AI PROJECT WORKFLOW

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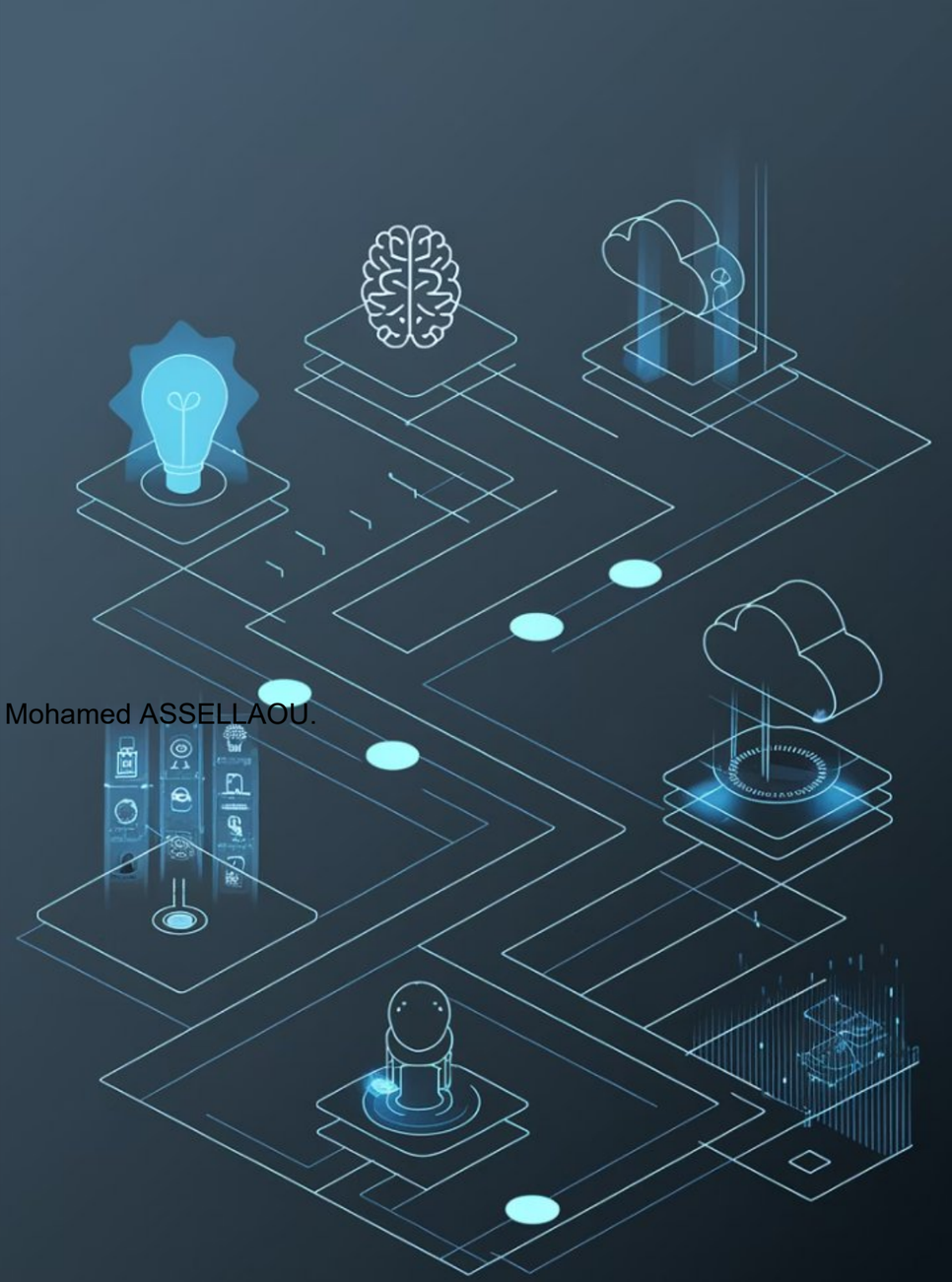
- Business Requirements
- Data Collection & Preprocessing
- Model Training & Evaluation
- Model Deployment & MLOPS
- Conclusion



