Fundamental Machine Learning

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Machine Learning Course

15/02/2019

Machine Learning

Deep Learning

Artificial Intelegence

Setiap teknik yang membuat komputer dapat memiliki pengetahuan seperti manusia

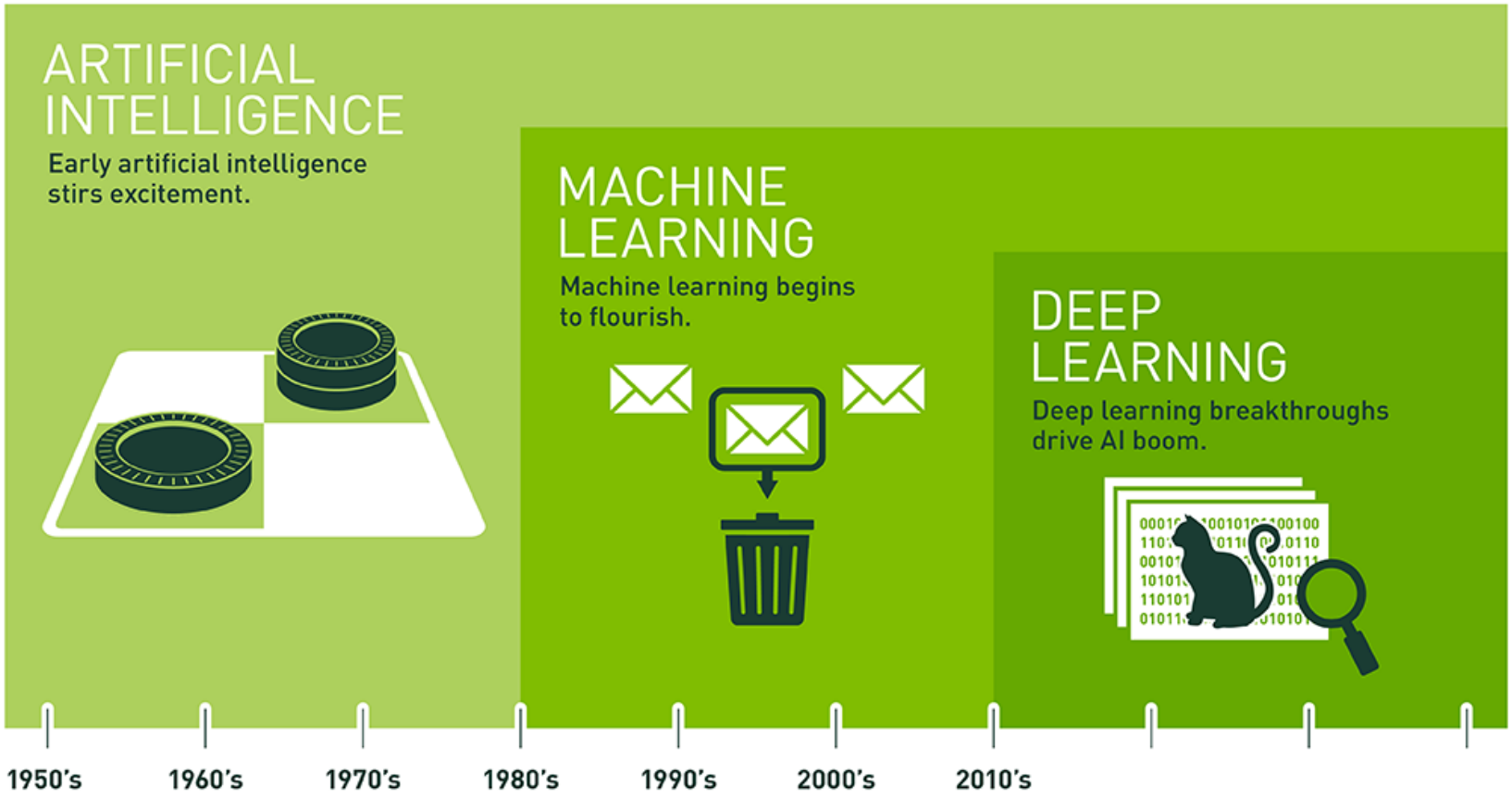
Machine Learning

Teknik untuk mengajari komputer tanpa secara langsung memprogram

Deep Learning

Belajar untuk memahami fitur dari data-data dengan menggunakan neural network (Jaringan syaraf tiruan)

Sejarah Machine Learning



Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.

