of Modeling (GIVEN pre WHEN process THEN output-result)**
- Types of Models (Context-Structure, Usage, Data Behavior, Process Flow)
- Context-Structure (Vision, Roadmap, Scope WBS)
- Usage (EPIC, UseCase, UserStory, Feature)
- Data Behavior (ERD, JOIN-Denormalization, Star Schema, Dimensional OLAP, Dashboard, Intelligence)
- Data Behavior (Data Dictionary, DataFlow, Data Structure Instance, Data Element Attribute, Data Store)
- Data Behavior (Process Logic, Business Rules)
- Process Flow (Swimlane)

04-DOCUMENT

- Categorization, Organization, Documentation, Integration, Automation
- Making Documents Easy to Read (Fonts & Navigation)
- Document Types (BRD, TRD)
- **LAB-Business Requirement Document (Concept of Operation)**
- Technical Requirement Document (System Specification)

05-VALIDATE

- Validation thru Triangulation (Prep Drills)
- Traceability (Project Unique Identifier)
- Requirements Baseline (ROM Estimate, Planning Estimate, Definitive Estimate)
- **LAB-Estimating Story Points (Complexity and Risk)**
- Lessons Learned (Course Wrap-Up)

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Project Management Agenda

Business Data Analytics "The Language of Data"

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- INCOSE (Rules for Writing Requirements) & QVscribe
- Waterfall and Agile (Assembly Methods)
- About PowerBI (Business Intelligence)

ENVISION (Initiate)

01-Understand the Business Need

- **Determine BUSINESS OBJECTIVES**
- Background
- Business Objectives
- Success Criteria
- **Assess SITUATION**
- Inventory of Resources
- Requirements, Assumptions, and Constraints
- Risks and Contingencies
- Terminology
- Costs and Benefits
- **LAB-Charter Vision**

PLAN (Increment Zero)

02-Understand the Data

- **Collect INITIAL DATA**
- Data Collection Notes
- **Describe DATA**
- Data Description Notes
- **Explore DATA**
- Data Exploration Notes
- **Verify DATA QUALITY**
- Data Quality Notes
- **LAB-WBS Roadmap**

DEVELOP (Execute)

03-Prepare the Data

- **Select DATA**
- Rationale for Inclusion/Exclusion
- **Clean DATA**
- Data Cleaning Notes
- **Construct DATA**
- Derived Attributes
- Generated Records
- **Integrate DATA**
- Merged Data
- **Format DATA**
- Reformatted Data
- **LAB-Duration Story Points**

04-Model the Data

- **Select MODELING TECHNIQUES**
- Modeling Technique
- Modeling Assumptions
- **Generate TEST DESIGN**
- Test Design
- **Build MODEL**
- Parameter Settings Model
- Model Description
- **Assess MODEL**
- Model Assessment
- Revised Parameter Settings
- **LAB-Risks & Release Schedule**

STABILIZE (Control)

05-Evaluate the Data

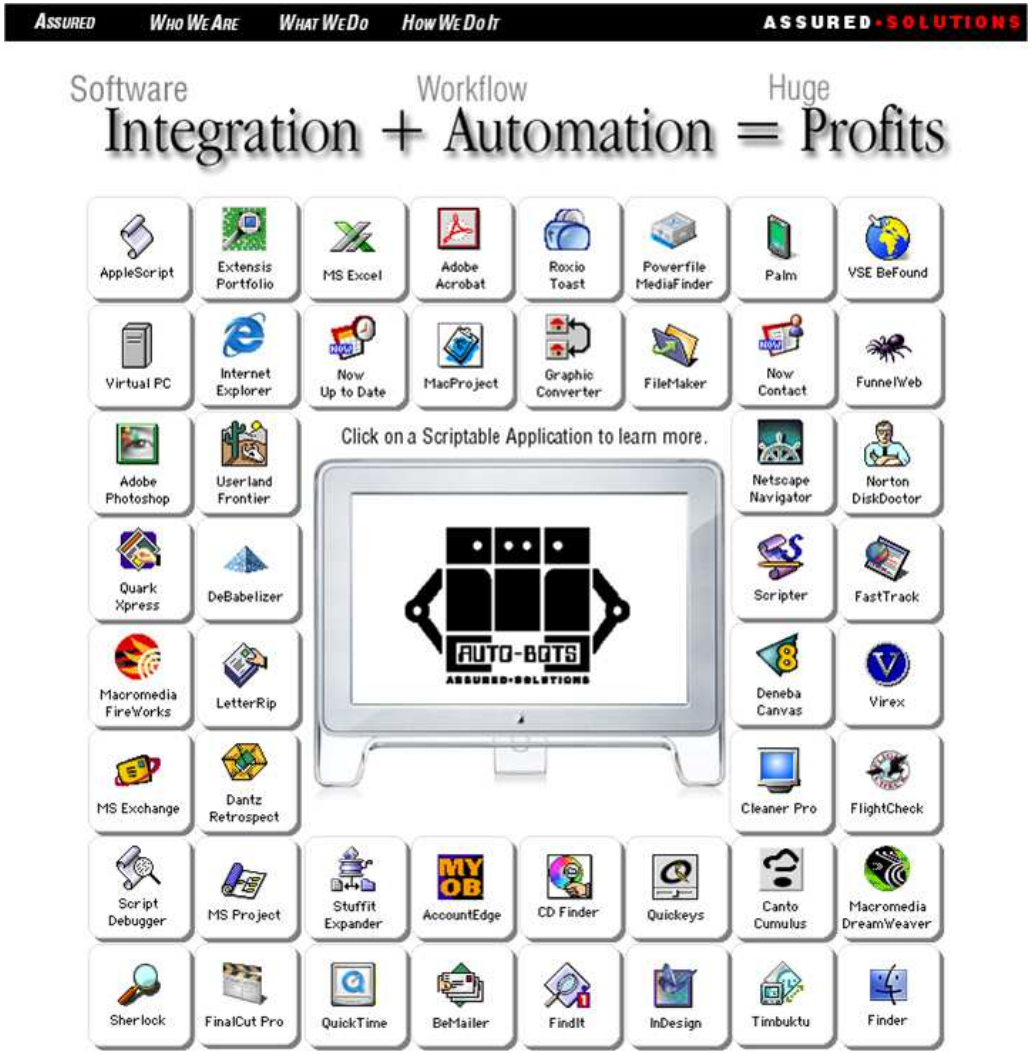
- **Evaluate RESULTS**
- Assess the Results against the Business Success Criteria
- **Review PROCESS**
- Review of Process
- **Determine NEXT STEPS**
- List Possible Actions
- Decision
- **LAB-One Page Project Manager (OPPM)**

