AI-POWERED DATA ANALYSIS & DECISION INTELLIGENCE

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Education

- **Masters in Engineering** [CSE]

- 3+ years of experience in IT field.
- Works as a delivery consultant in Order Management System, Expert Labs, deliver technical services to clients for the implementation and optimization of technology solutions. Provide expertise in an agile, collaborative environment across software architecture, understanding both front-end and back-end concerns.
- Dedicated to staying updated with the latest technological advancements and applying them to solve problems.

AGENDA FOR TODAY

What is Decision with Example

Importance of Decision Intelligence?

How does it work?

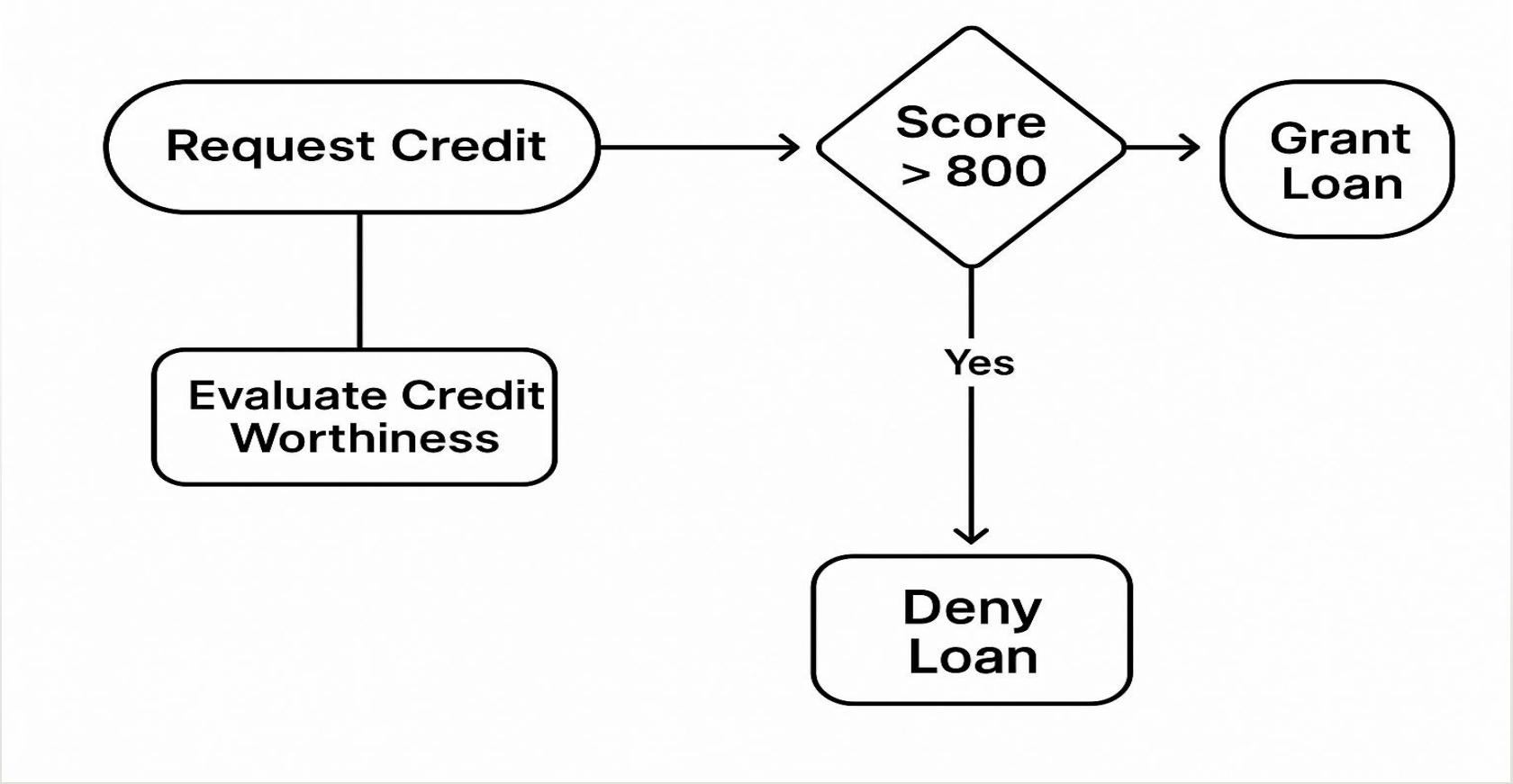
Data Analysis & Pattern Identification

How LLMs makes our lives better

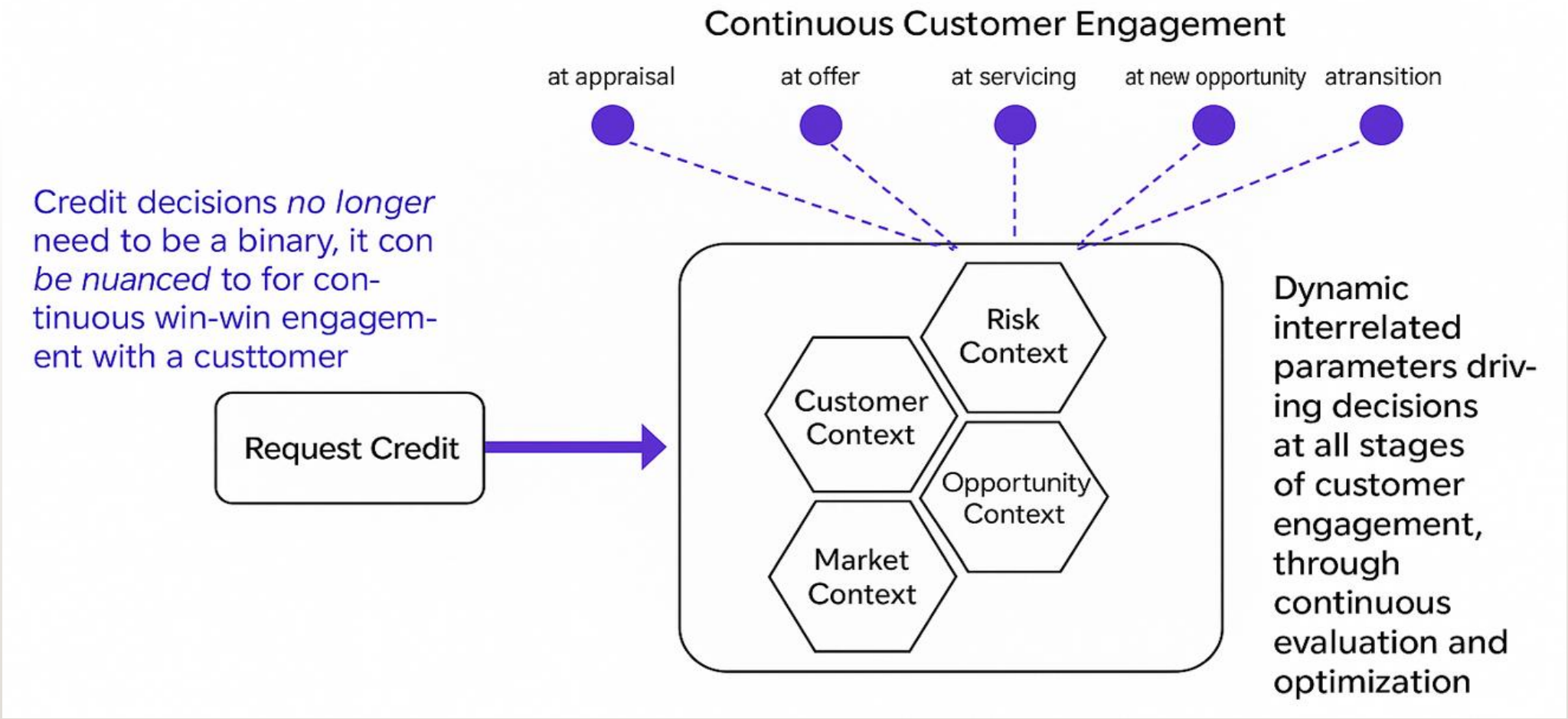
Process & Components

Examples

WHAT IS DECISION?



PARAMETERS DRIVING DECISION?



DECISION INTELLIGENCE

What?

- Combines AI, machine learning, data fusion, and visualization to enhance decision-making
- Augments human decisions — **empowering**, not replacing
- Delivers **actionable insights** beyond manual analysis capabilities
- Encourages **collaboration** through accessible, user-friendly platforms

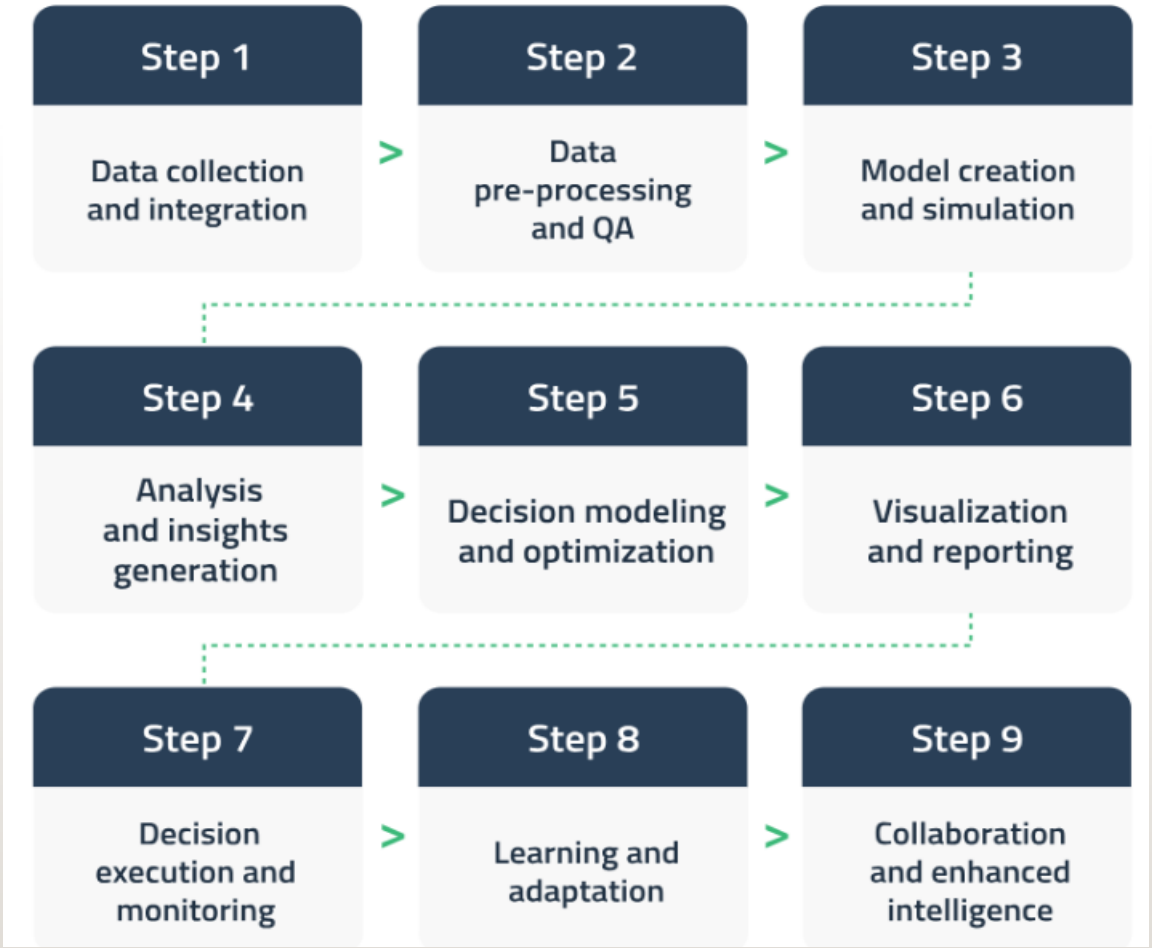
Why?