Traditional Approach

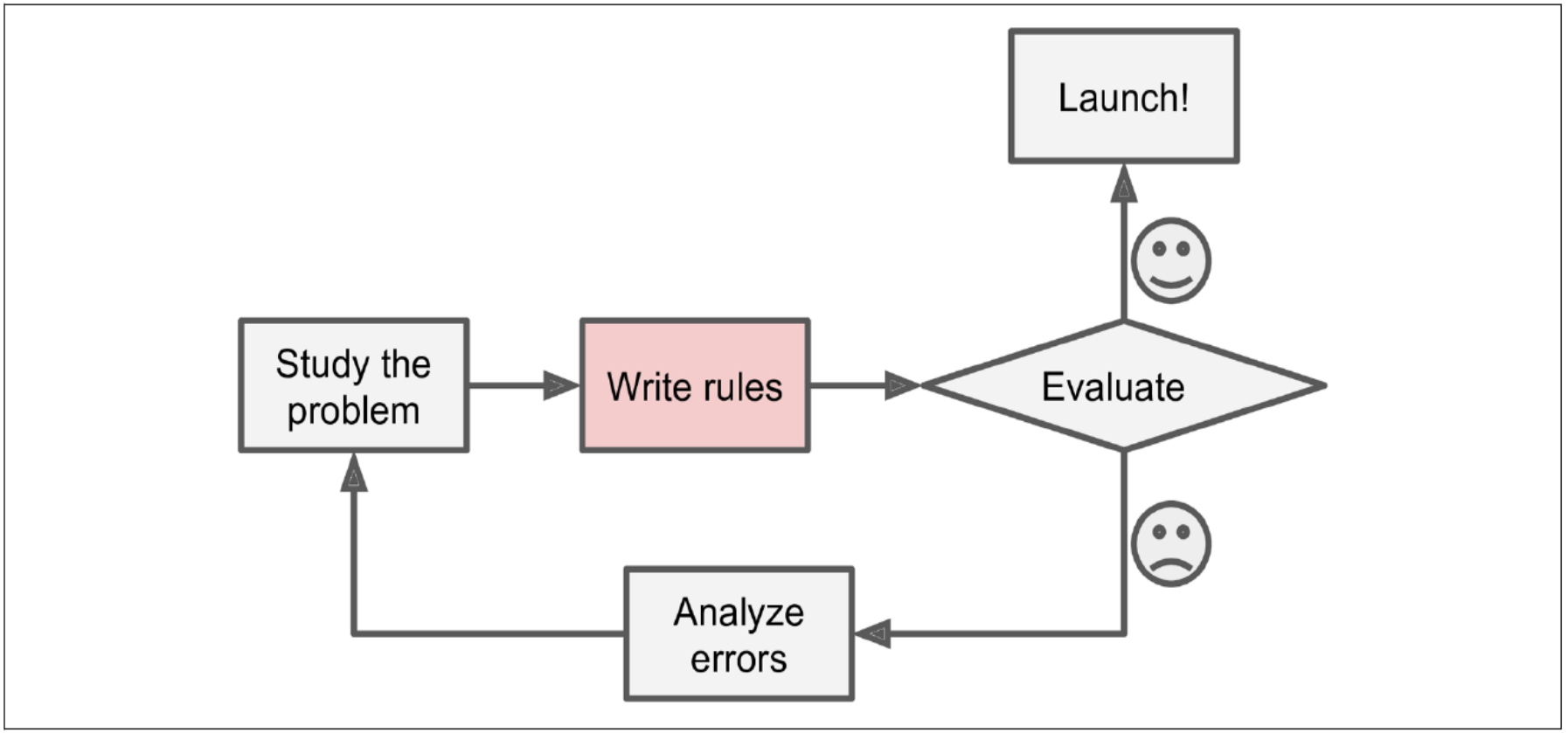


Figure 1-1. The traditional approach

Machine Learning Approach

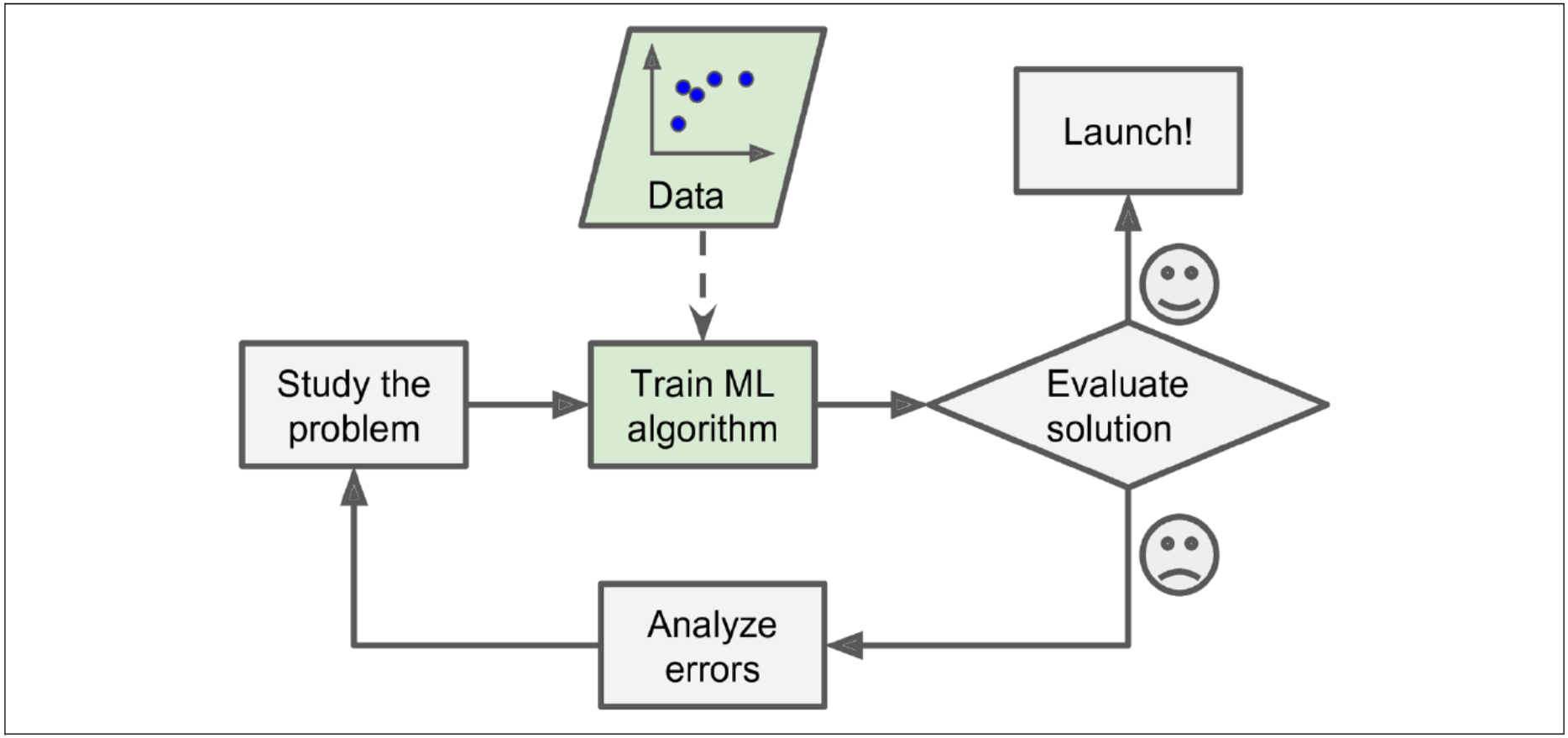


Figure 1-2. Machine Learning approach

Automatic Machine Learning Approach

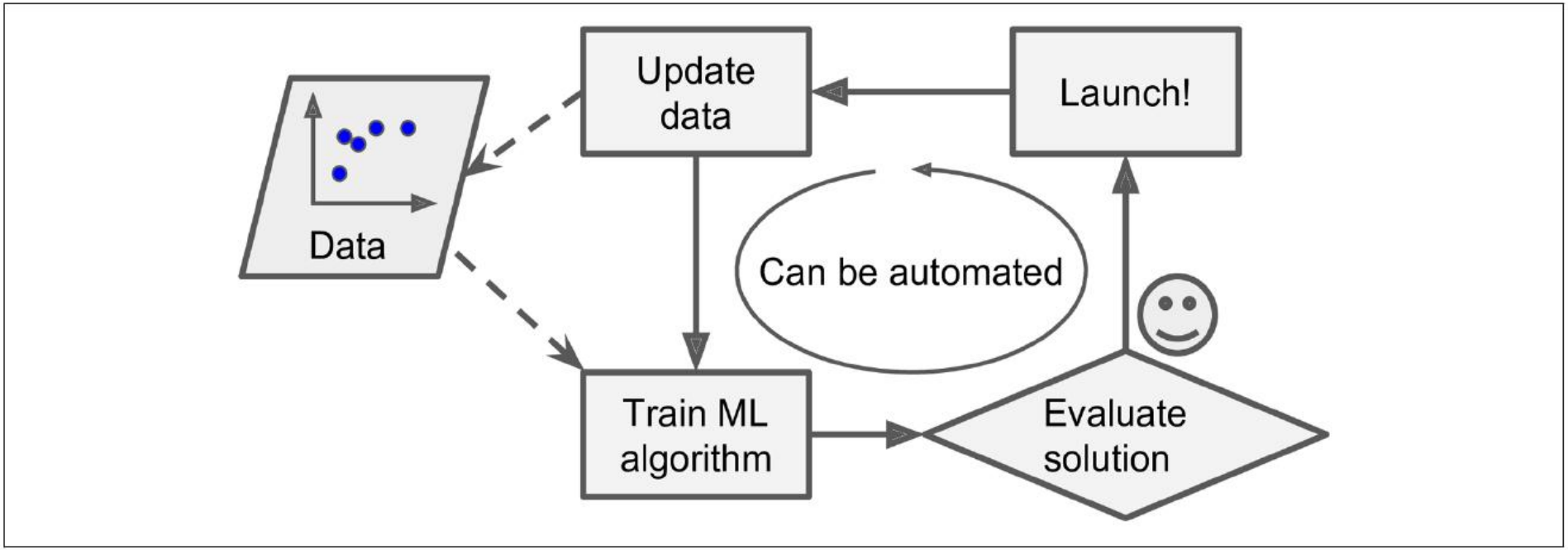
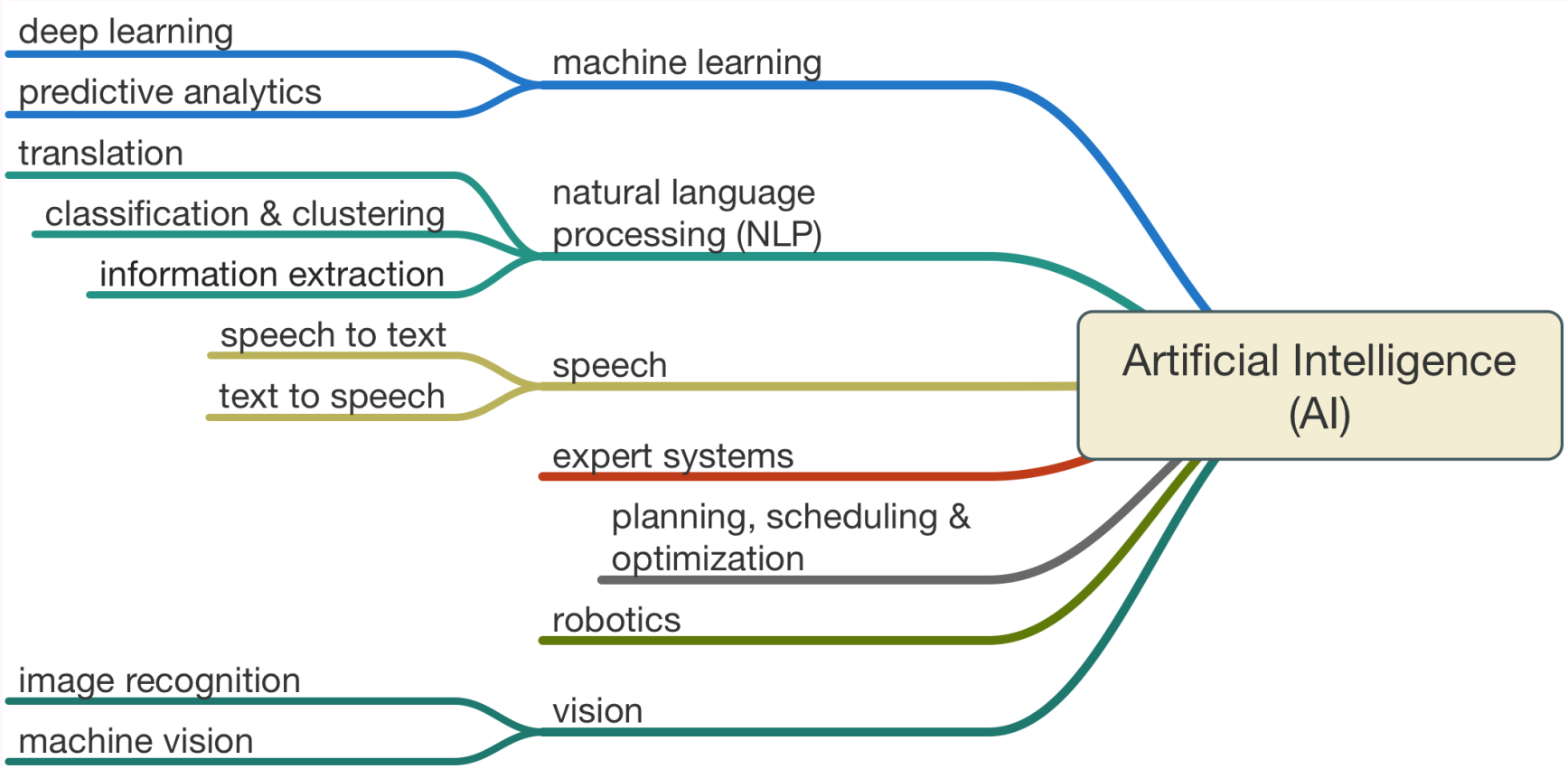