DEPLOY (Close)

06-Deploy the Solution

- **Plan DEPLOYMENT**
- Deployment Plan
- **Plan MONITORING & MAINTENANCE**
- Monitoring & Maintenance Plan
- **Produce FINAL REPORT**
- Final Report
- Final Presentation
- **Review PROJECT PLAN**
- Experience Documentation
- **LAB-Lessons Learned (Train the Trainer)**

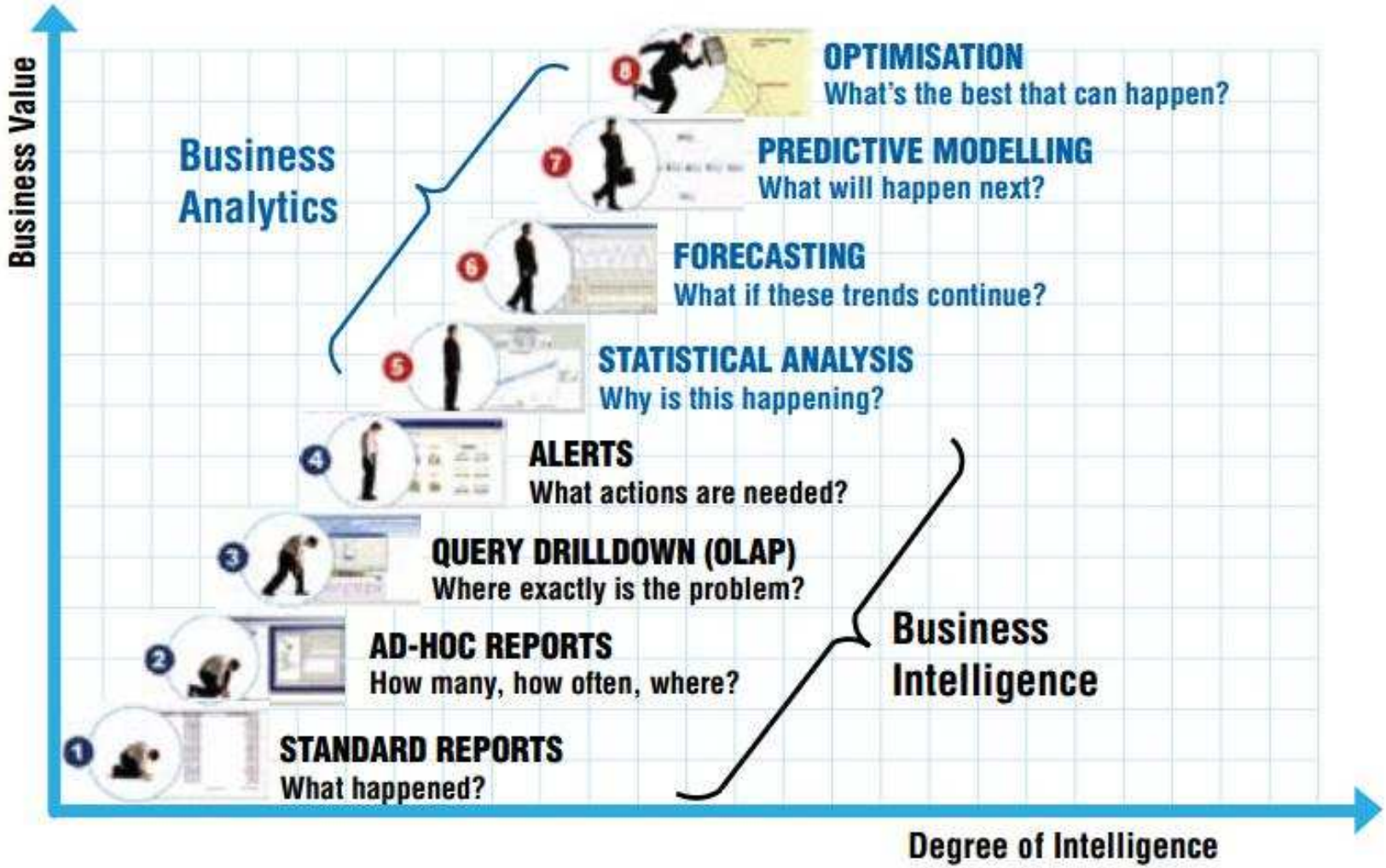
Assured Solutions



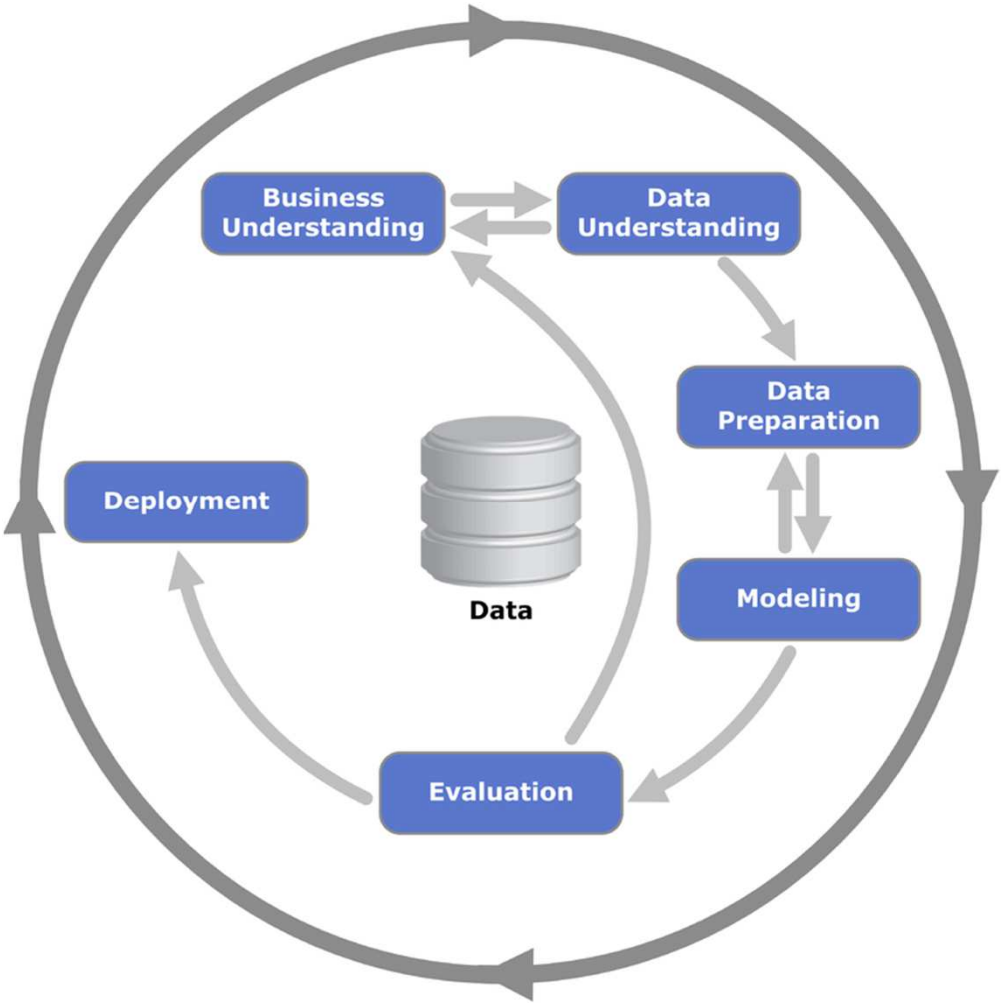
Overview "Seek to Understand"