- Traditional tools only **summarize trends** — not always actionable
- Advanced analytics often limited to **technical experts**
- Decision Intelligence promotes **data democratization**
- Empowers both technical and non-technical users
- Enables smarter, faster, **data-driven decisions**

BI V/S DI

	Business Intelligence (BI)	Decision Intelligence (DI)
Data Approach	Descriptive & diagnostic (what happened, why)	Predictive & prescriptive (what might happen, what to do)
Type of Data	Mostly historical data	Real-time + historical data
Data Sources	Internal systems (ERP, databases, spreadsheets)	External + internal (IoT, sensors, unstructured data)
Tech Used	Traditional BI tools, dashboards	AI, ML, NLP, advanced analytics
User Interaction	Basic, often limited to analysts	Interactive, accessible to all decision-makers
Complexity	Simpler, mostly reporting-based	More complex, includes modeling, learning, automation

HOW DOES DECISION INTELLIGENCE WORK?



DATA PREPROCESSING

Data Pre-Processing

Data Formatting

Data Cleaning

- Missing values

Outlier Detection

Data Transformation

- Normalization and Scaling

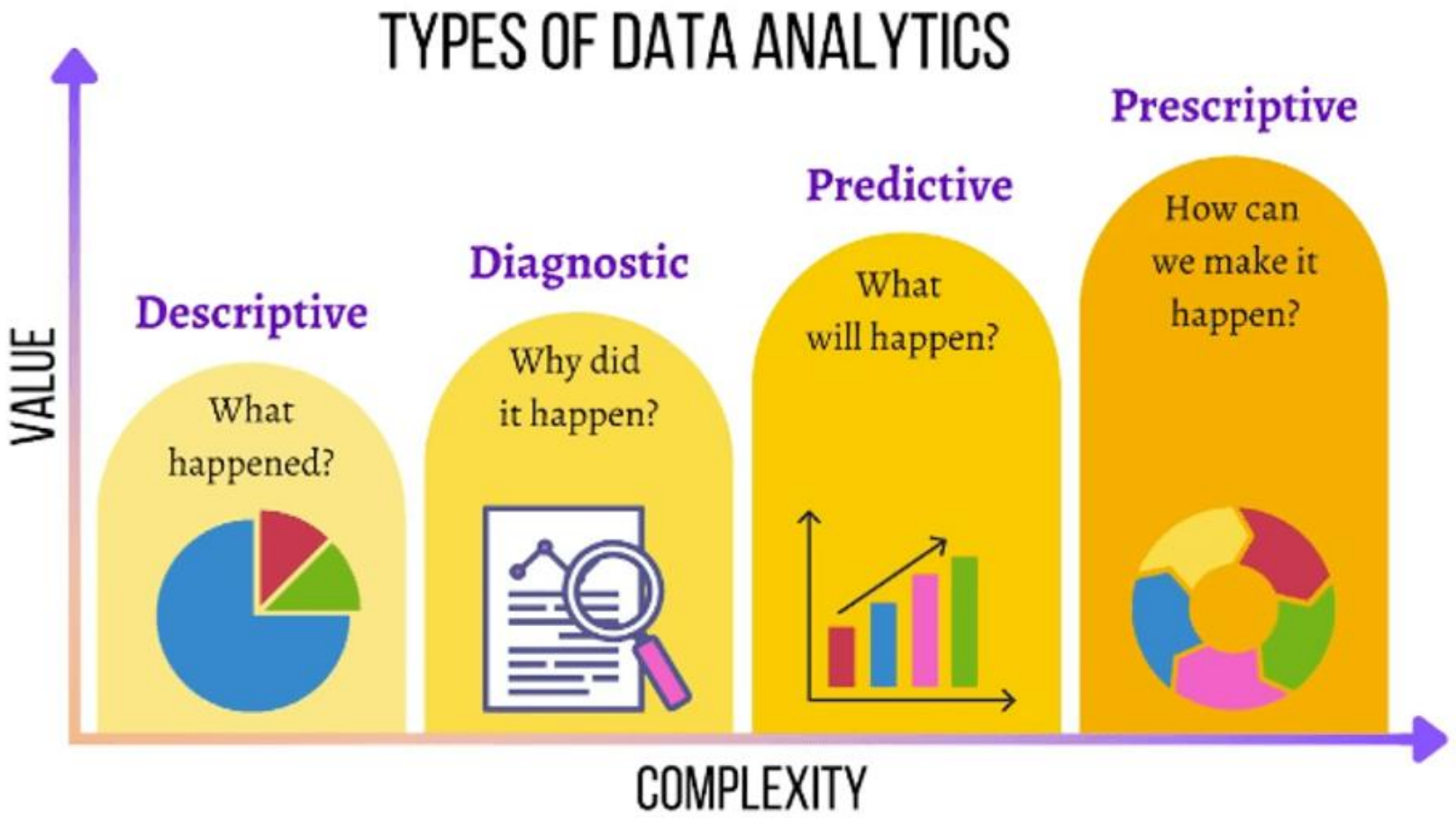
Sampling:

- Exploratory Data Analysis

Time Series Data Analysis:

Feature Extraction

Like for raw data, Identifies attributes like entities and sentiment using NLP techniques


TYPES OF DATA ANALYTICS
VALUE
Descriptive
What happened?
Diagnostic
Why did it happen?
Predictive
What will happen?
Prescriptive
How can we make it happen?
COMPLEXITY

