

# Role of Data-driven Decision Making in Data Analytics in Automation Systems

Course: 23MCT305 - Data Analytics in Automation System

## Ecosystem capabilities\*:

Faculty: N. KARTHI, AP/MCT

-  Connected customer
-  Dynamic fulfillment
-  Intelligent supply
-  Synchronized planning
-  Talent access
-  Smart production
-  Digital development/innovation

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\*Ecosystem capabilities are constantly developing and may not be limited to the ones mentioned above.

Source: Deloitte analysis.





## Definition

Using **facts, metrics, and data** to guide strategic decisions aligned with organizational goals



**Data Collection**



**Analysis**



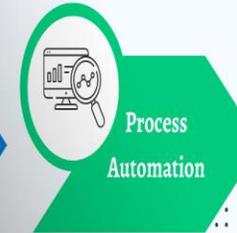
**Interpretation**



**Action**

"Data is the new currency in automation systems"

## Transform Your Operations with Tailored Solutions



- 1. Tailored Solutions for Your Business
- Custom ERP systems designed for your unique needs
- Integration of automation and data analytics

- Benefits:
- Increases efficiency
- Reduces errors
- Cuts operational costs

- Sophisticated Analytics Platforms:
- Transforms complex data into actionable insights
- Facilitates informed business decisions

- Advanced CRM Systems:
- Tracks and analyzes customer interactions
- Enables personalized marketing strategies
- Builds customer loyalty



