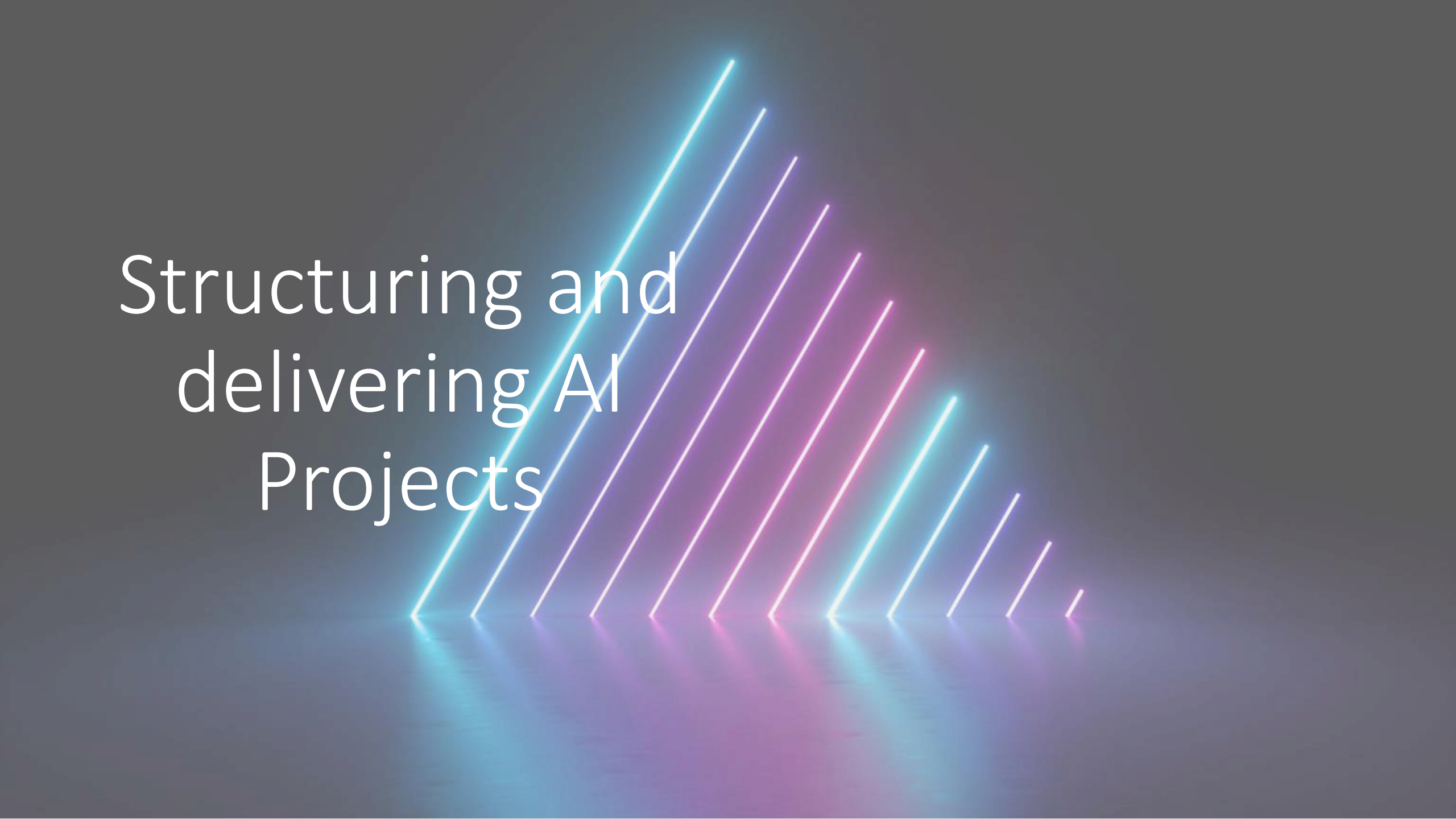
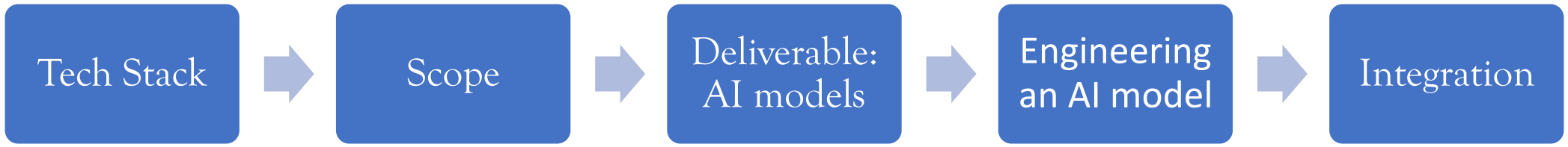
Structuring and delivering AI Projects