Figure 1-3. Automatically adapting to change

Artificial Intelligence (Kecerdasan Buatan)



Manfaat Machine Learning

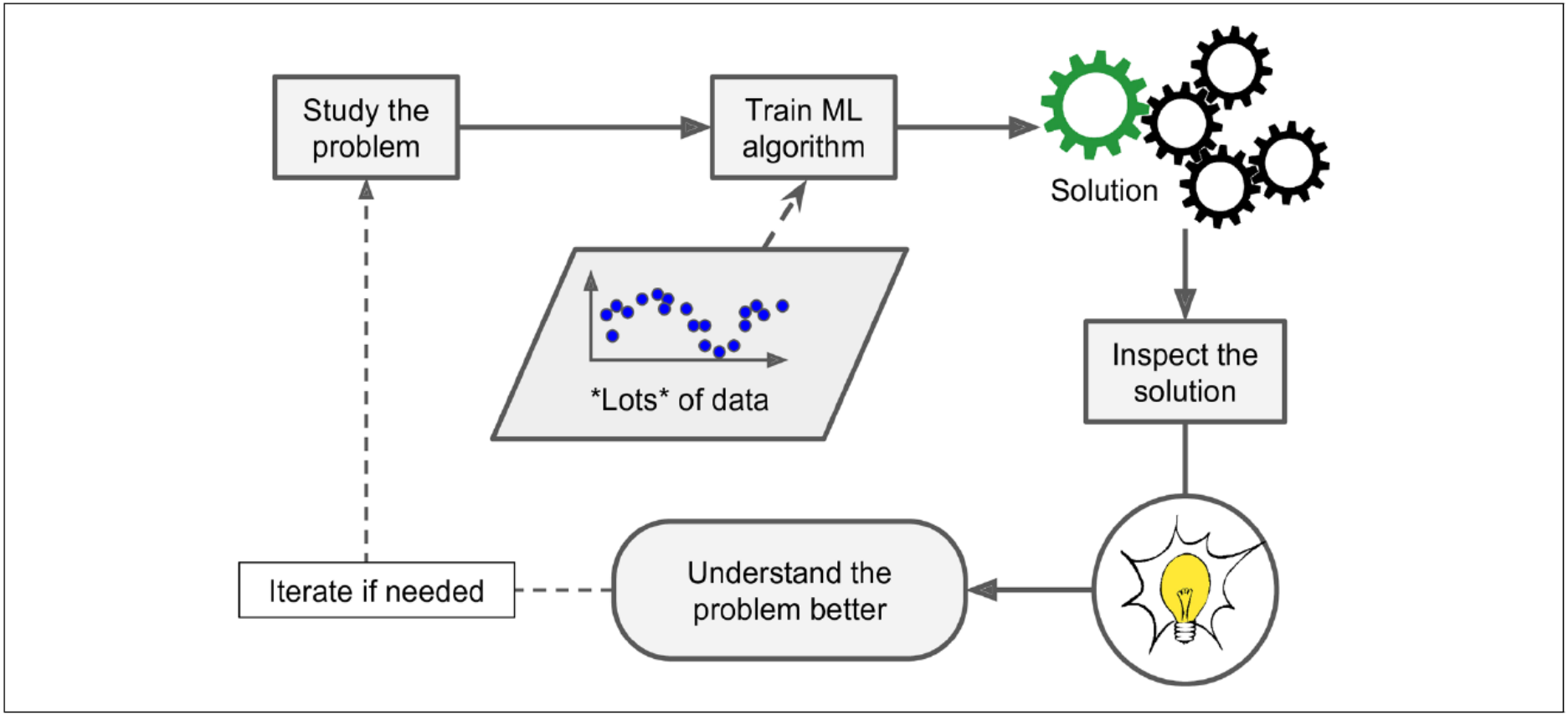


Figure 1-4. Machine Learning can help humans learn

Manfaat Machine Learning

- Menyederhanakan permasalahan
  - *Traditional approach*: menggunakan berbagai macam rule
  - *Machine learning approach*: menggunakan beberapa baris kode serta dapat diterapkan di problem lain
- Machine learning dapat beradaptasi dengan data baru sedangkan traditional approach mengharuskan merubah banyak rule
- Mendapatkan wawasan tentang masalah kompleks dan data dalam jumlah besar.

Dataset Problem

Anjing dan Kain Pel

Chiuahua dan Kue Muffin?

Chiuahua dan Kue Muffin

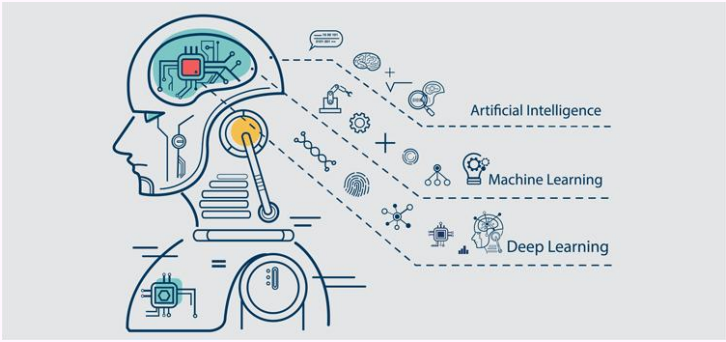
Kakatua dan Buah

Donald Trump dan Ayam

Manfaat Machine Learning

Pemanfaatan Machine Leanring

- Face recognition
- Image classification
- Speech recognition
- Text-to-speech generation
- Handwriting transcription
- Machine translation
- Medical diagnosis
- Cars: drivable area, lane keeping
- Digital assistants
- Ads, search, social recommendations
- Game playing with deep RL