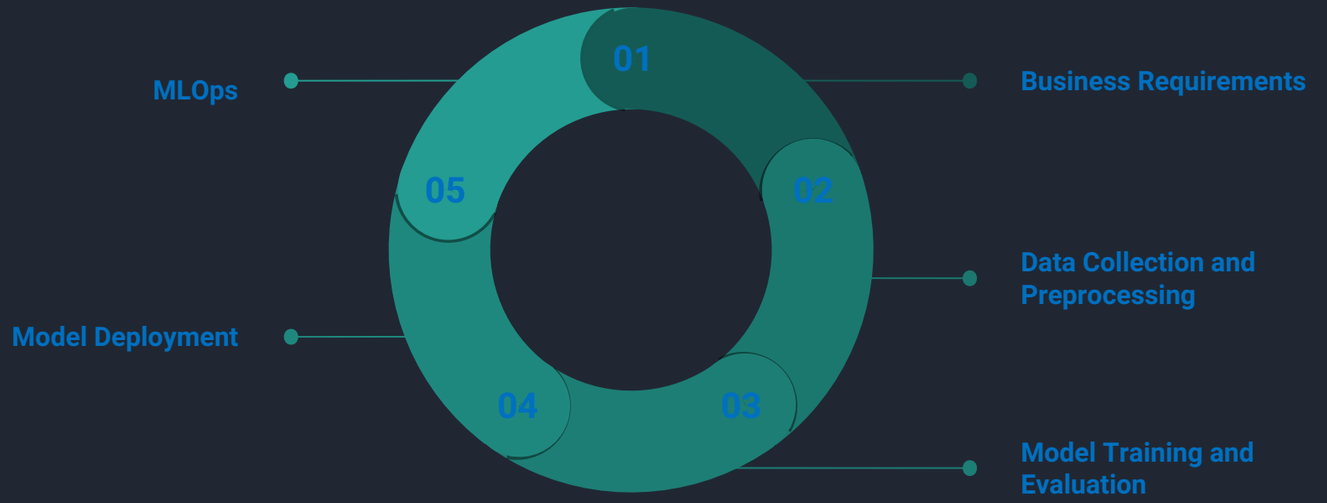
What is AI Project Workflow?

Definition

Artificial Intelligence (AI) simulates human intelligence in machines, enabling them to learn, reason, and solve problems.

AI Workflow

AI workflow is the structured path guiding AI projects, ensuring efficiency and effectiveness.



Business Requirements Overview

Clear business requirements establish the project foundation.

They align AI solutions with strategic goals.

Identifying the Business Problem

Recognizing Challenges

Identify problems impacting operations or strategy.

Clearly define the problem to be solved with specific parameters.

Understand the impact and importance of solving the problem.

Aligning AI

Match AI capabilities to solve those problems.

Identify stakeholders and their perspectives.

Develop a clear problem statement with measurable objectives.

Examples include automating customer support or forecasting demand.

Engaging Stakeholders and Team Alignment

Cross-Functional Roles

Collaboration fuels AI project success.

Communication

Regular updates ensure shared understanding and goals.

Strong team alignment accelerates impact.

Defining Success Metrics & KPIs

ROI

Measure financial returns from AI initiatives.

Efficiency Gains

Track time or cost savings.

Customer Satisfaction

Assess improvements in user experience.

KPIs guide evaluation and continuous improvement.

Introduction to Data Collection & Preprocessing

Quality data is critical for effective AI models.

Preprocessing ensures data usability and integrity.

Exploring Data Sources and Types

Internal Data

Includes CRM, ERP, and company databases.

External Data

Open data sets and IoT sensors extend insights.

Structured data fits spreadsheets; unstructured includes text and images.

Ensuring Data Quality

Accuracy

Correct and valid data entries.

Completeness

All required data points must be present.

Consistency

Uniform formatting and standards.

Maintaining quality avoids model errors and bias.

Data Cleaning and Transformation Techniques

Cleaning

Remove duplicates and fill missing data.

Effective cleansing prepares data for accurate modeling.

Transformation

Normalize and encode for compatibility with models.