## Real-time Insights

Instant decision support capabilities



## Predictive Maintenance

Anticipate equipment failures



## Process Optimization

Continuous improvement of operations



## Quality Control

Enhanced product consistency

## Impact



Efficiency

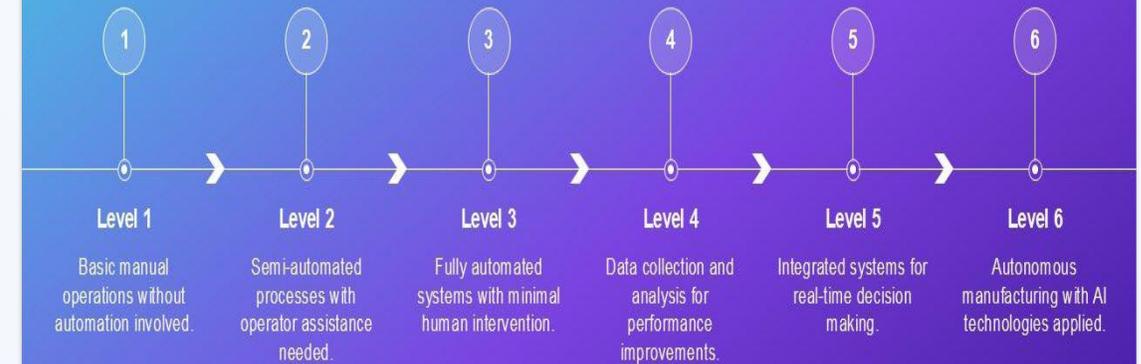


Downtime



Productivity

## Understanding Each Level of the Pyramid



# Data Analytics Process in Automation



## 1. Data Collection

Gather from sensors, IoT devices, systems



## 2. Data Processing

Clean, transform, validate data



## 3. Data Analysis

Apply algorithms, statistical methods



## 4. Interpretation

Derive meaningful insights



## 5. Implementation

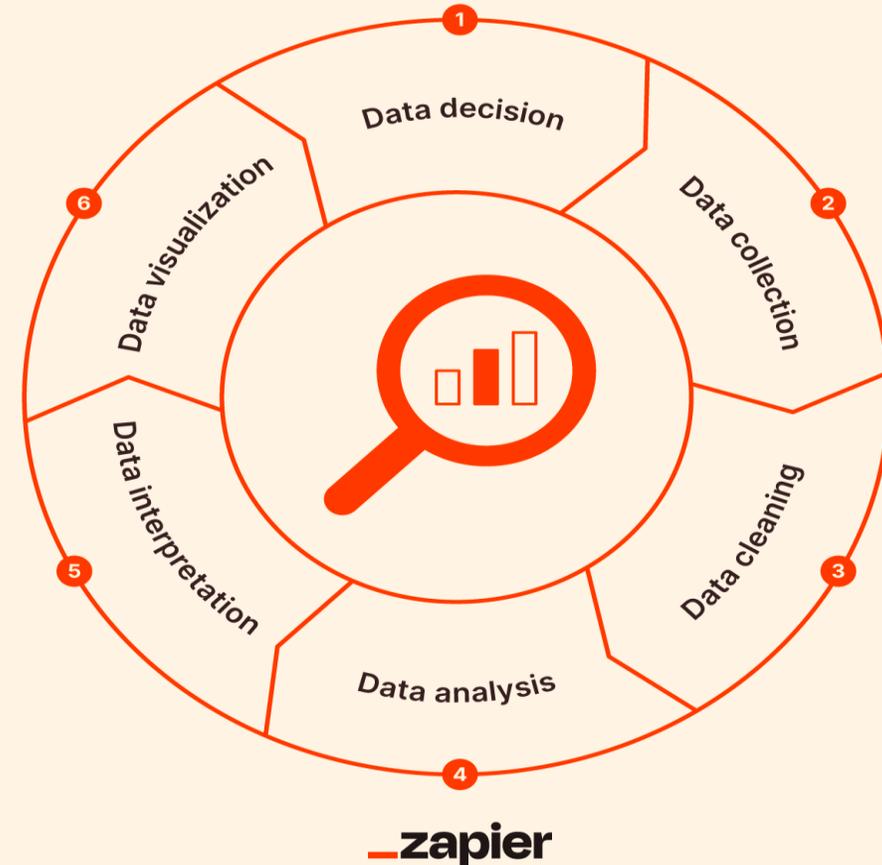
Take data-driven action



## 6. Monitoring

Continuous improvement and optimization

## Data analysis process



# Key Components of Data-driven Decision Making



## Data Collection

Internal & external sources, sensors, IoT devices



## Data Processing

Cleaning, integration, transformation, validation



## Data Analysis

Descriptive, diagnostic, predictive, prescriptive



## Implementation

Decision execution, feedback loop, continuous improvement

## The Data Lifecycle

### Generation

Data is created or acquired from various sources.



### Collection

Data is gathered from different sources and prepared for processing.



### Processing

Raw data is processed and manipulated to be usable and consistent.



### Storage

Processed data is securely stored in databases or data warehouses.



### Interpretation

Results are interpreted to inform decision-making and drive actions.



### Visualization

Insights are presented in graphical or visual formats for easier interpretation.



### Analysis

Data is examined to extract insights and patterns.



### Management

Data is organized, maintained, and governed to ensure quality and accessibility.