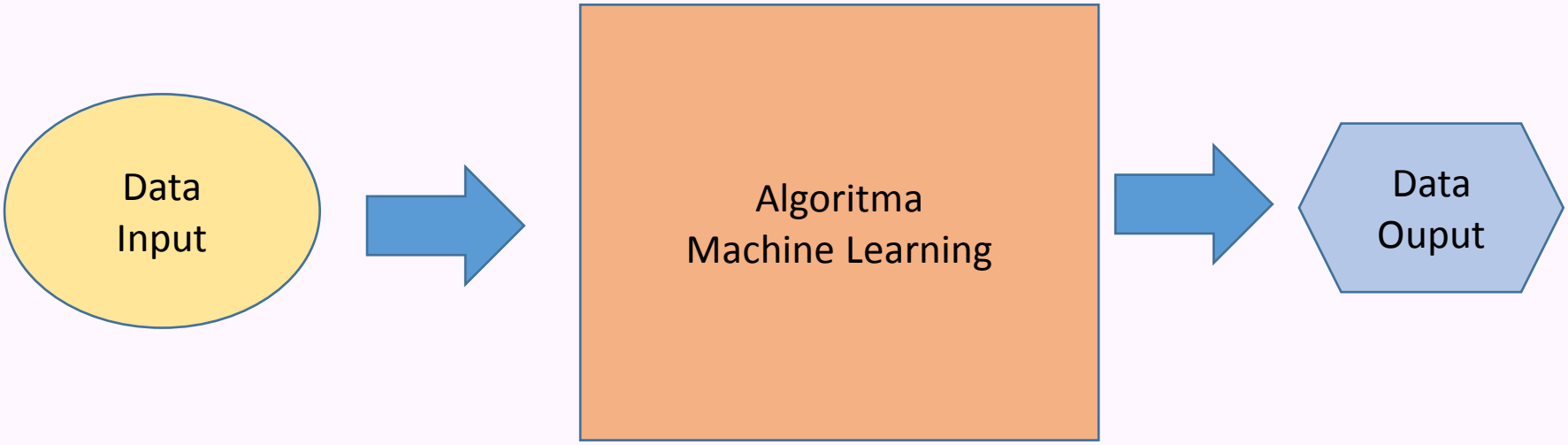

YouTube

Jenis-Jenis Machine Learning

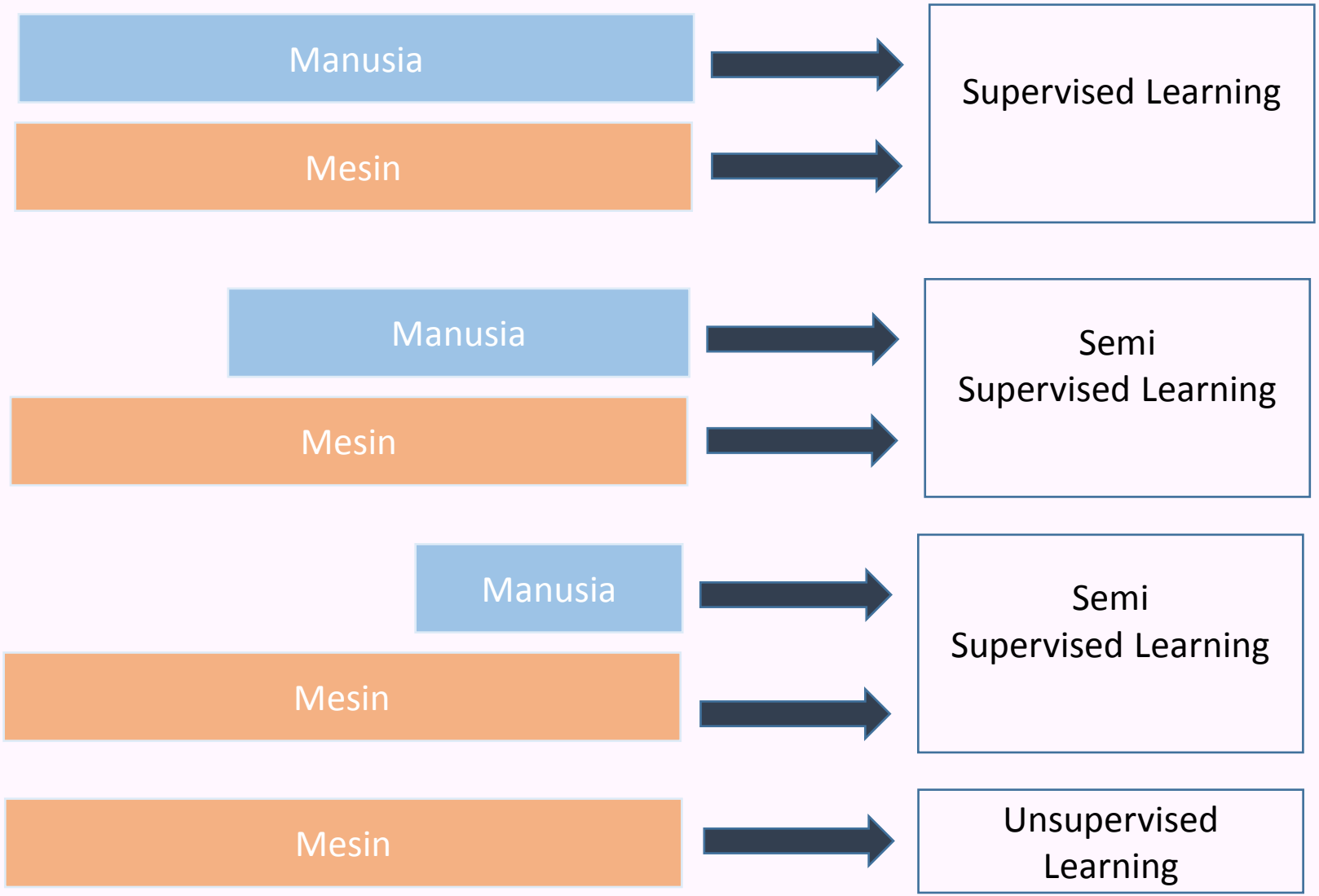
Jenis-Jenis Machine Learning

- Berdasarkan campur tangan manusia.
  - Supervised Learning
  - Unsupervised Learning
  - Reinforcement Learning
- Berdasarkan cara melakukan training
  - Batch Learning
  - Online Learning
- Berdasarkan komparasi data
  - Instance Based Learning
  - Model based Learning

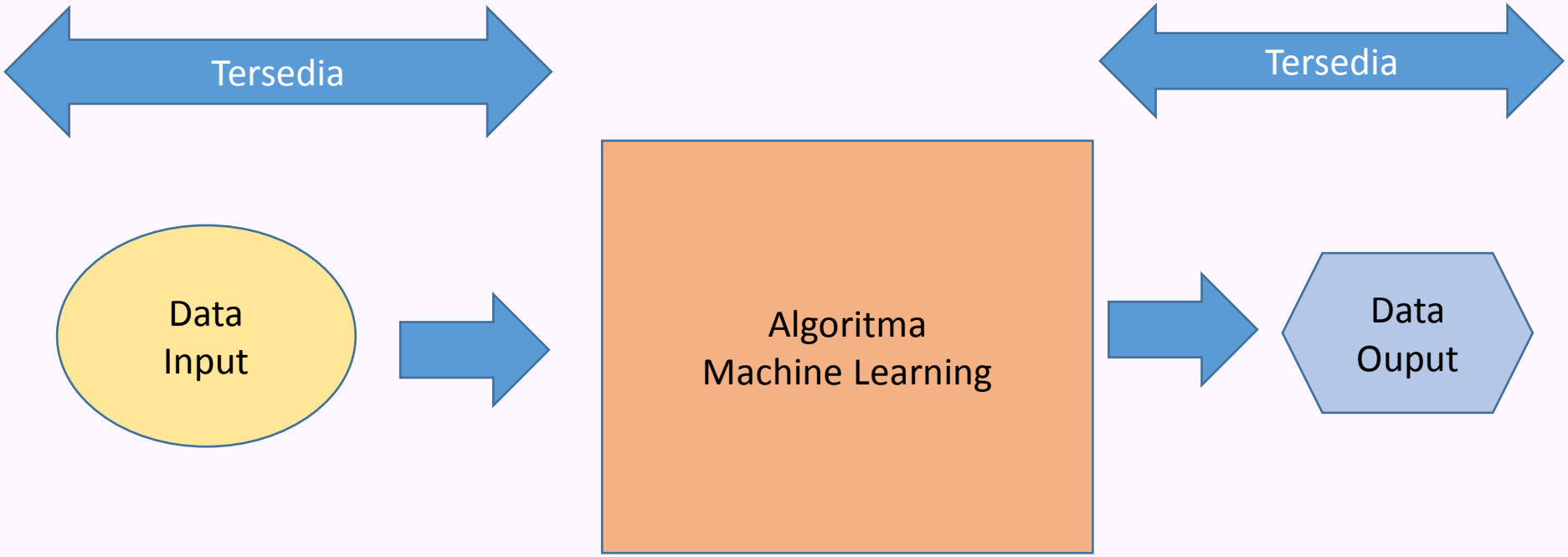
Model Pembelajaran



Berdasarkan Campur Tangan Manusia



Supervised Learning



Supervised Learning

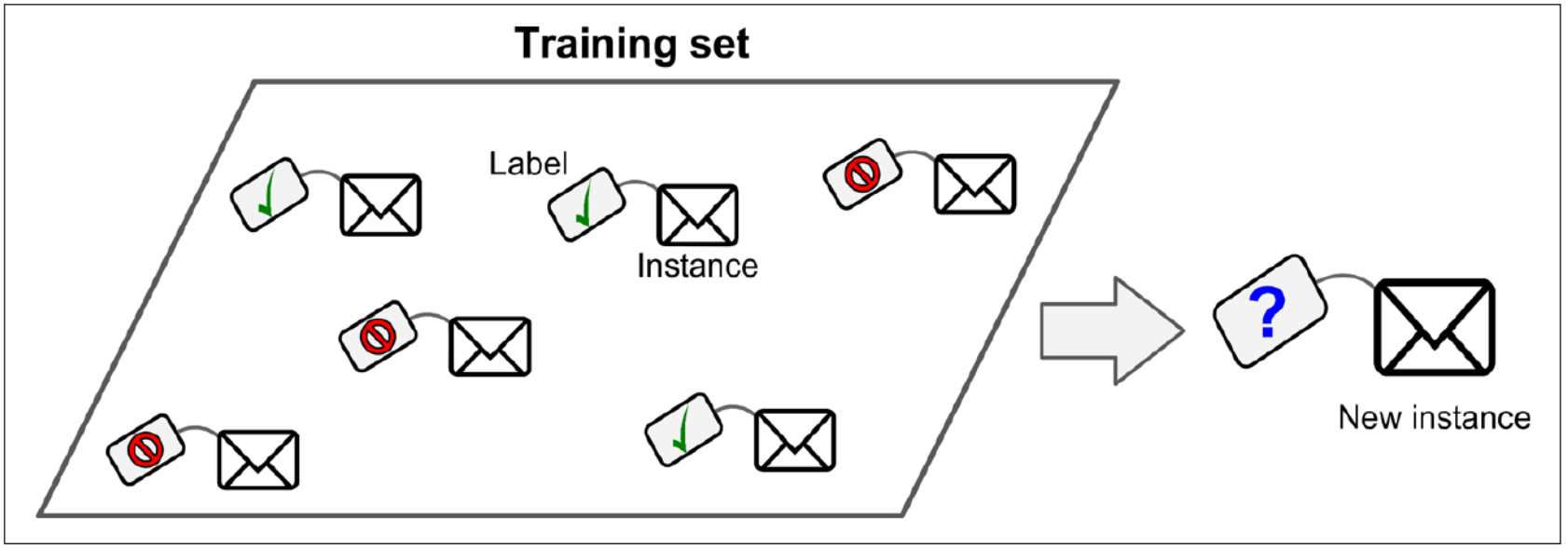


Figure 1-5. A labeled training set for supervised learning (e.g., spam classification)