Ethical Considerations in Data Handling

Data Privacy

Protect sensitive information with governance policies.

Bias Mitigation

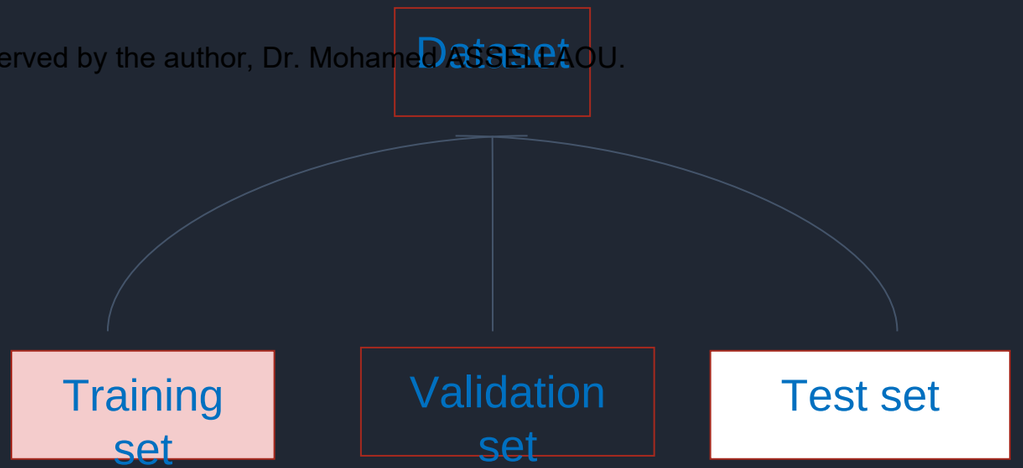
Ensure fairness by detecting and reducing biases.

Responsible AI fosters trust and compliance.

Introduction to Model Training and Evaluation

Training is an iterative process of learning and improving.

Evaluation ensures models meet desired performance standards.



The Model Training & Testing Process

Data Splitting

Separate data into subsets for training validation and test sets.

Training

Models learn patterns from training data.

Validation

Adjust models based on validation feedback.

Iterate to improve accuracy and generalization.

Test

Evaluate the model on unseen data after training.

Overview of Machine Learning Models

Classification

Predict discrete labels.

Regression

Predict continuous outcomes.

Clustering

Group similar data points.

Neural Networks

Model complex patterns with deep learning.

Hyperparameter Tuning and Optimization

Tuning Techniques

Apply grid and random search methods.

Optimization Goal

Find the best parameters for peak model results.

Fine-tuning boosts model accuracy significantly.

Evaluating Model Performance

Metrics

- Accuracy : Correctness of predictions
- Precision : Correctness of positive predictions
- Recall : Ability to identify all positive instances
- F1 Score : Balance between precision and recall

Select metrics aligned to business goals.

Visual Tools

- ROC Curves : Trade offs between true and false positions
- Confusion Matrices : Breakdown of true vs prediction outcomes :

Challenges: Overfitting, Underfitting, and Cross-Validation

Overfitting

Model too closely fits training data but poor generalization.