- **Unsupervised Learning: Dimension Reduction**
- **Unsupervised Learning: Clustering**
- **Supervised Learning: Classification**
- **Supervised Learning: Regression**

Prescriptive Analysis



Cross Industry Standard Process For Data Mining Machine Learning CRISP-DMML



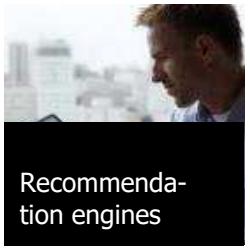
Using Past Data to Predict Future Outcomes

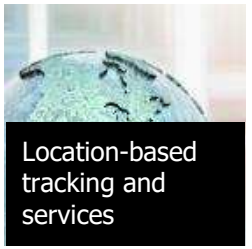
Common Applications

Imagine what Machine Learning could do to your business


Churn analysis


Social network analysis


Recommenda-tion engines


Location-based tracking and services


Vision Analytics


Weather forecasting for business planning


Legal discovery and document archiving


Equipment monitoring


Advertising analysis


Pricing analysis


Fraud detection


Personalized Insurance

Machine Learning Applications across Industries

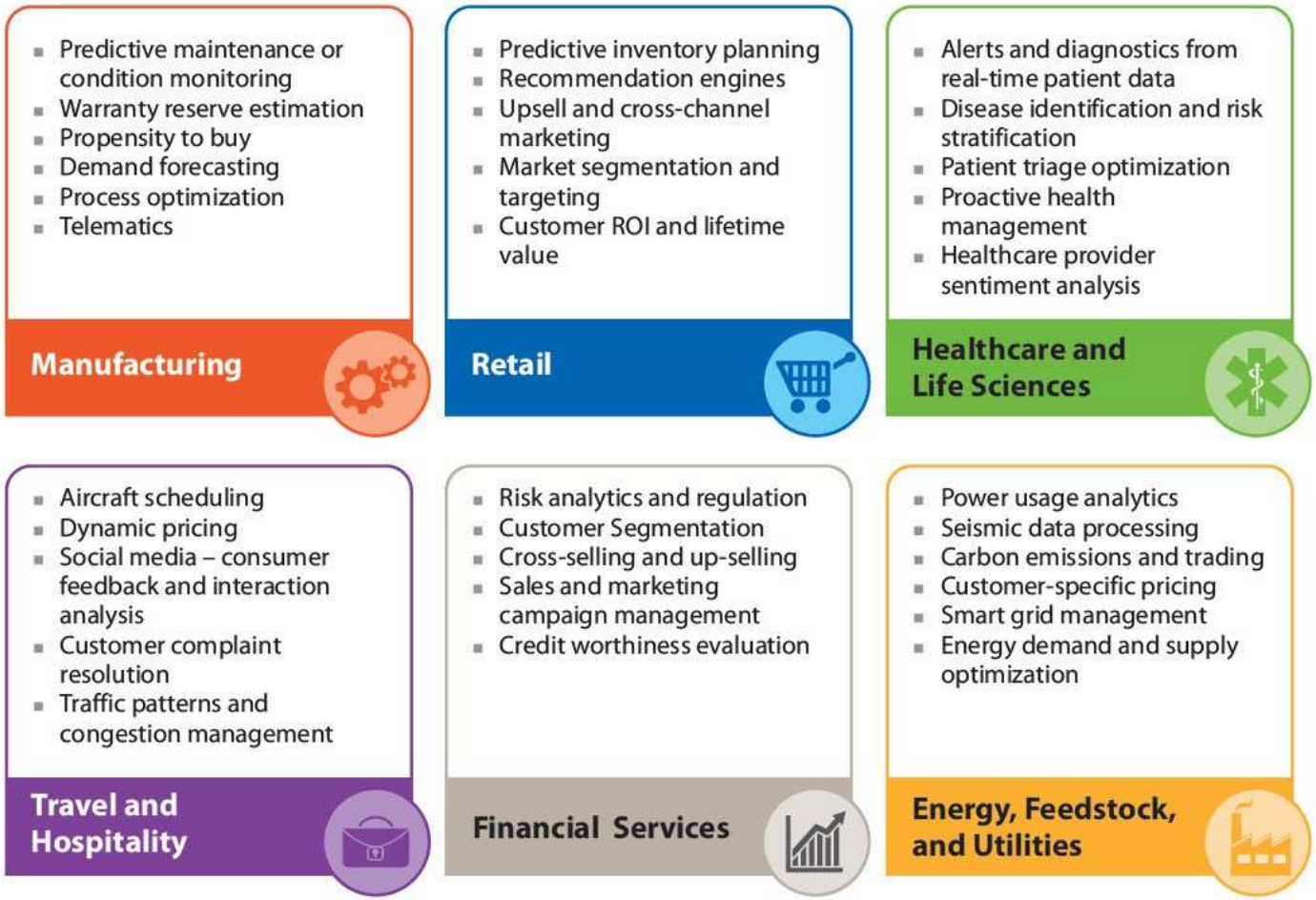
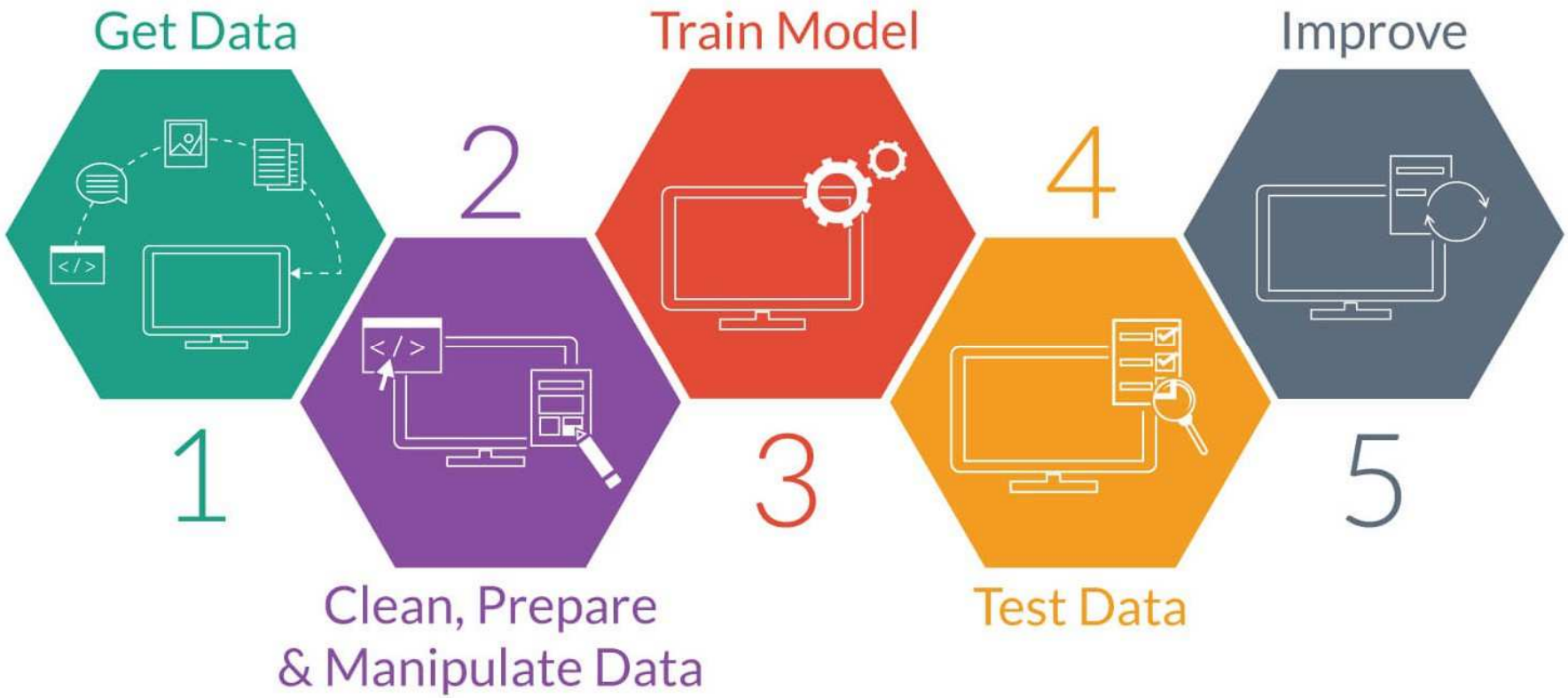
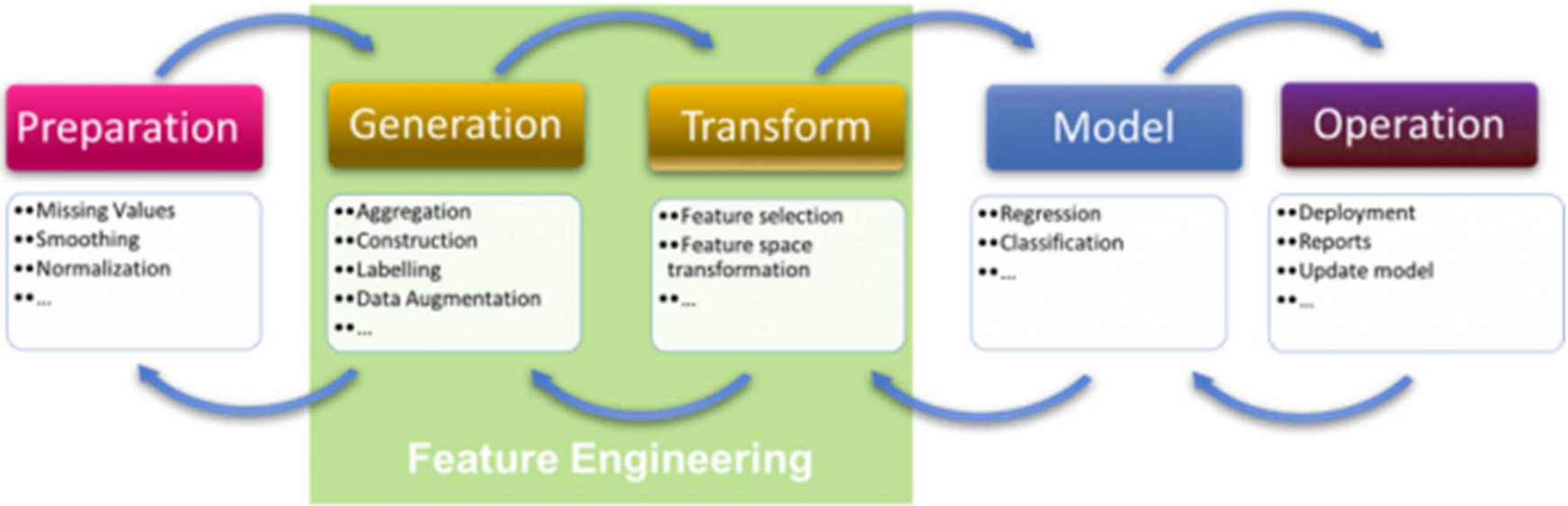


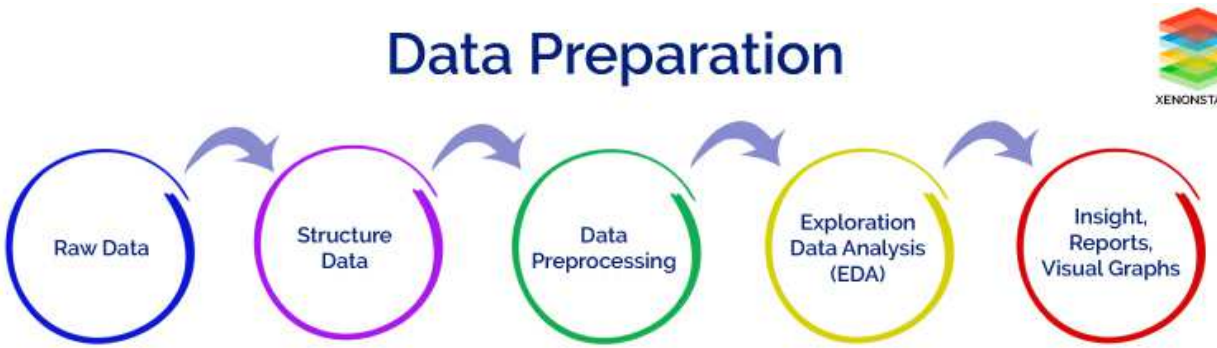
Figure 2: Machine Learning applications across industries