- Tipe Tugas dari Supervised Learning adalah Klasifikasi
- Tugas khas lainnya adalah memprediksi nilai numerik target, seperti harga mobil, diberikan serangkaian fitur (jarak tempuh, usia, merek, dll.) Yang disebut prediktor. Tugas semacam ini disebut regresi. Untuk melatih sistem, Anda perlu memberikan banyak contoh mobil, termasuk prediktor dan labelnya (mis., Harga mereka).

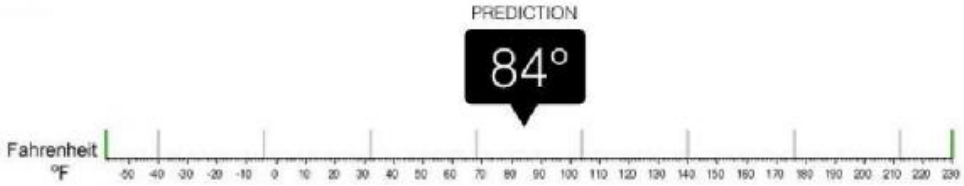
Algoritma Supervised Learning

- k-Nearest Neighbors
- Linear Regression
- Logistic Regression
- Support Vector Machines (SVMs)
- Decision Trees and Random Forests
- Neural networks
- Dan lain-lain

Regression vs Classification

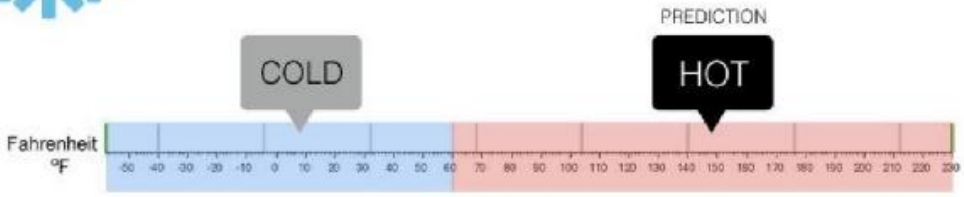
Regression

What is the temperature going to be tomorrow?

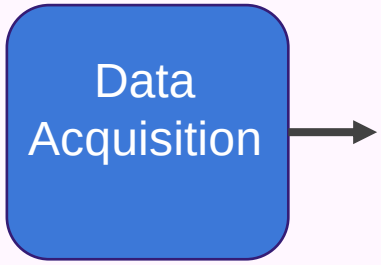


Classification

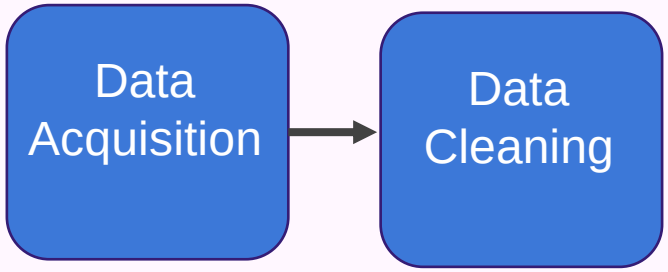
Will it be Cold or Hot tomorrow?