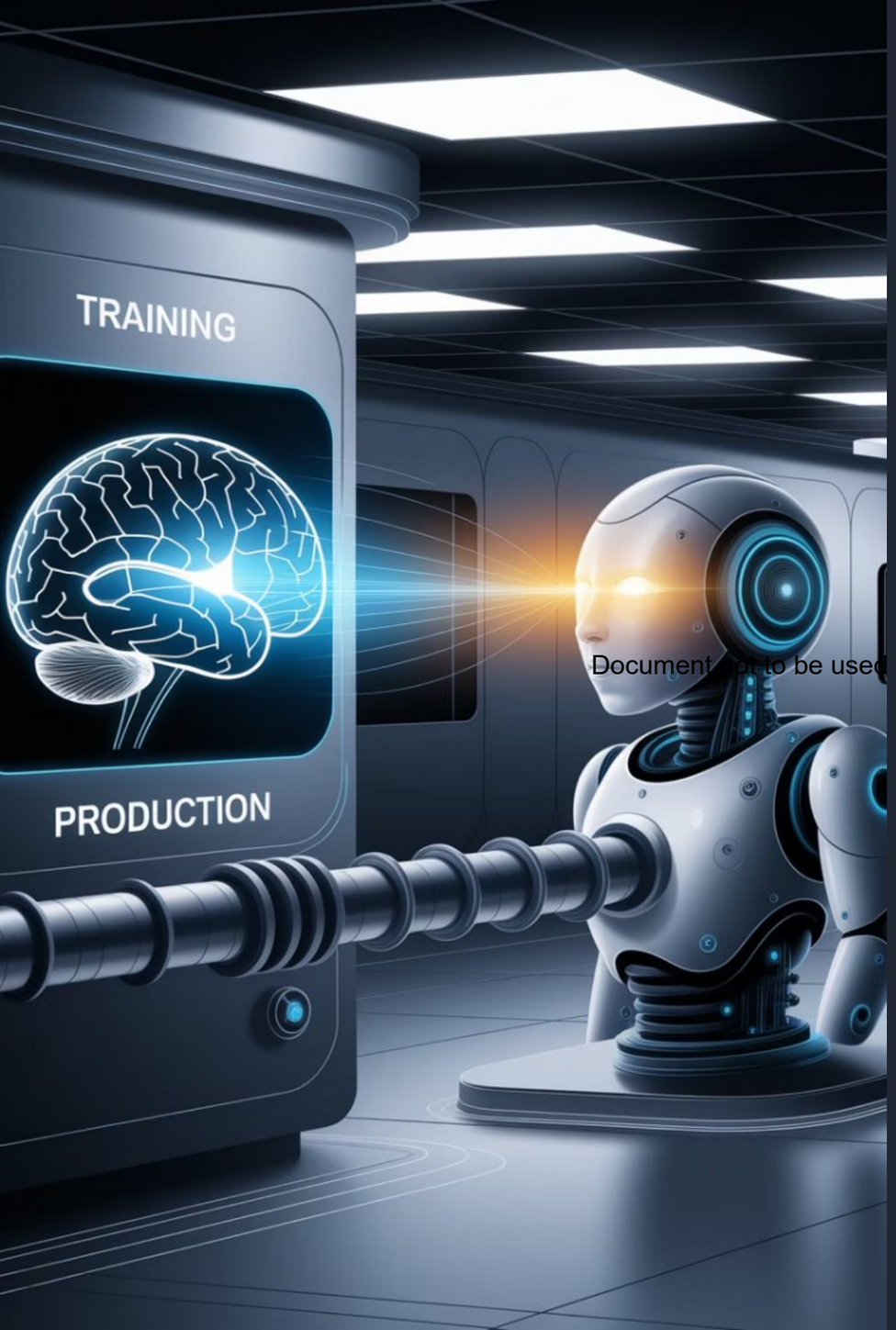
Underfitting

Model too simple, misses patterns.

Cross-Validation

Reliable method to assess model performance.

Balance bias and variance for robust AI.



Introduction to Model Deployment

Deployment moves models into real-world use.

Ensuring reliability and scalability is key.

Deployment Strategies and Environments

Staging Environment

Testing area before production.

Techniques like blue-green minimize downtime and risk.

Production Environment

Live environment for end users.

Containerization and Microservices

Containers

Package apps with dependencies for consistency.

Microservices

Break application into manageable services.

These tools enhance scalability and manageability.

Monitoring and Post-Deployment Maintenance

Performance Monitoring

Track model accuracy and latency continuously.

Maintenance

Update models to adapt to changing data.

Monitoring ensures sustained AI effectiveness.

Introduction to MLOps

MLOps bridges AI development and operations.

It enables continuous integration and delivery in AI projects.

Components of an MLOps Pipeline

Automation

Streamlines workflows for efficiency.

Version Control

Keeps track of code and data changes.

CI/CD

Continuous integration and deployment pipelines.

Monitoring

Ensures model health and reliability.

Best Practices and Common Challenges in MLOps

Team Collaboration

Foster clear communication and shared goals.