Machine Learning Process

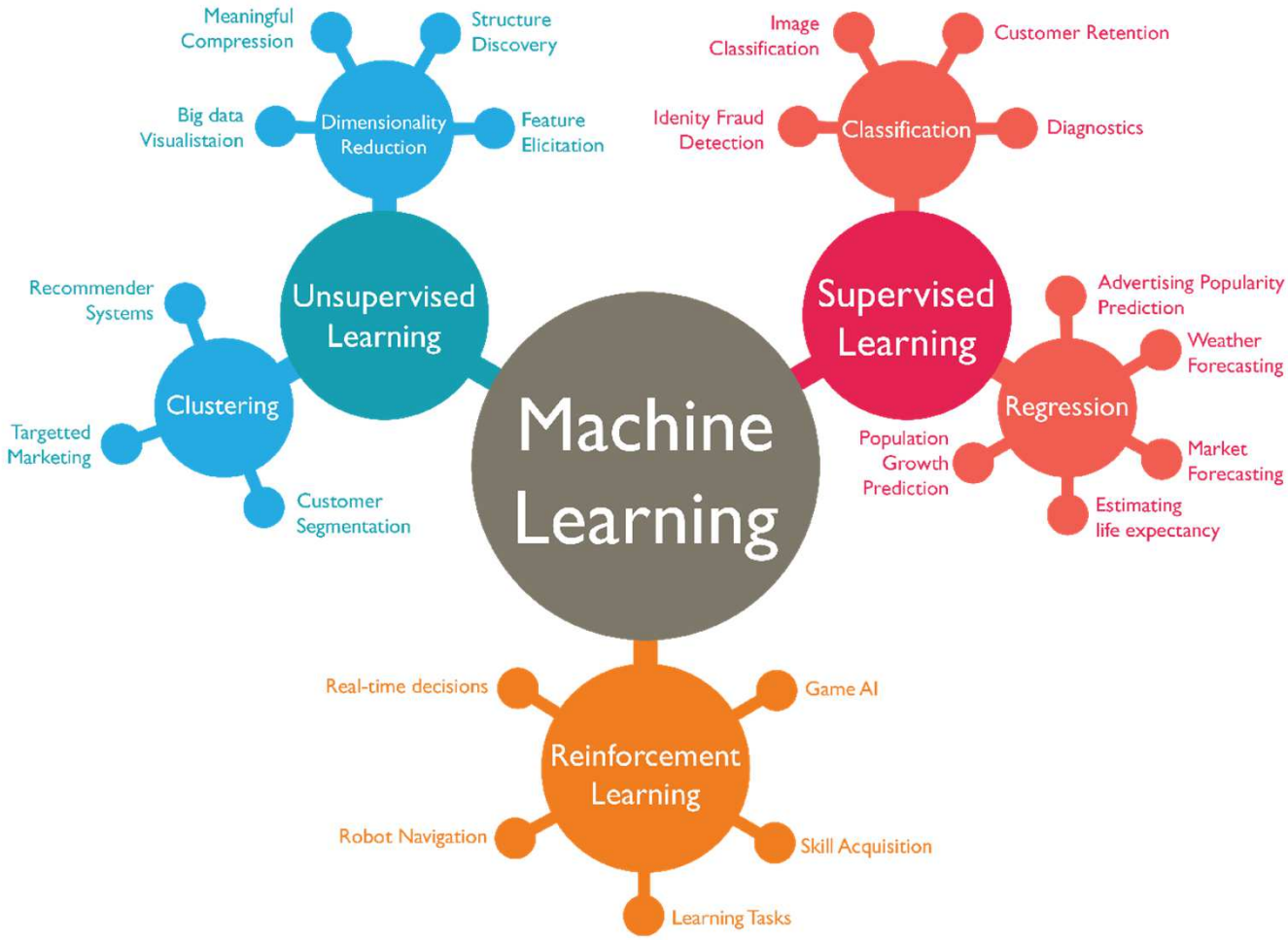


Feature Engineering Process

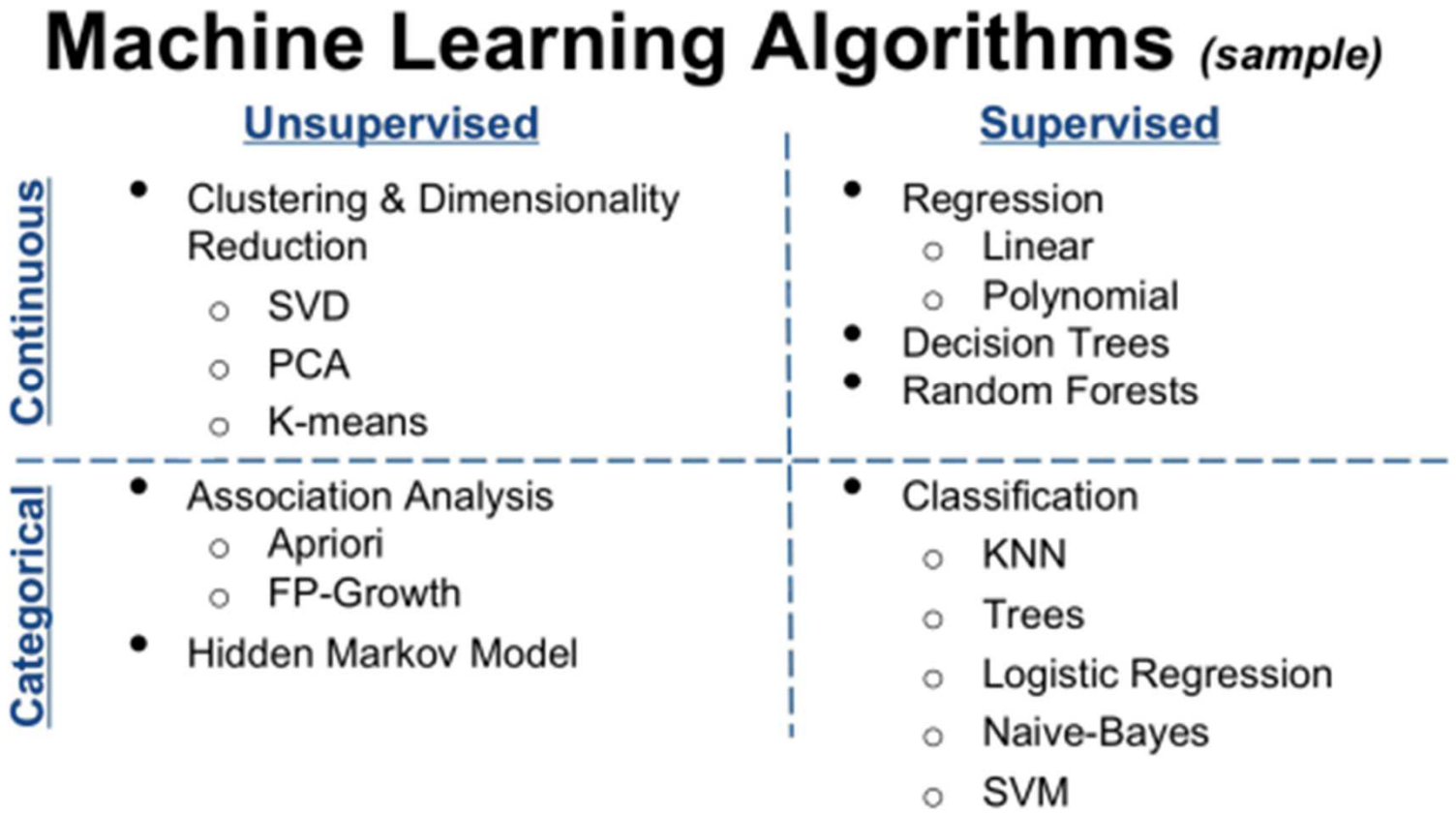




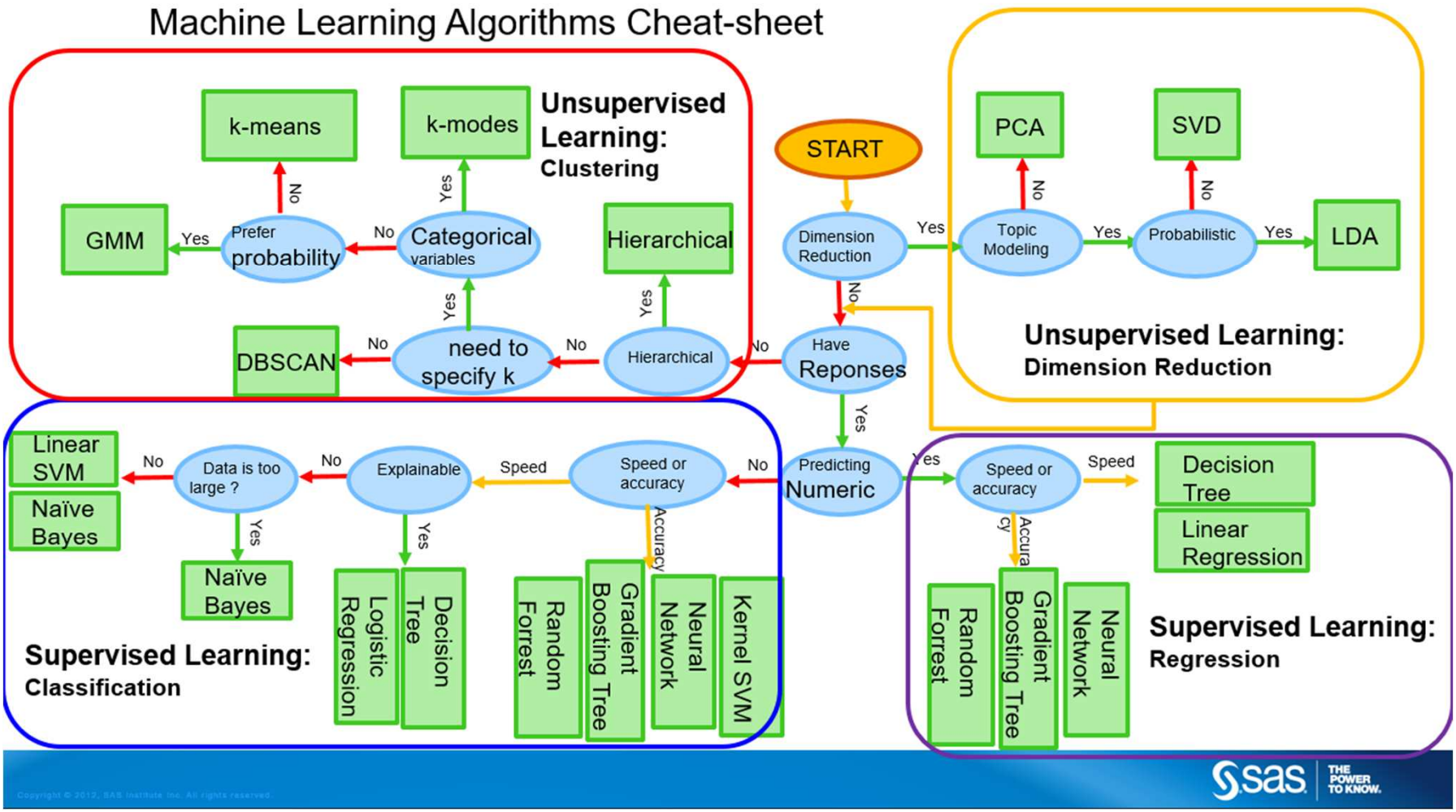
Training the Model



Machine Learning Process: Unsupervised vs Supervised