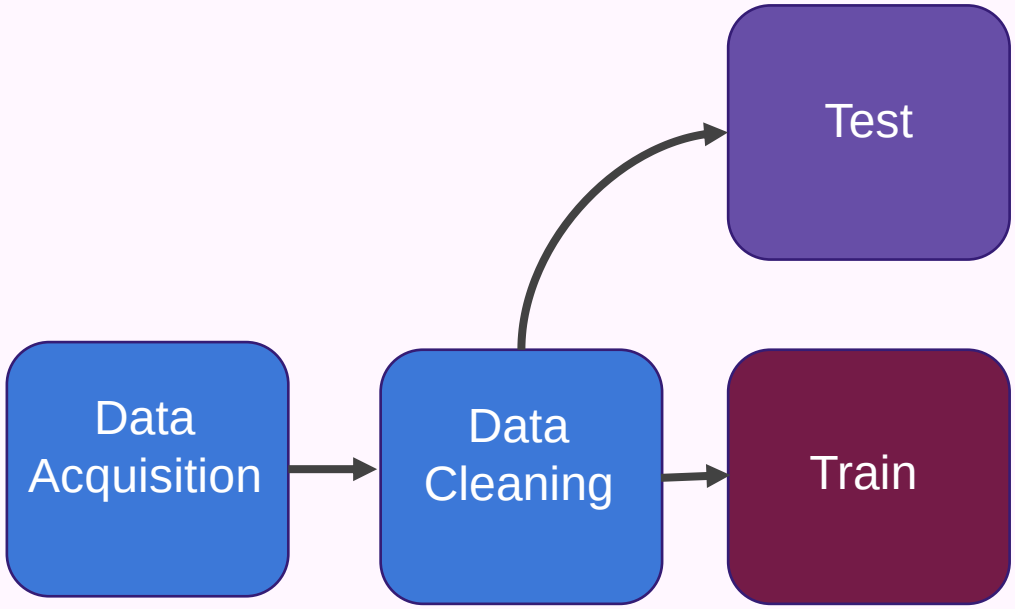
Pengambilan Data



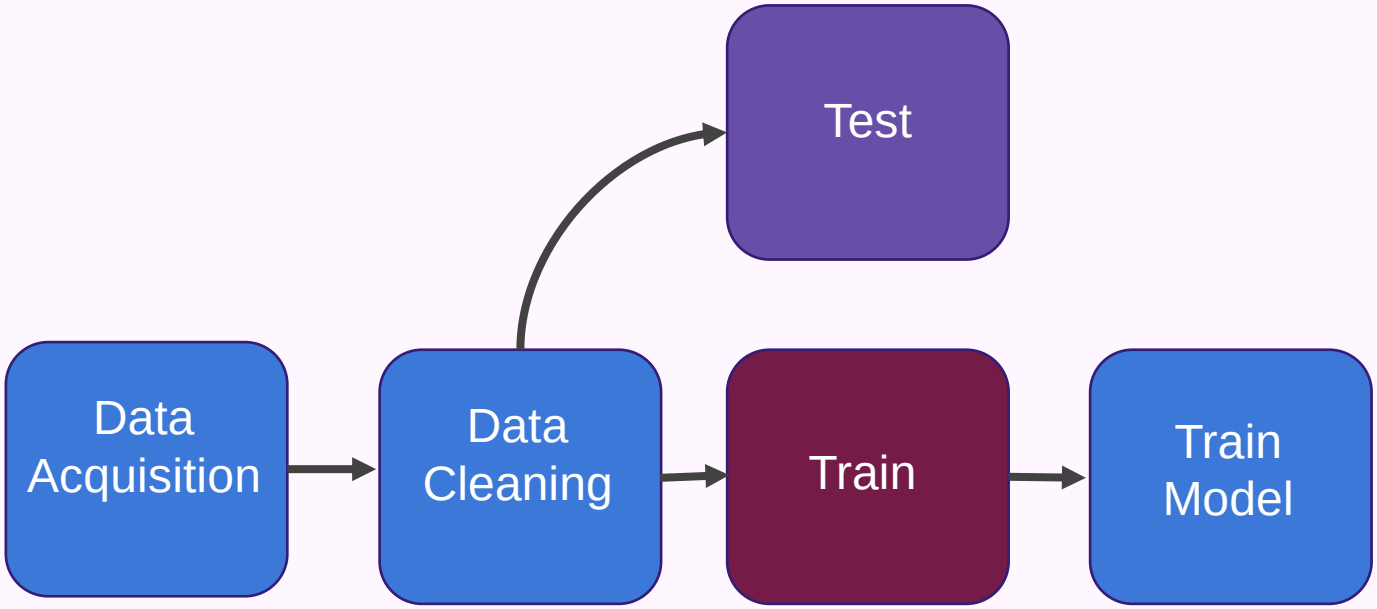
Pembersihan Data



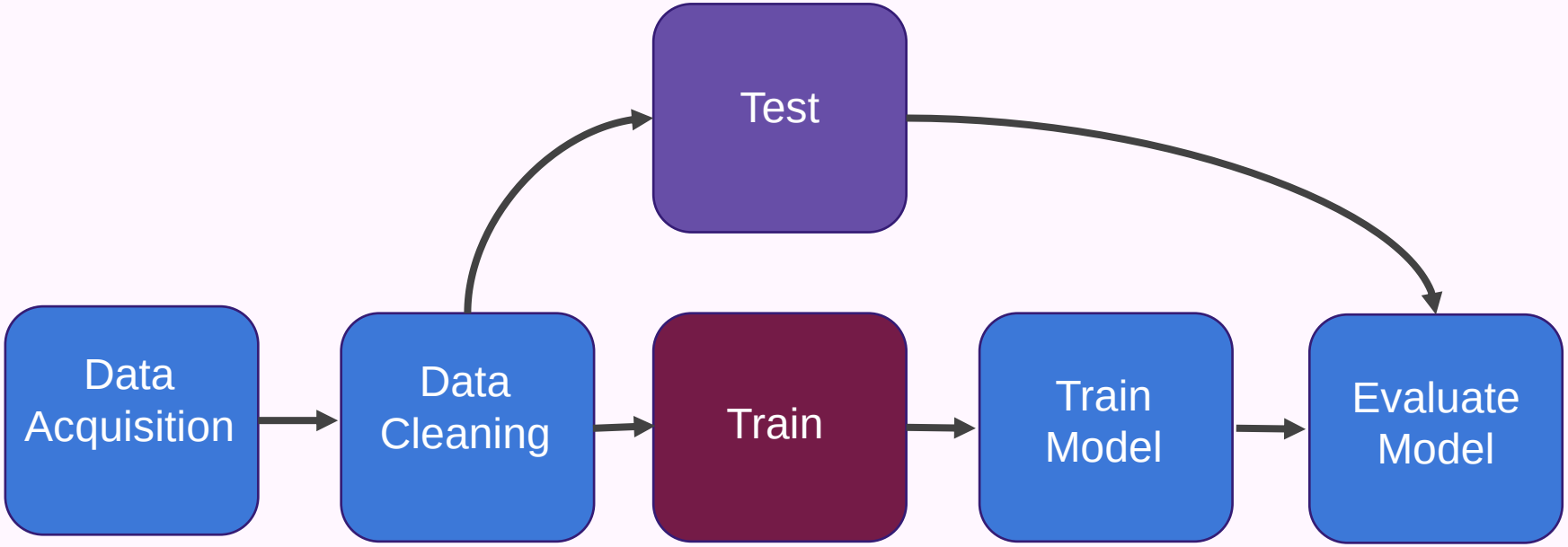
Pembagian Data



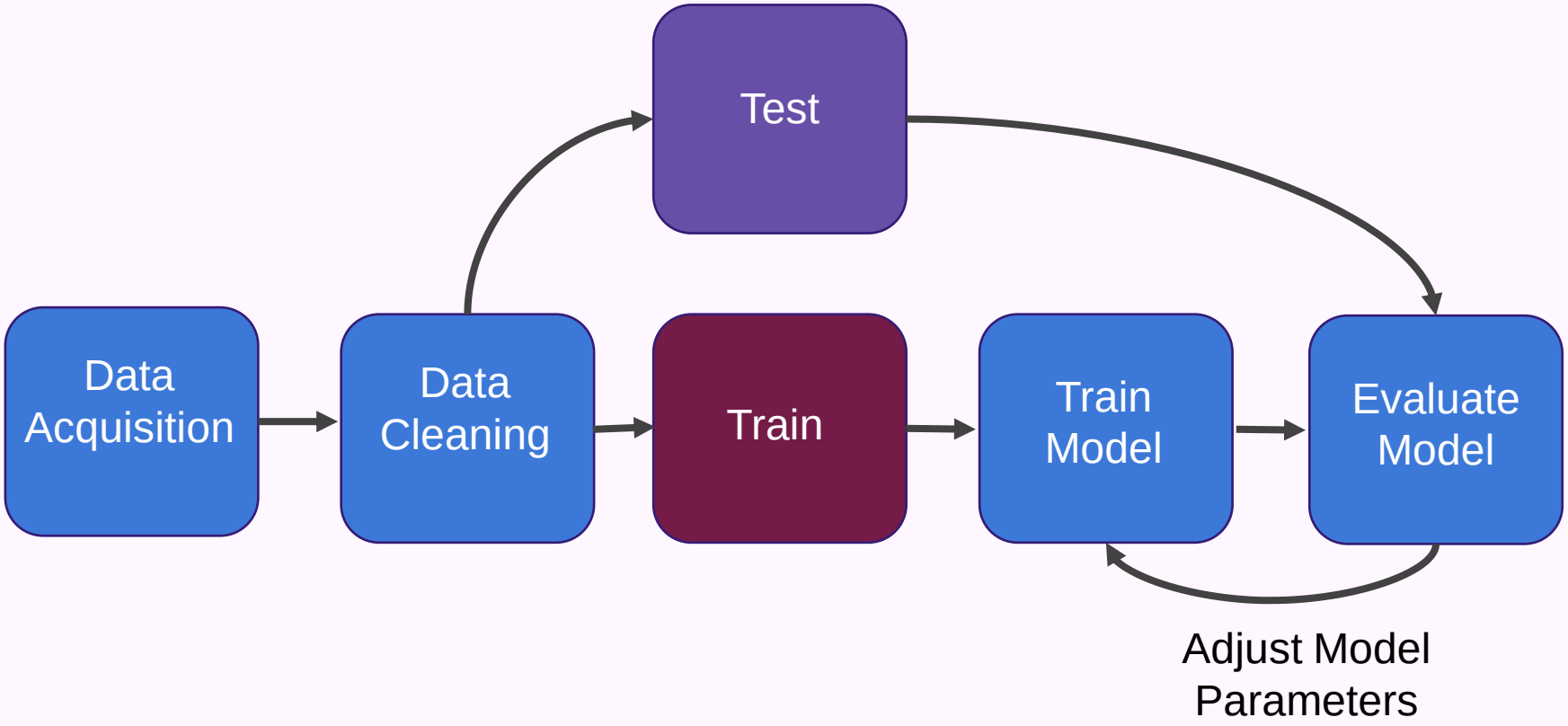
Training Data



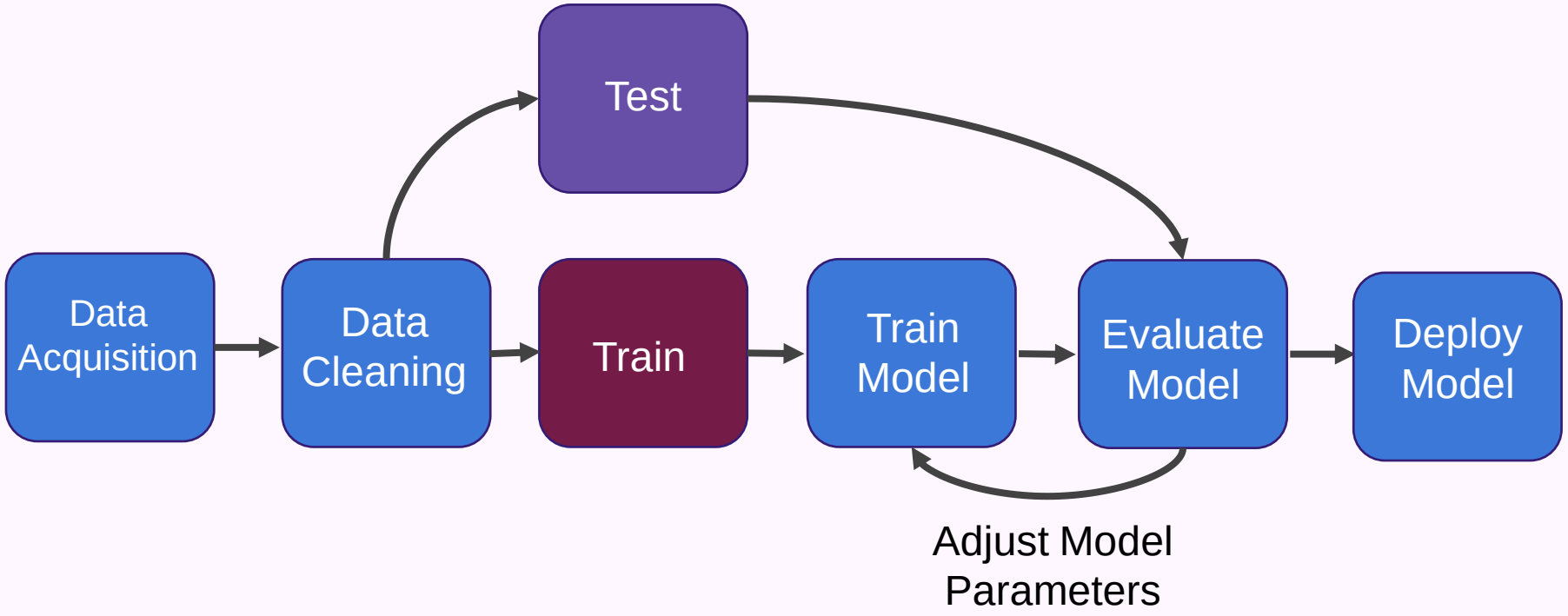