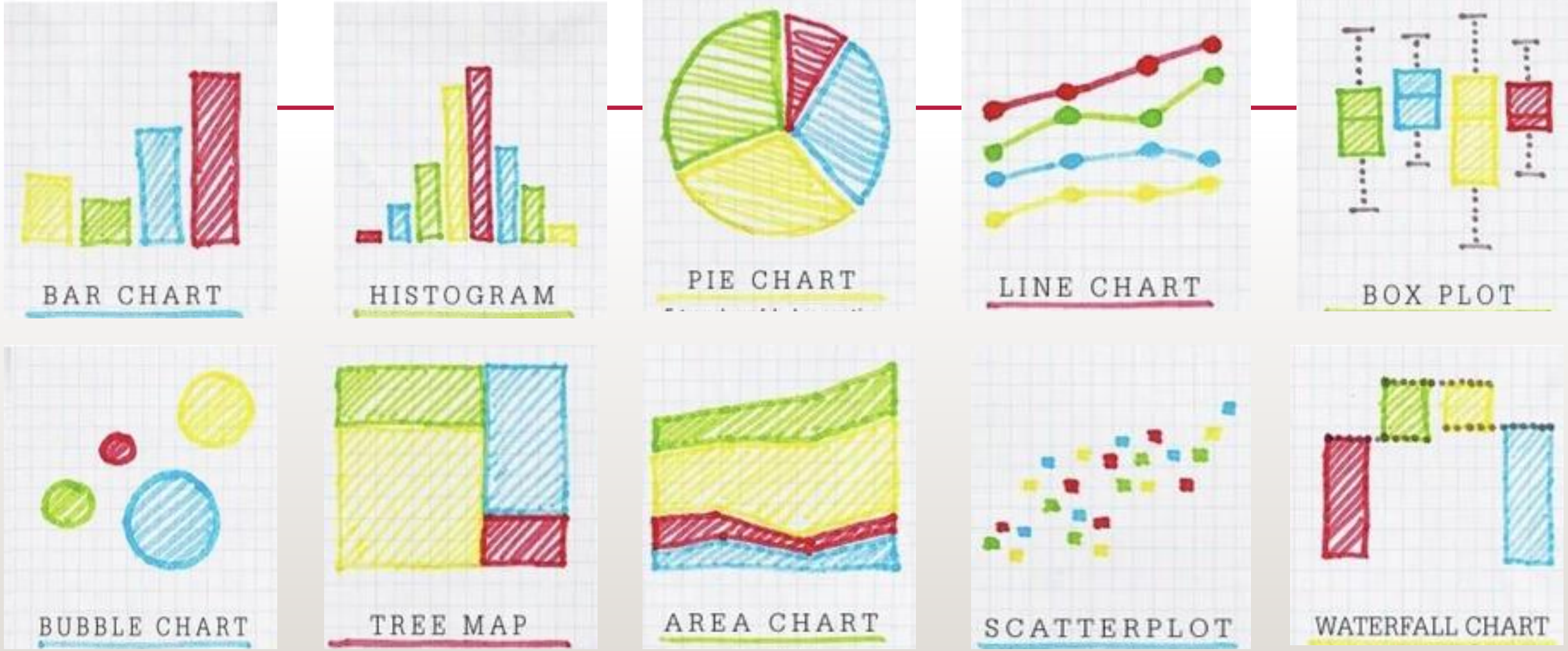
Tools used for Data Analysis

Excel

Power BI

Tableau

IBM Watson Studio

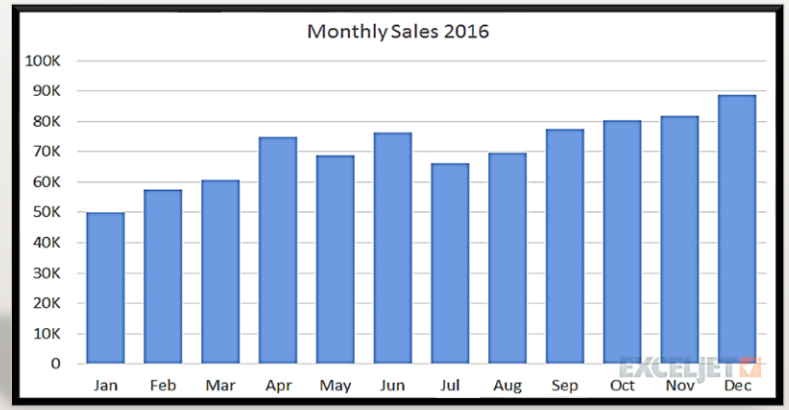

BAR CHART
HISTOGRAM
PIE CHART
LINE CHART
BOX PLOT
BUBBLE CHART
TREE MAP
AREA CHART
SCATTERPLOT
WATERFALL CHART

QUESTIONS TO ASK WHEN DECIDING WHICH TYPE OF CHART TO USE

1. Do you want to compare values?

Charts are perfect for comparing one or many value sets, and they can easily show the low and high values in the data sets. To create a comparison chart, use these types of graphs:

- Column
- Bar
- Line
- Scatter Plot
- Bullet



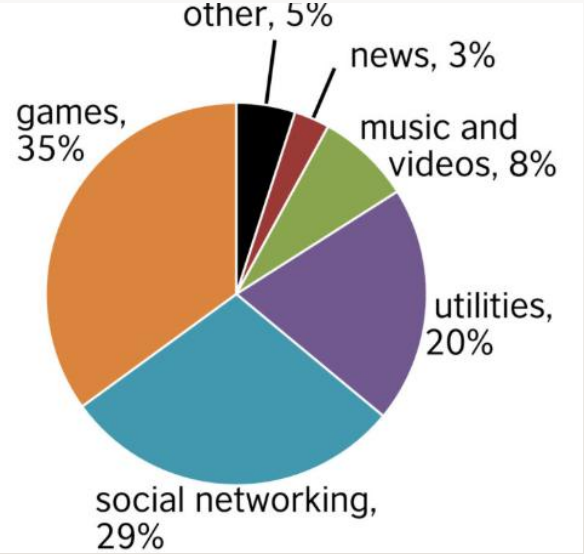
Questions to Ask When Deciding Which Type of Chart to Use

2. Do you want to show the composition of something?

Use this type of chart to show how individual parts make up the whole of something, such as the device type used for mobile visitors to your website or total sales broken down by sales rep.

To show composition, use these charts:

- Pie
- Stacked Bar
- Stacked Column
- Area
- Waterfall



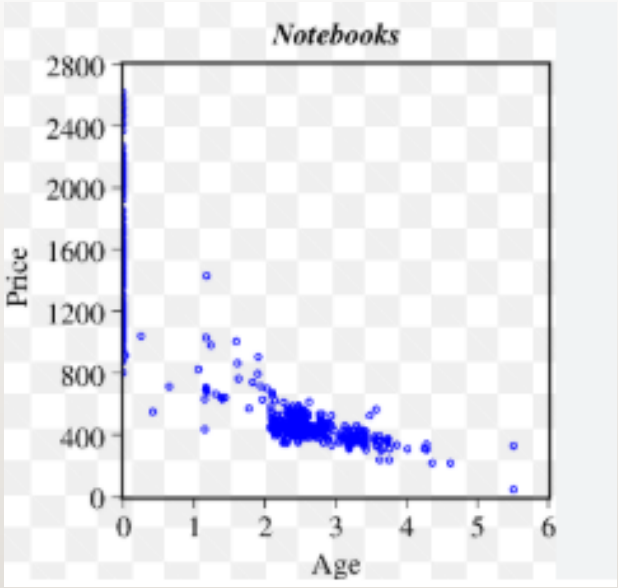
QUESTIONS TO ASK WHEN DECIDING WHICH TYPE OF CHART TO USE

3. Do you want to understand the distribution of your data?

Distribution charts help you to understand outliers, the normal tendency, and the range of information in your values.