Overview

- **Certain rules apply to all projects, regardless of their type**
  - A guide to the project management body of knowledge (PMBOK® guide)



Based on K.Haller, Managing AI in the Enterprise

Technology stack for AI

Most of the time team members will be more technical (math, computer science) and less business knowledgeable;

AI project managers must prevent data scientists from doing AI reasearch (Unless the goal of the project is research itself)

Structure a technology area in layers and define technology stack:

- Hardware layer
- AI framework layer
- AI services layer
- Customized AI layer

Hardware Layer

Processors (CPUs, GPUs, TPUs)

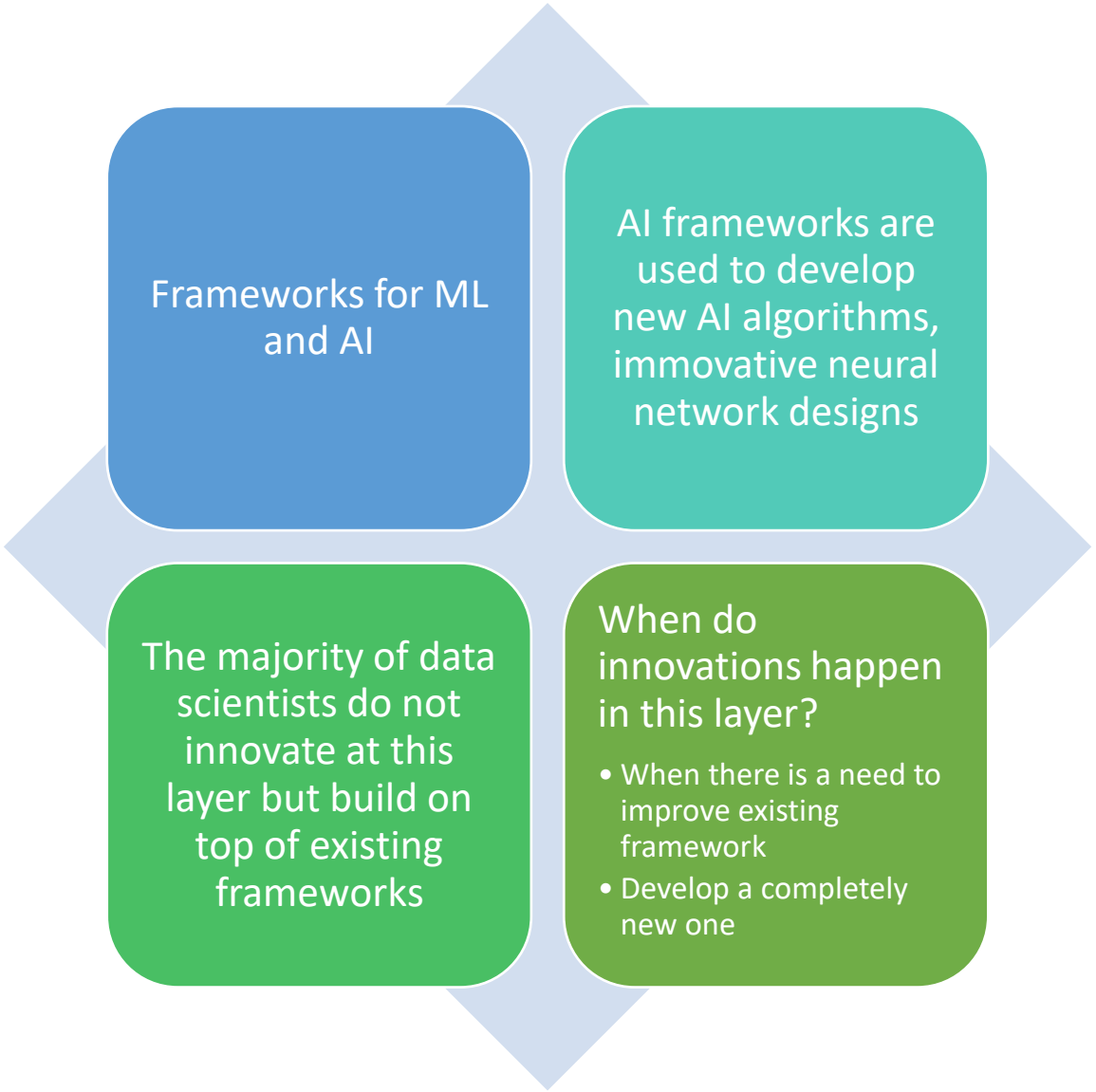
Memory and Storage (RAM, SSD/HDD, NVMe Storage)