Evaluasi Model



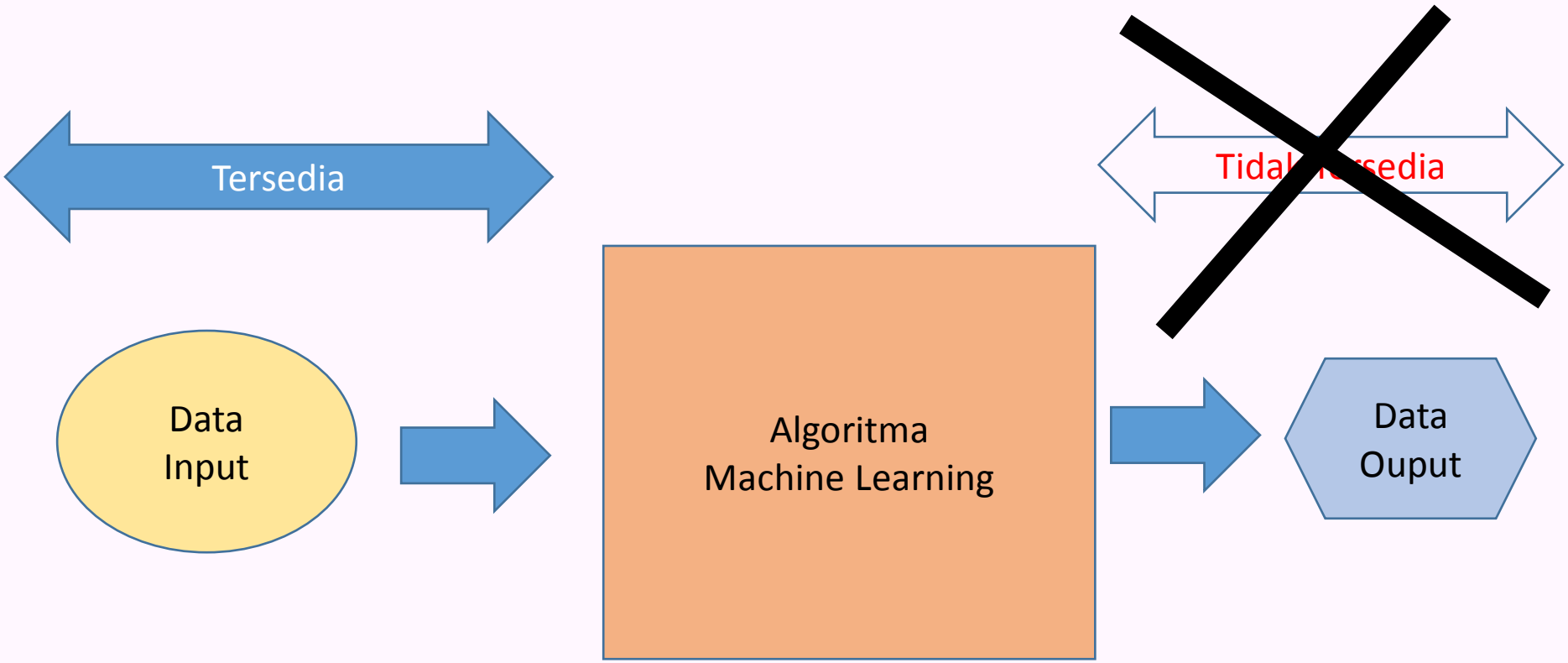
Adjust Model Parameters



Deploy Model dgn Data Baru



Unsupervised Learning



Unsupervised Learning

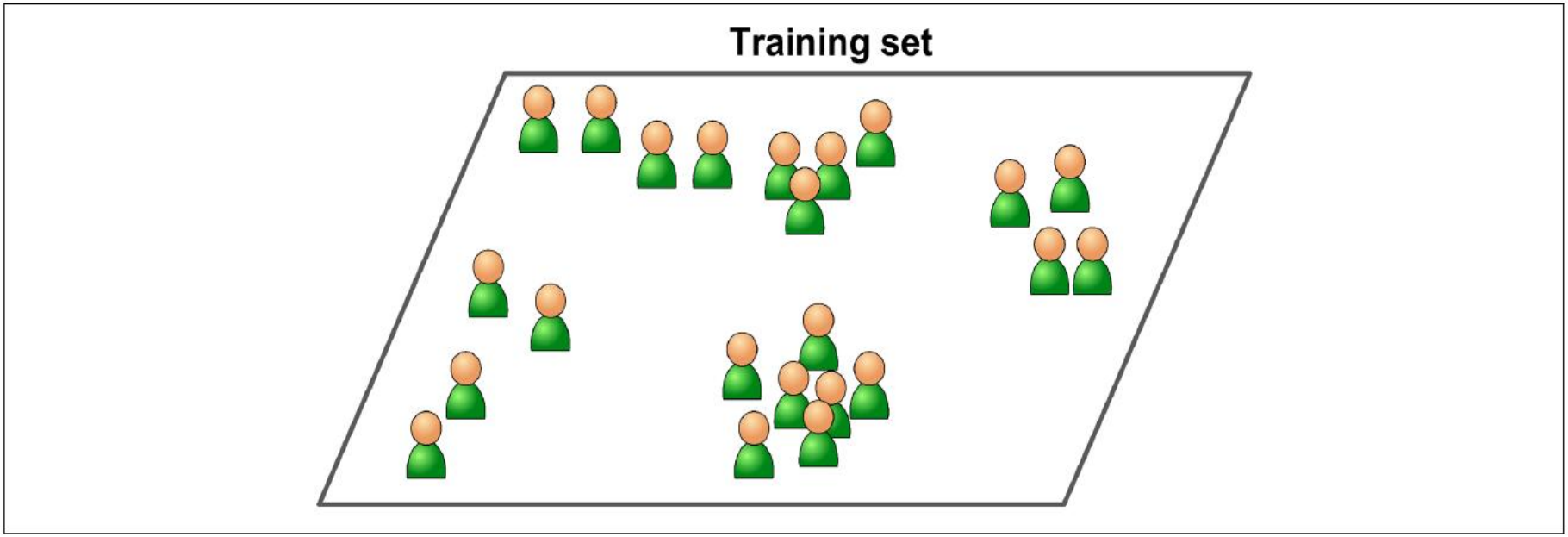
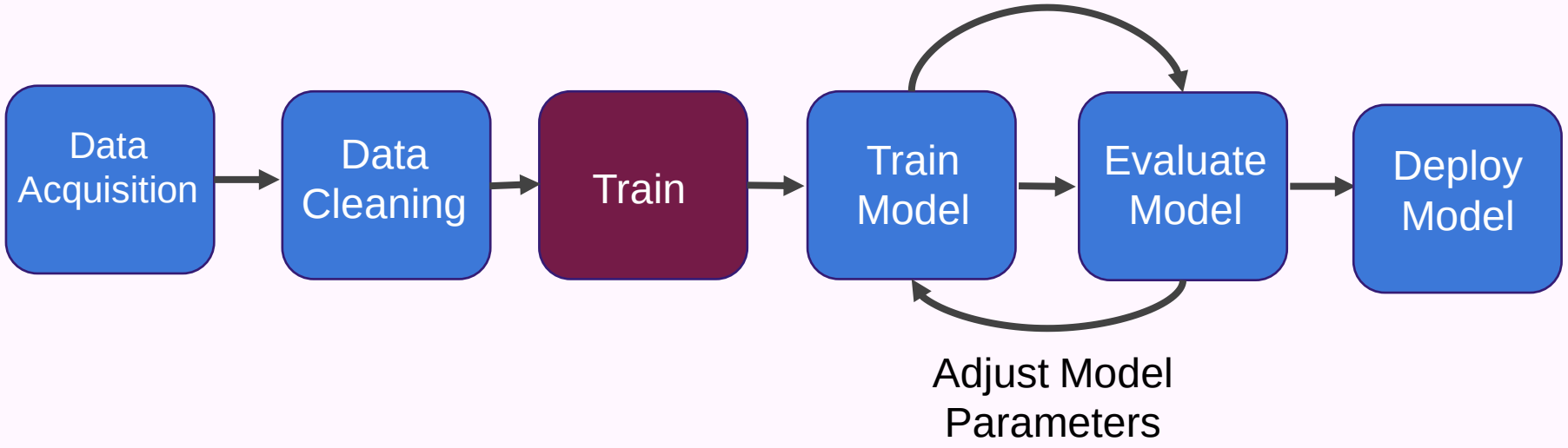