## Build Data Infrastructure

Robust pipelines, cloud storage, ETL processes



## Deploy Analytics Tools

BI platforms, ML algorithms, real-time analytics



## Train Personnel

Data literacy programs, skill development



## Governance

Quality standards, security protocols



## Integration

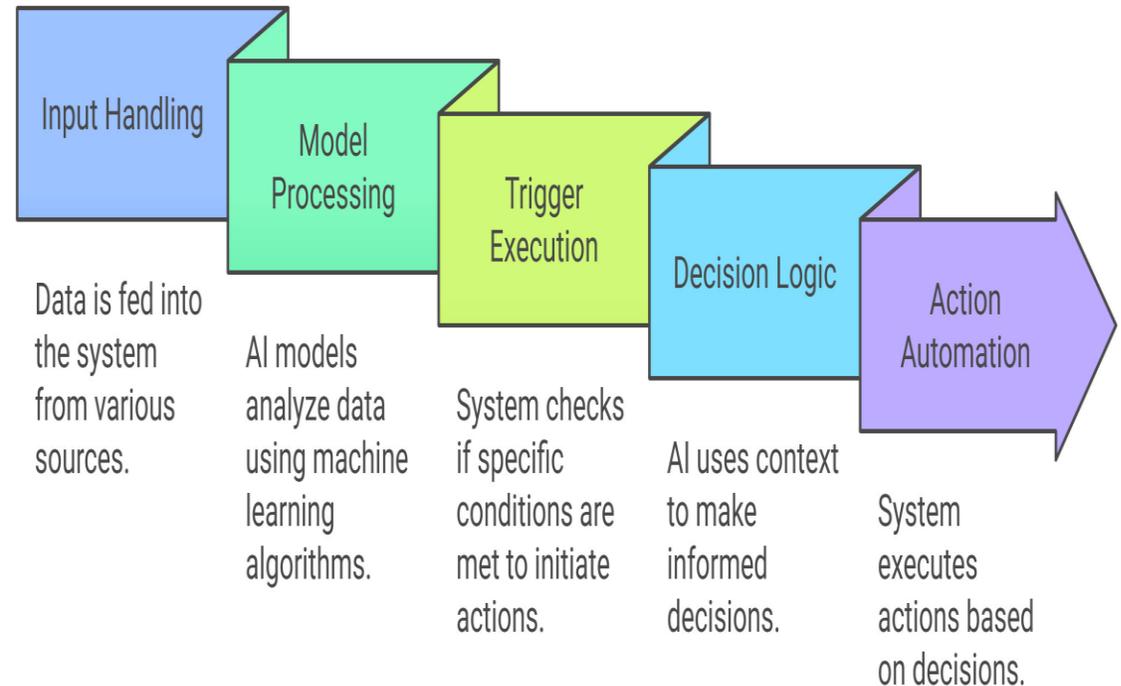
Connect all automation components



## Key Success Factors

Phased implementation, stakeholder buy-in, continuous monitoring

## AI Automation Process



# Benefits of Data-driven Decision Making



## Improved Accuracy

Decisions based on factual evidence, reduced bias



## Enhanced Efficiency

Faster decisions, streamlined operations



## Proactive Approach

Predict trends, prevent issues before escalation



## Competitive Advantage

Market insights, strategic positioning



## Resource Optimization

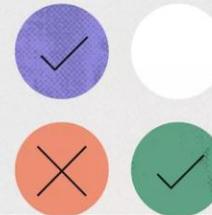
Optimize allocation, reduce waste



## Overall Impact

Cost reduction, customer satisfaction, sustainable growth

## Benefits of data-driven decision making



Make confident decisions



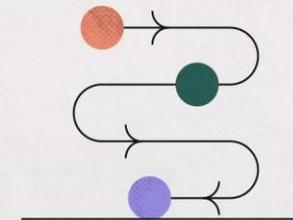
Guard against biases



Find unresolved questions



Set measurable goals



Improve company processes



# Mind Map: Data Analytics in Automation Systems



## Data Sources

IoT Sensors, SCADA, PLC, MES, ERP Systems



## Analytical Methods

Predictive Analytics, Machine Learning, Real-time Analytics, Statistical Analysis



## Automation Technologies

Robotics, PLCs, SCADA Systems, Digital Twins, Industrial IoT



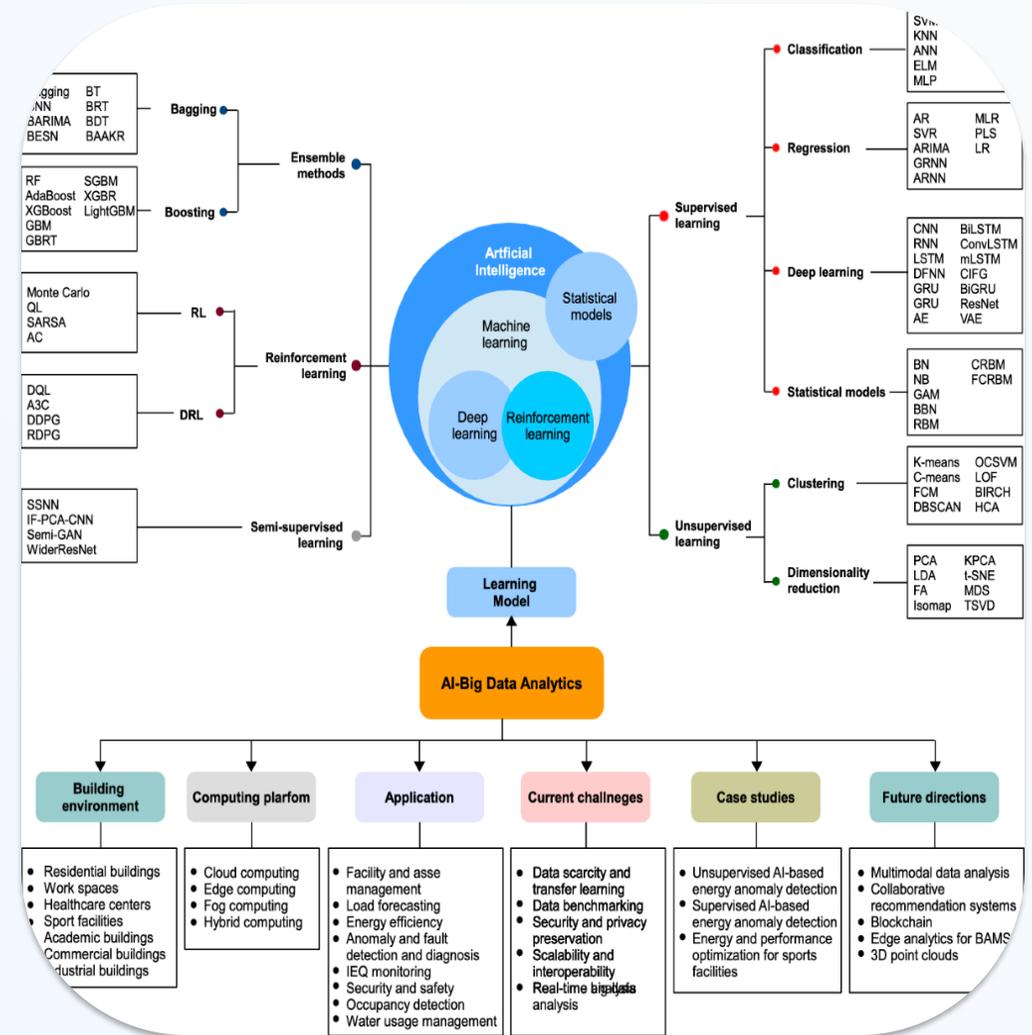
## Applications

Manufacturing, Energy Management, Quality Control, Supply Chain Optimization



## GenAI-Generated Insights

Integration of advanced analytics with automation for intelligent decision support



# Recap and Summary

## Key Takeaways

-  **Transforms Automation Systems**  
Enables intelligent decision-making
-  **Structured Process**  
Collection → Processing → Analysis → Implementation
-  **Key Benefits**  
Accuracy, Efficiency, Competitive Advantage
-  **Strategic Approach**  
Address challenges through planning and investment
-  **Future Integration**  
AI, IoT, Advanced Analytics

### Summary



Data-driven decision making is essential for modern automation, enabling smarter, faster, and more efficient operations across industries.