Scalability

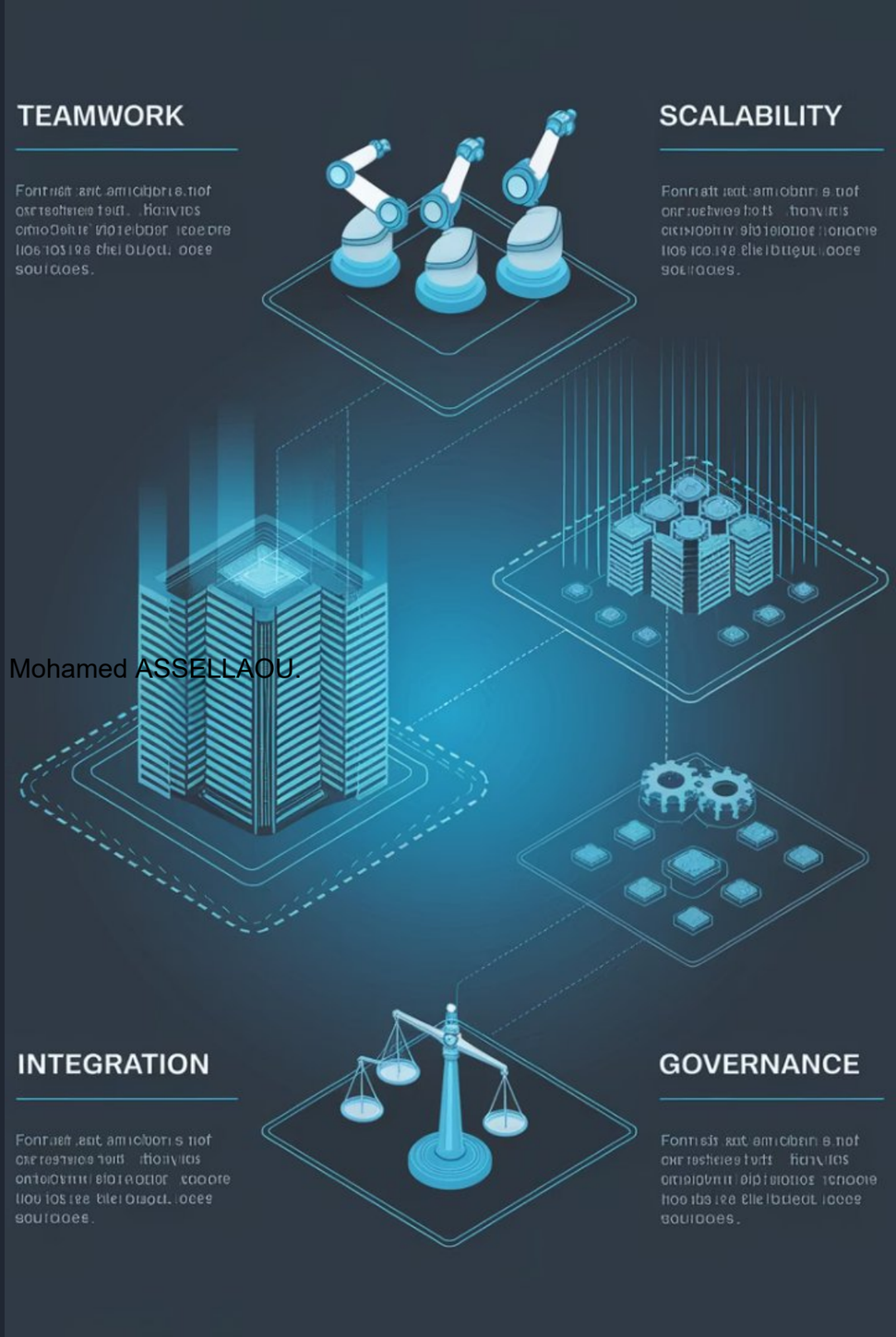
Design pipelines that grow with demand.

Integration

Ensure smooth tool and data interoperability.

Governance

Maintain compliance and ethical standards.



Conclusion and Recap

This journey connects business needs to AI operations.

Clear strategy and collaboration unlock AI potential.

MLOps sustains continuous improvement and impact.

Thank you! Keep innovating and lifting others in tech.