Machine Learning Algorithms Cheat-Sheet

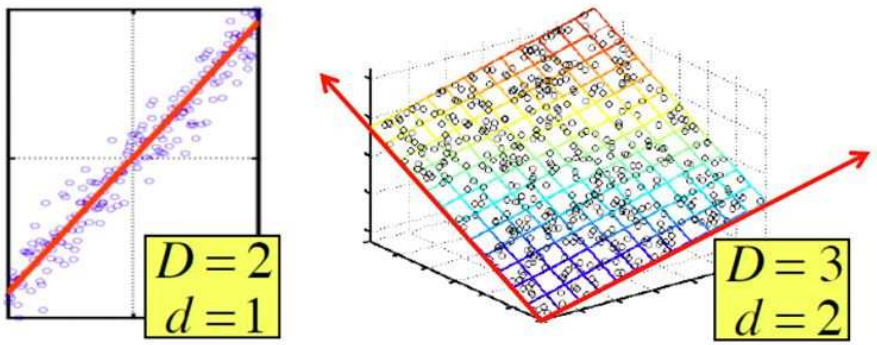


Unsupervised Learning: Dimension Reduction

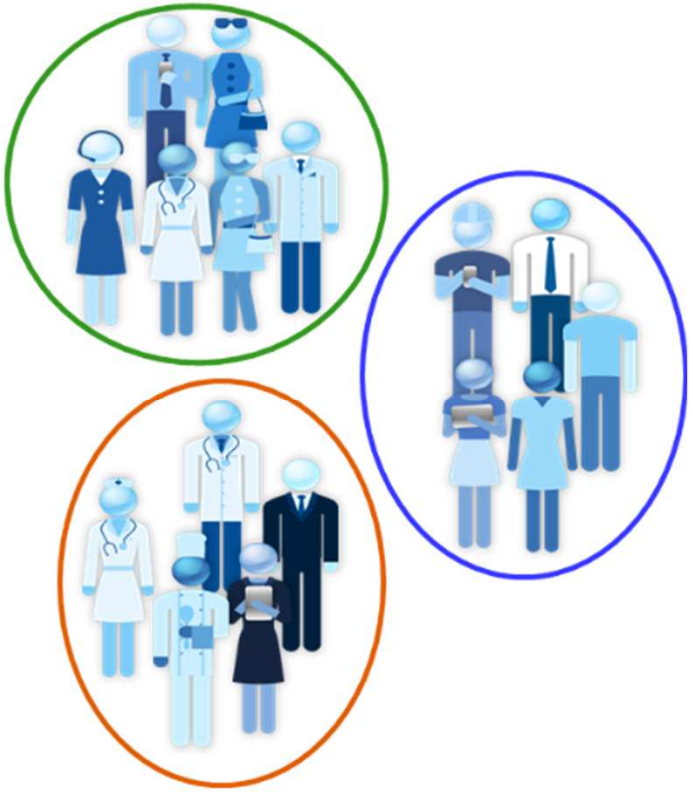
- Describing Data using Fewer Dimensions