Use these charts to show distribution:

- Scatter Plot
- Line
- Column
- Bar



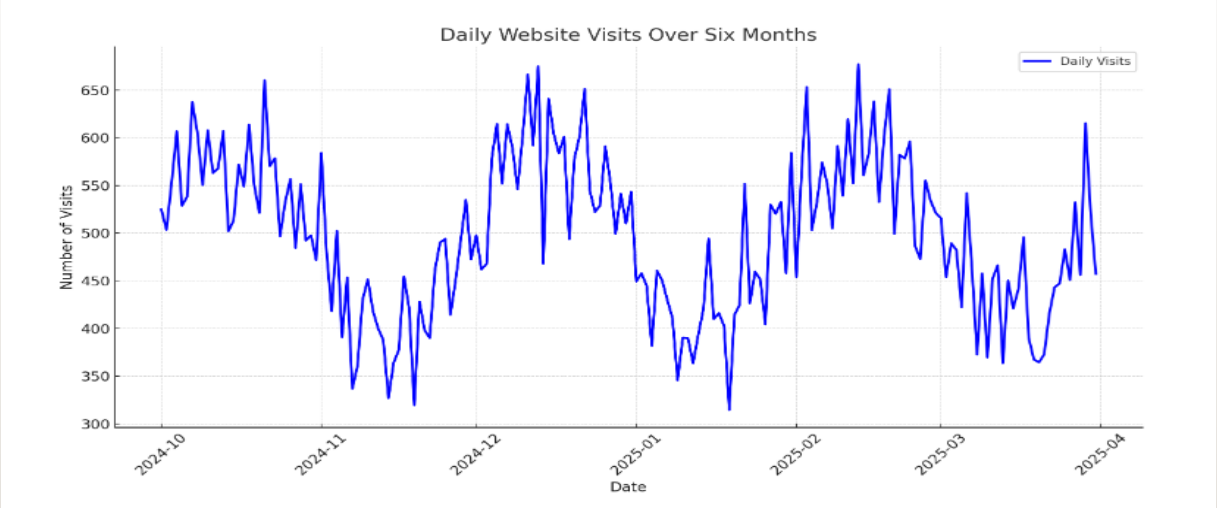
QUESTIONS TO ASK WHEN DECIDING WHICH TYPE OF CHART TO USE

4. Are you interested in analyzing trends in your data set?

If you want to know more information about how a data set performed during a specific time period, there are specific chart types that do extremely well.

You should choose a:

- Line
- Dual-Axis Line
- Column



QUESTIONS TO ASK WHEN DECIDING WHICH TYPE OF CHART TO USE

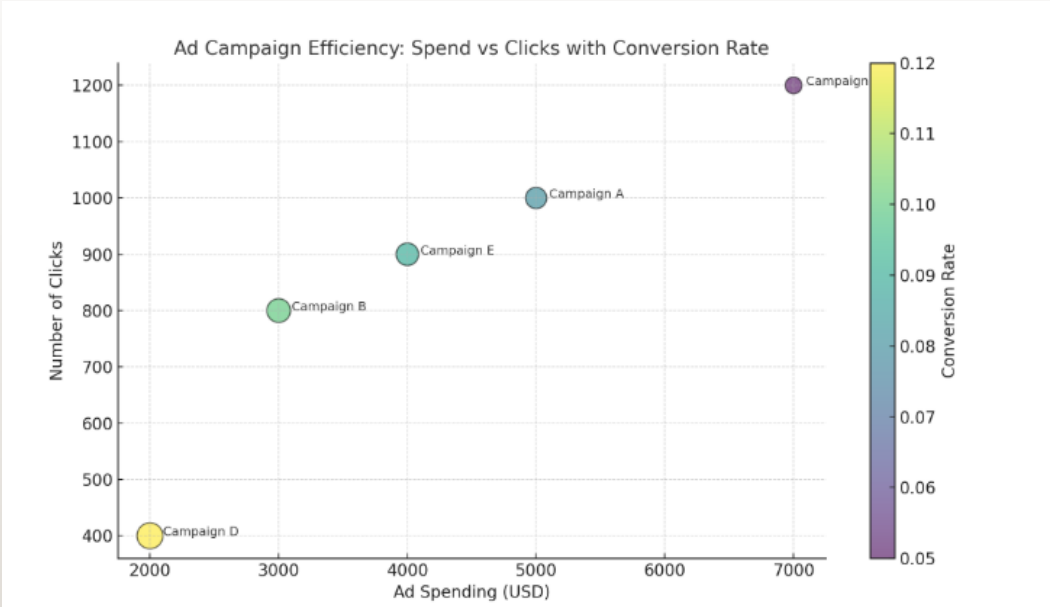
5. Do you want to better understand the relationship between value sets?

Relationship charts are suited to showing how one variable relates to one or numerous different variables. You could use this to show how something positively effects, has no effect, or negatively effects another variable.

When trying to establish the relationship

between things, use these charts:

- Scatter Plot
- Bubble



DIFFERENT TYPES OF GRAPHS AND CHARTS FOR PRESENTING DATA

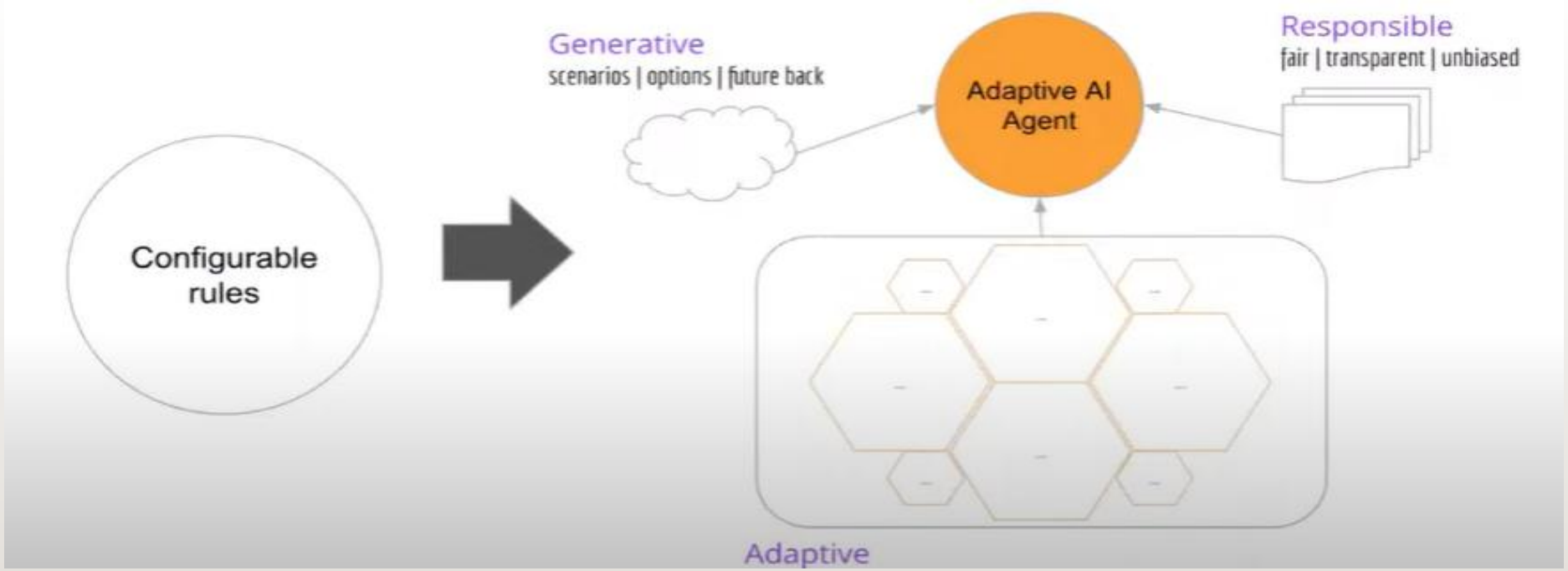
Bar Graph

A bar graph, basically a horizontal column chart, should be used to avoid clutter when one data label is long or if you have more than 10 items to compare.

Design Best Practices for Bar Graphs:

- **Use consistent colors** throughout the chart, selecting accent colors to highlight meaningful data points or changes over time.
- **Use horizontal labels** to improve readability.
- **Start the y-axis at 0** to appropriately reflect the values in your graph.

HOW MACHINES MAKE DECISIONS



INTRODUCTION TO LARGE LANGUAGE MODELS (LLMS)

•A type of AI algorithm using deep learning and neural networks to understand and generate human language.

•Trained using self-supervised learning on massive datasets.
•Key applications:
- Text generation
- Machine translation
- Summarization
- Image generation from text
- Chatbots & Conversational AI

Popular LLMs:
•ChatGPT (OpenAI)
•BERT (Google)

HOW LLMS WORK & ARCHITECTURE

How Do LLMs Work?

•Based on deep learning and transformer architecture.
•Trained on vast corpora using self-supervised learning.
•Capture relationships and dependencies in text through attention mechanisms.

LLM Architecture Components:
•**Input Embeddings**: Tokenization & semantic representation
•**Positional Encoding**: Order of tokens
•**Encoder/Decoder Layers**: For processing and generating text
•**Self-Attention Mechanisms**: Importance of token relationships
•**Feedforward Layers**: Non-linear token transformation
•**Multi-Head Attention**: Multiple relationships captured simultaneously
•**Output Layer**: SoftMax for prediction

GPT Model Evolution:

•GPT-4 (2023): Trillions of parameters
•GPT-4 Turbo (Late 2023): Speed & cost optimized

APPLICATIONS, USE CASES, AND CHALLENGES

Use Cases:
•Code Generation & Debugging
•Question Answering
•Translation & Grammar Correction
•Prompt-based versatility (one-shot & zero-shot learning)

Applications:
•Chatbots & Virtual Assistants
•Content Creation & Creative Writing
•Language Translation
•Text Summarization

Challenges:
•High cost & training time
•Legal & data sourcing concerns

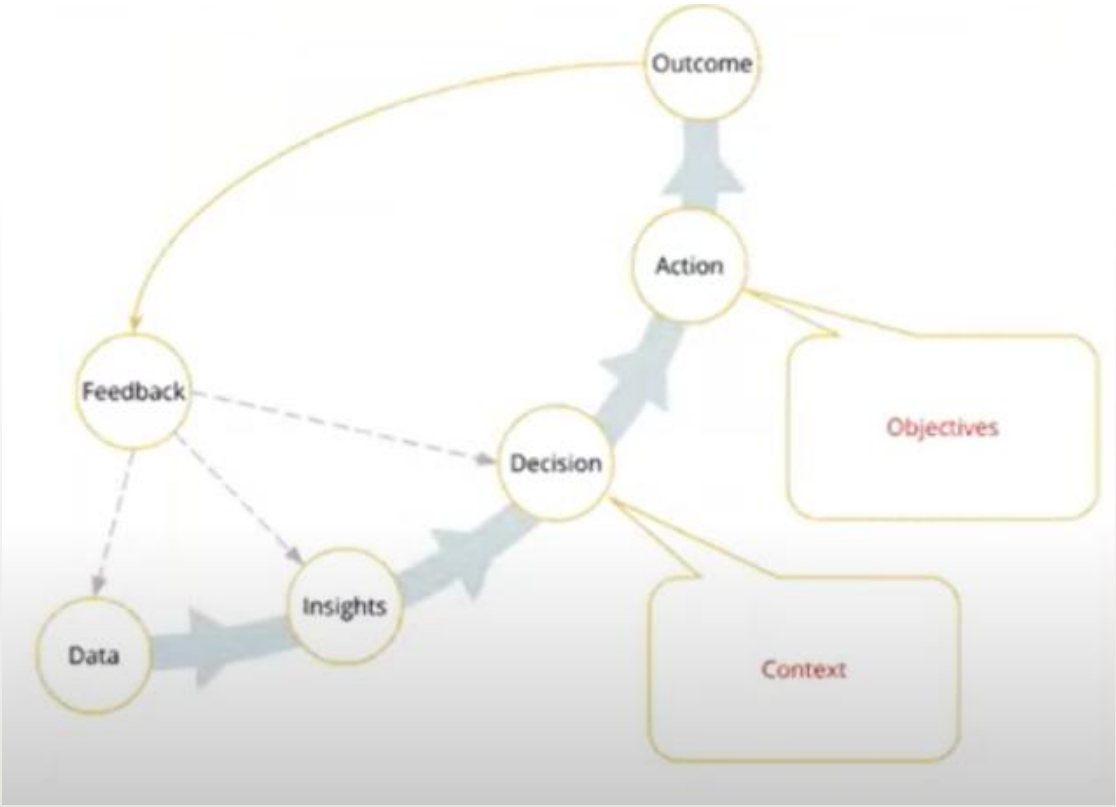
PROCESS

•What does implementing AI and ML in enterprises involve?