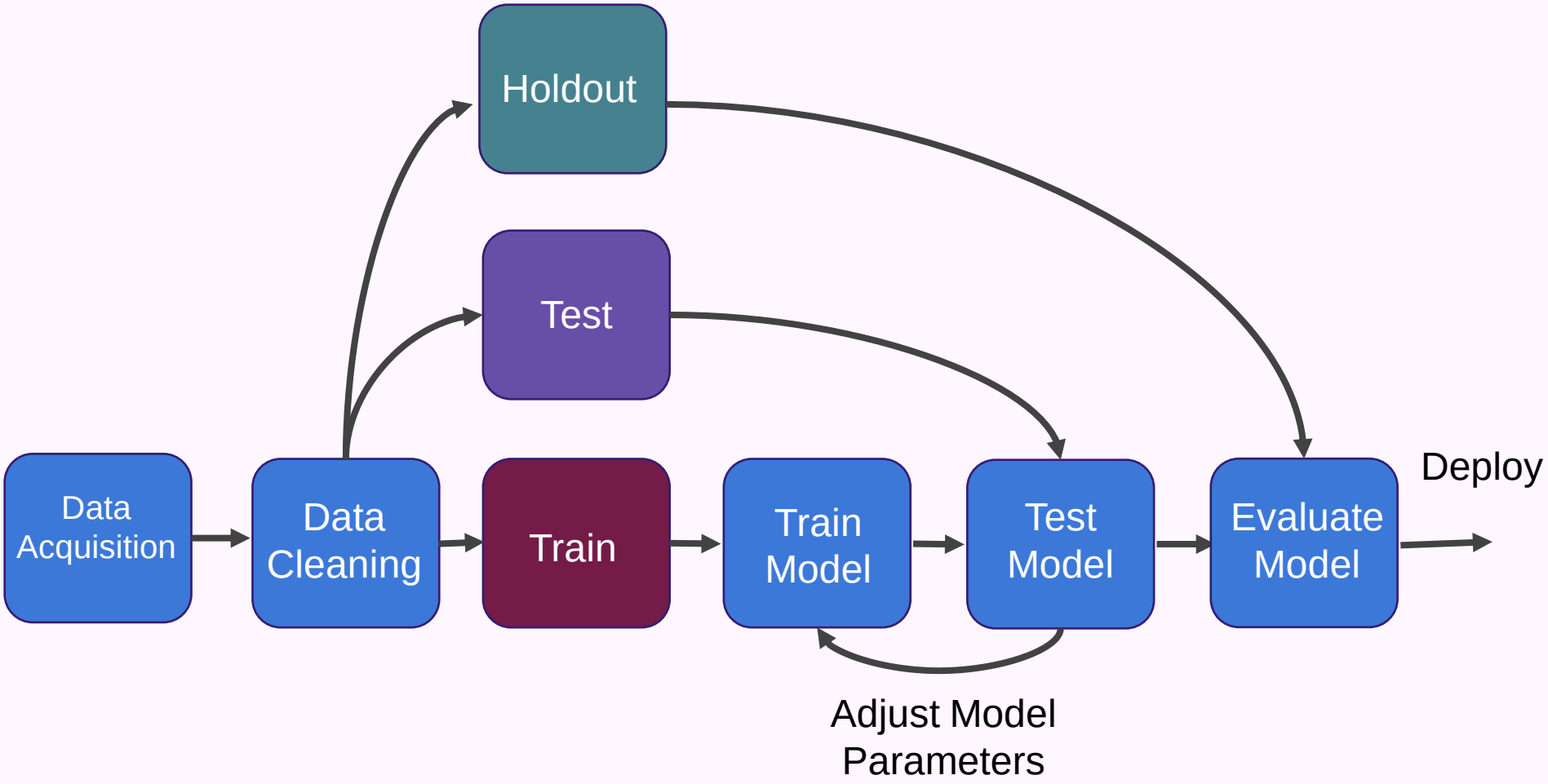
Figure 1-7. An unlabeled training set for unsupervised learning

- Tipe unsupervised learning adalah Cluster
- Contohnya implementasi fraud pada kartu kredit
- Dapat dikombinasikan dengan algortima supervised learning

Unsupervised Learning



Hold Out Sets



Algoritma Unsupervised learning

- **Clustering**
  - K-Means
  - Hierarchical Cluster Analysis (HCA)
  - Expectation Maximization
- **Visualization and dimensionality reduction**
  - Principal Component Analysis (PCA)
  - Kernel PCA
  - Locally-Linear Embedding (LLE)
  - t-distributed Stochastic Neighbor Embedding (t-SNE)
- **Association rule learning**
  - Apriori
  - Eclat

Semi supervised Learning

- Algoritma yang dapat mengkombinasikan data dengan label dan tanpa label
- Example:
  - Faceboook photo
  - Google photo
- Contoh Algoritma seperti Deep Belief Network (DBN)

Reinforcement Learning

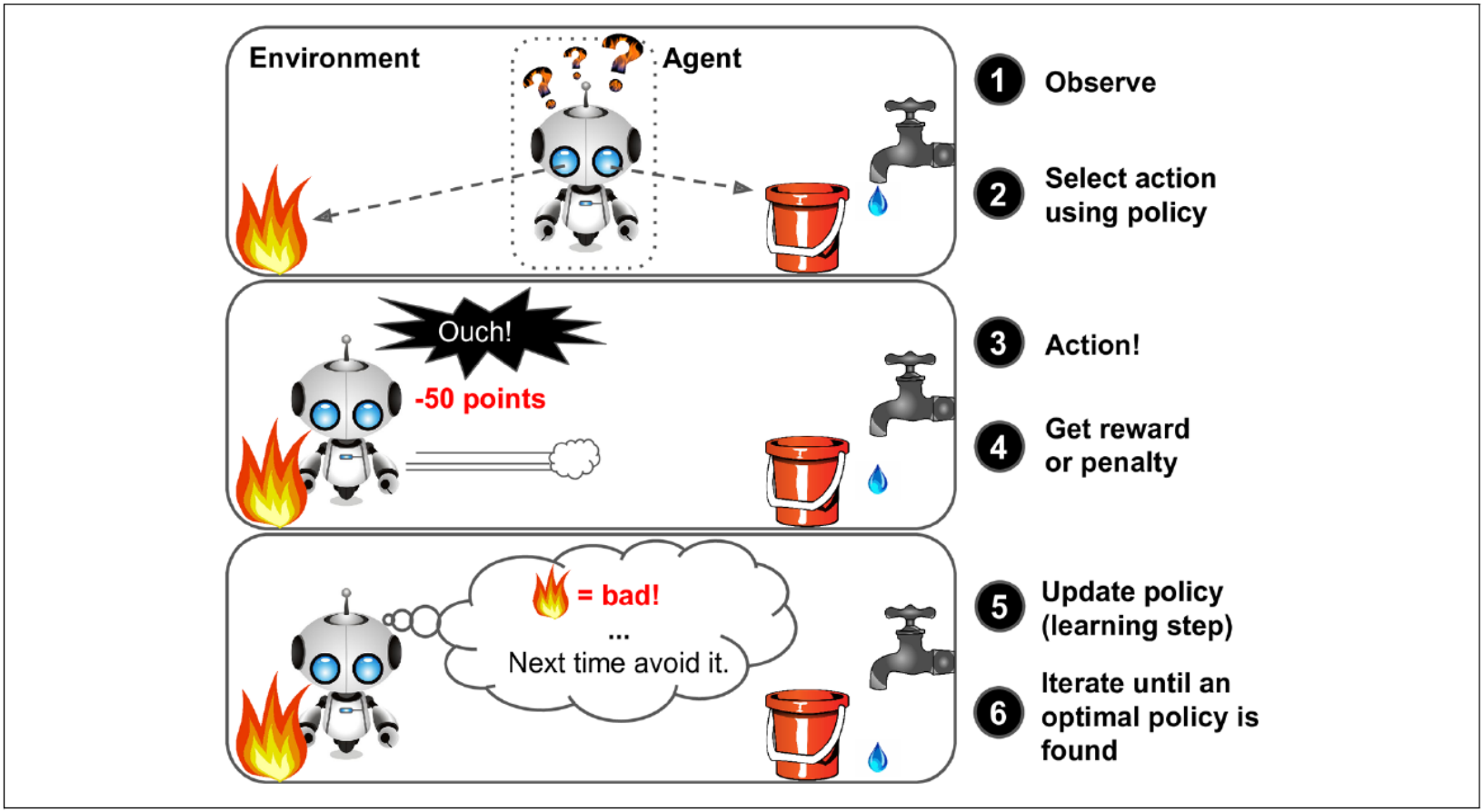


Figure 1-12. Reinforcement Learning

Deep learning is just like kids depend on your training.

Deep learning is big tool

TERIMA KASIH