Networking (High-Speed Interconnects, Cloud Networking)

Specialized Chips (ASICs, FPGAs)

Edge AI Hardware (NVIDIA Jetson, Google Coral, or Qualcomm Snapdragon)

AI framework layer



AI services layer

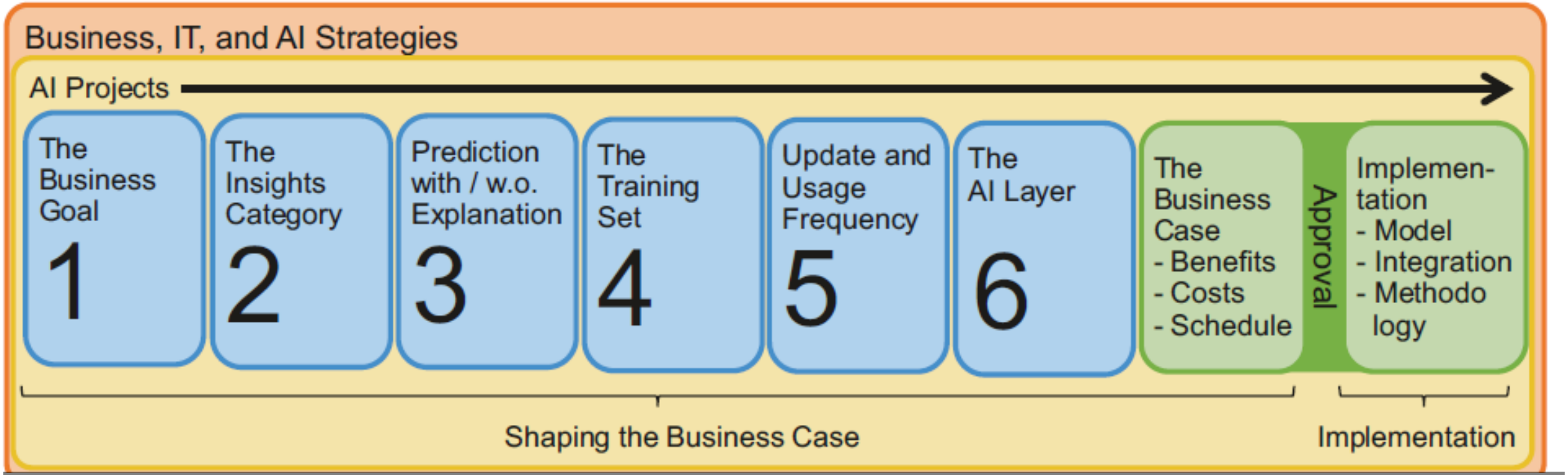
- Incorporate an already existing and ready to use AI solution;
- No knowledge about AI or data science is needed;
- For example:
  - LogoGrab/Visua
  - AWS Rekognition
  - Amazon Comprehend Medical
- Quick innovation, only concern is integration into existing processes and software solutions
- No risk in project delays due to AI related failures

Customized AI layer

- Domain-Specific Solutions
- Optimized Performance
- Custom Models and Algorithms

AI project scope

- Clear project scope = success
- Undestand specific goals that come from stakeholders
- Make sure that the team stays focused on those goals



Based on K.Haller, Managing AI in the Enterprise

Business goal

- What does the business want to achieve? (Goal)
- What are the success criteria?
- How does the project relate to strategic and tactical business goals?
- What is the expected timeline?
- Is there already a budget? How much is it?

Insights

- Business problem ---> AI Problem
- Supervised learning
  - Classification – puts data items or objects in one of the defined classes
  - Prediction
  - Supervised learning is often directly actionable
- Unsupervised learning – structures the input data
  - Clustering
  - Associations
  - Dimensionality reduction

Data input

Structured data:

- Database
- CSV/Excel Tables

Images and videos

Speech and sound

Text (documents or emails for example)

Data quality

- Good data is required to train AI models;
- AI model cannot be better than the quality of its input training data;
- Who will ensure that the data is good?
  - Ask Experts?
  - Use automatically derived real world data?
  - Humans make mistakes, AI components do not

Model

- The costs of integrating AI components into existing applications are costly;
- Time and resources are required to ensure that AI components , new applications and existing applications run smoothly;
- Automating – collecting data from various source systems, cleaning and transforming
- Key decision parameters:
  - Model usage frequency – is the model one time? Is it for daily use?
  - Model update frequency

Preparing a business case

- Main milestones and resources that are needed for a minimal viable product
- Resources:
  - Engineers with specific skills;
  - Financials for external staff;
  - Licenses;
  - Computing infrastructure
- What benefits AI project will bring