•How can we connect data and insights to drive decision-making?

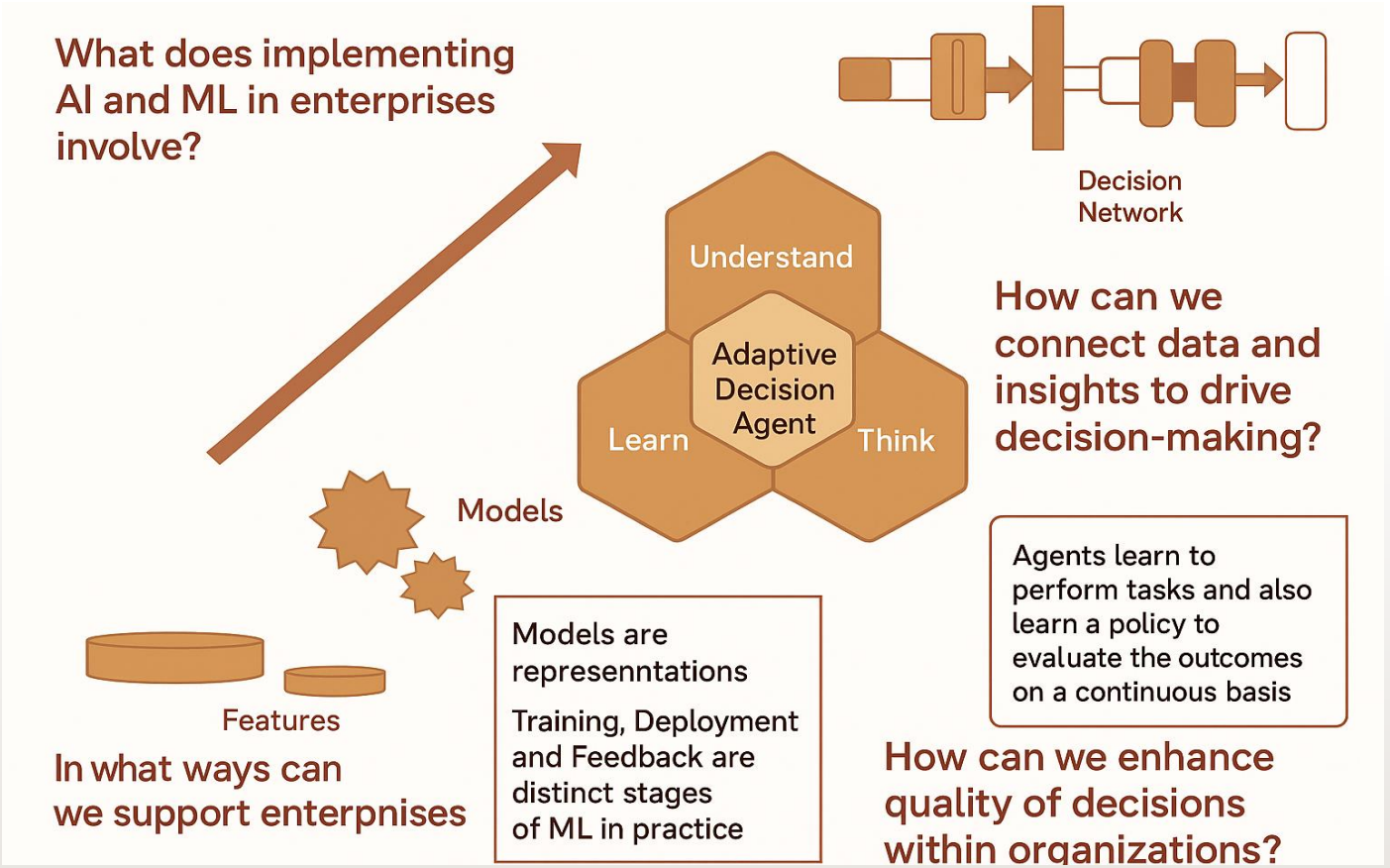
•In what ways can we support enterprises in making informed decisions?

•How can we enhance the quality of decisions within organizations?