Dimensionality Reduction

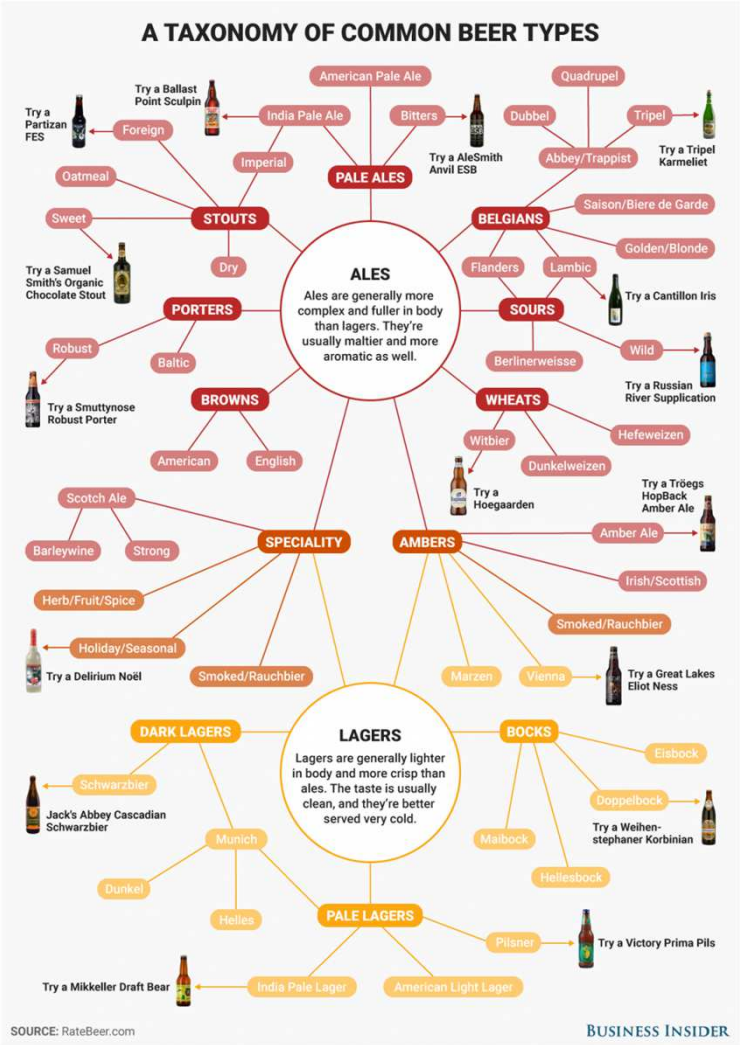
- Usually the data can be described with fewer dimensions, without losing much of the meaning of the data.
  - The data reside in a space of lower dimensionality