AI models

- AI models solve particular, narrow problems
- Symbolic artificial intelligence
- Computational intelligence

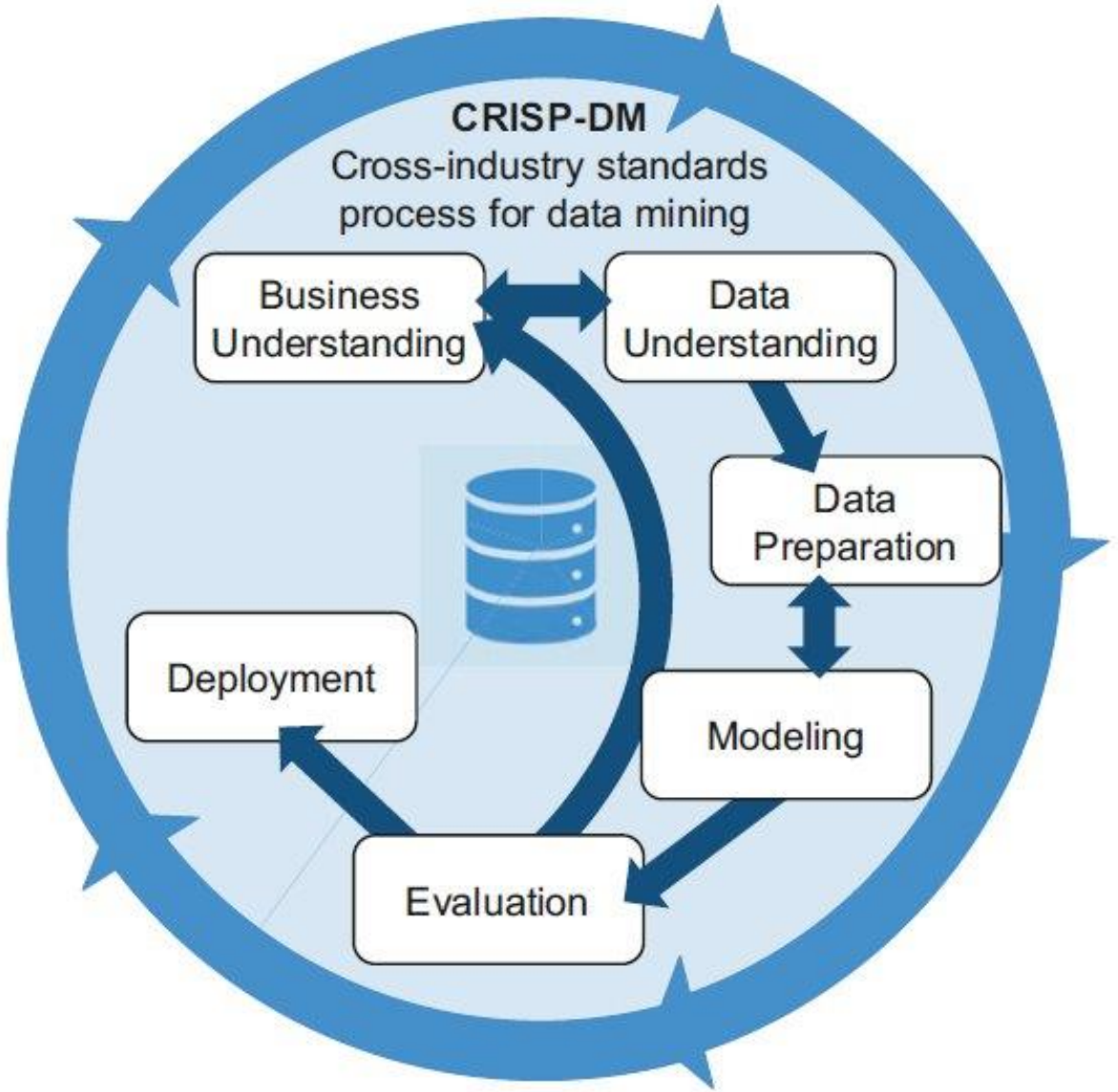
- Statistics-based methods
- Neural networks

Advanced Neural Network Topologies

- Convolutional neural networks
- Recurrent neural networks
- Residual neural networks

Model development (1)

- Cross-Industry Standard Process for Data Mining (CRISP-DM)



Model development (2)

Business Understanding (assessing the resource situation is included)

Data Understanding

Data Preparation

- Identify data
- Feature engineering
- Cleaning the data

Modeling

Evaluation

- Does the solution meets the business goals

Deployment

Integrating AI Models in IT Solutions

- The collaboration between the AI component and the rest of the application is the goal
- The exact deployment or integration can follow various patterns:
  - Precalculation
  - Reimplementation
  - Encapsulated AI component