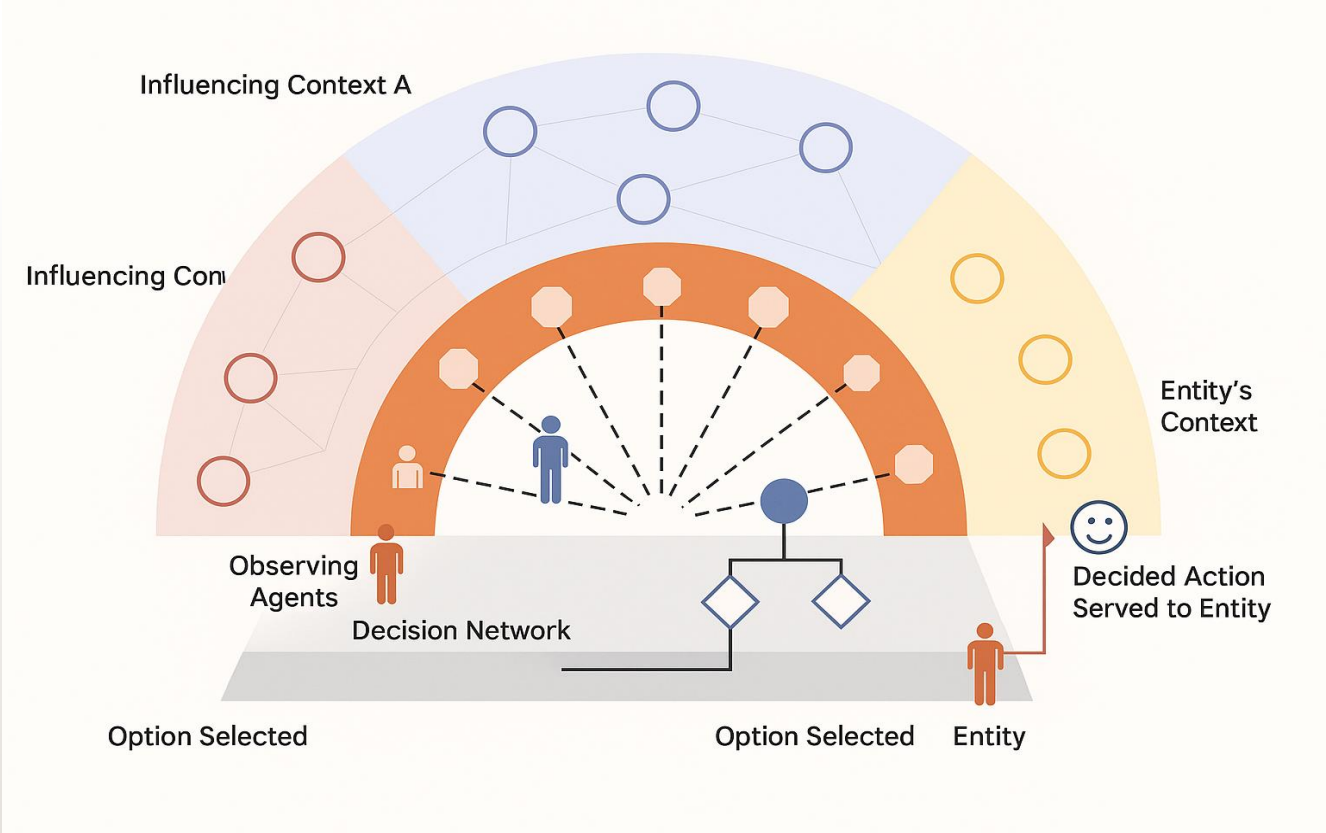


COMPONENTS

- ❑ Decision network
- ❑ Agents
- ❑ Insights from models
- ❑ Features
- ❑ Decision Making
- ❑ Feedback Learning
- ❑ Agent Collaboration

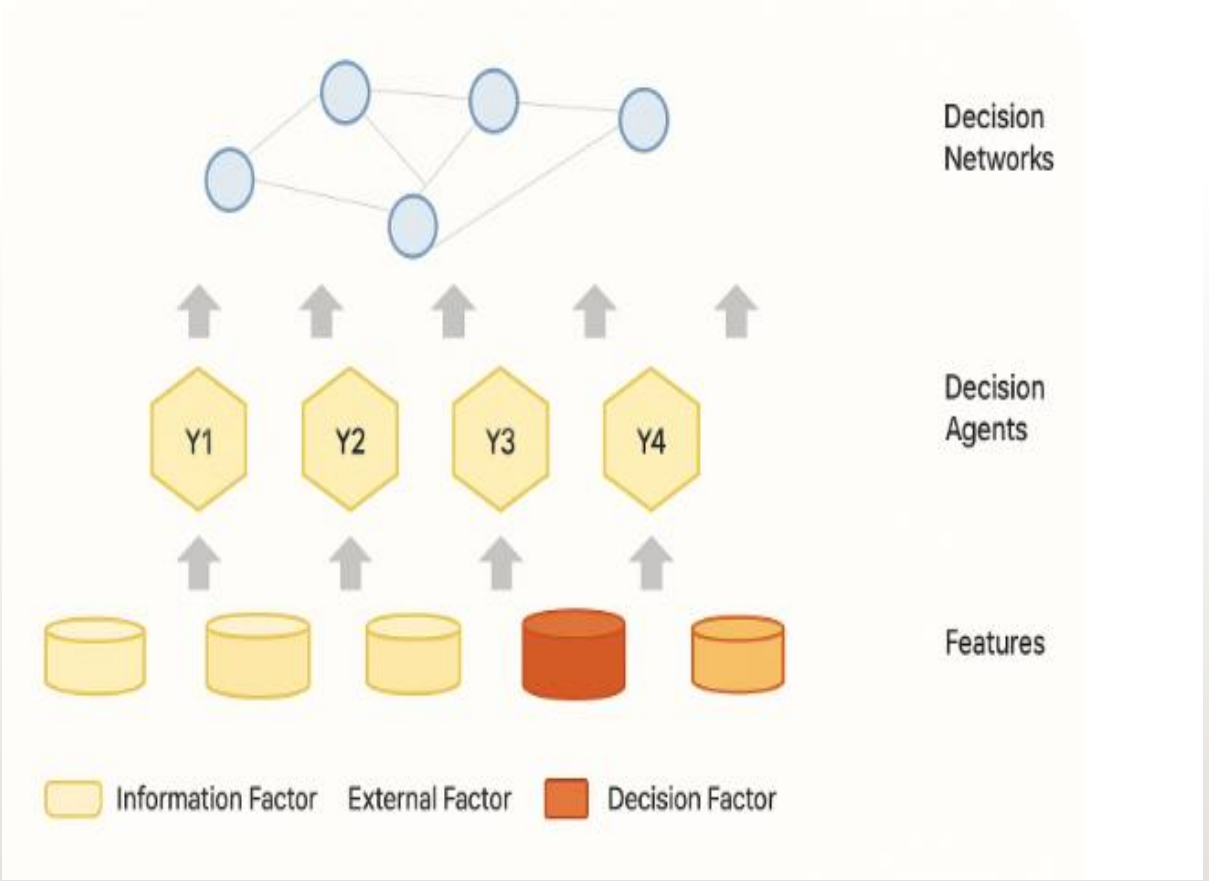


Integrating all the elements into a unified framework



EXAMPLES

- Finance and Banking
- Retail
- Healthcare
- What channel should be tapped for maximizing collection
- What are the optimal pricing bans for ensuring upcoming crop



WHAT IS THE PURPOSE OF EXPLORING DATA?

1. To digitize your data.
2. To generate labels for your data.
3. To gather your data into one repository.
4. To gain a better understanding of your data.

Thank you