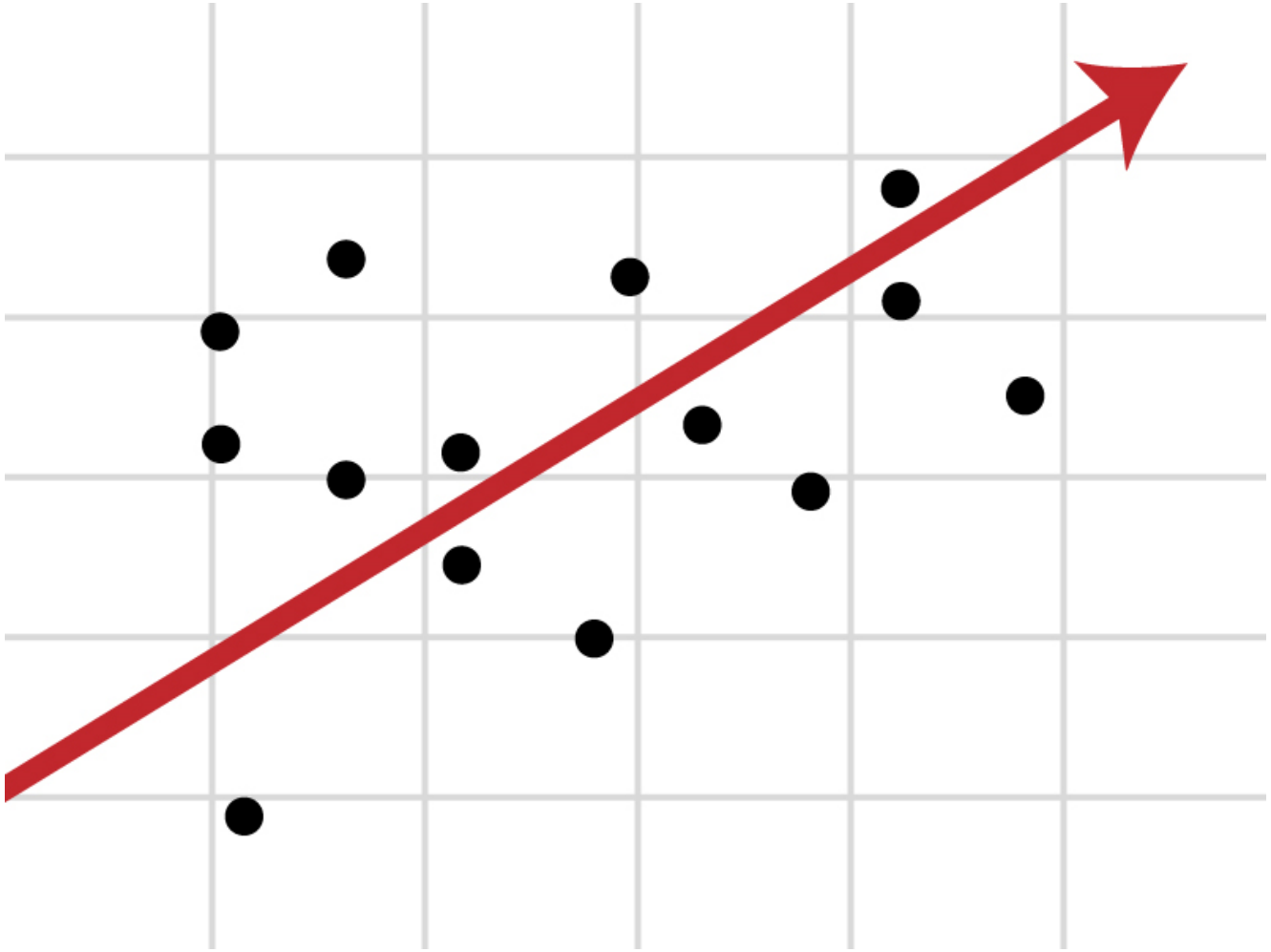
Unsupervised Learning: Clustering / Segmentation

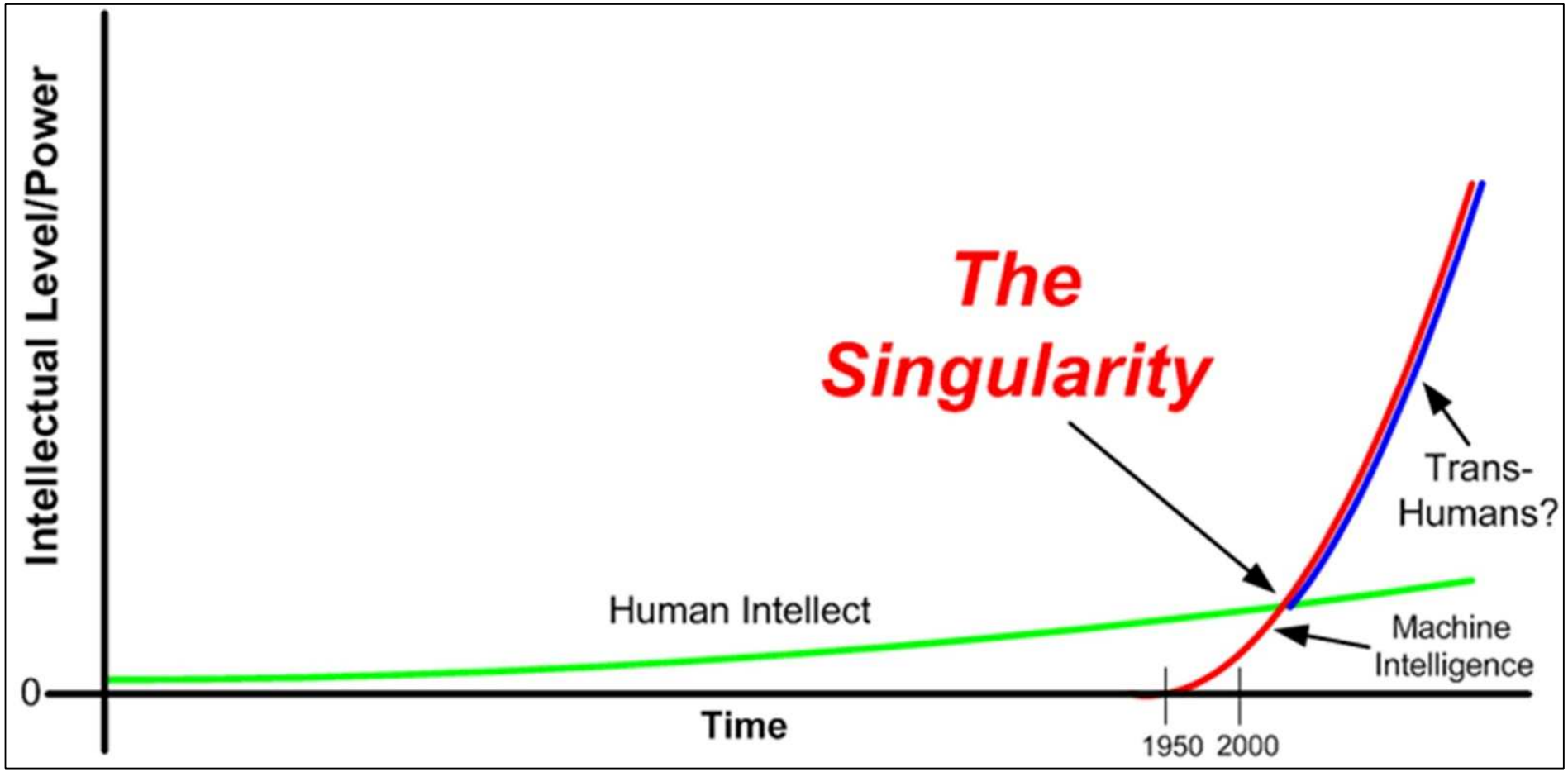


Supervised Learning: Classification



Supervised Learning: Regression Prediction




Intellectual Level/Power
The Singularity
Trans-Humans?
Human Intellect
Machine Intelligence
0
Time
1950
2000

Summary “Train the Trainer”

- **Unsupervised Learning: Dimension Reduction**
- **Unsupervised Learning: Clustering**
- **Supervised Learning: Classification**
- **Supervised Learning: Regression**

Let’s stay in contact:

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