INTRODUCTION TO MACHINE LEARNING

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بارم بندی

- تمرین‌های کلاسی (۸ عدد) **۸ نمره**
  - برنامه نویسی
  - حل کردنی
- مینی پروژه (۱ عدد) **۵ نمره**
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LIBRARIES

- numpy

- matplotlib

- pandas

- scikit-learn

- ...

RELATED TOPICS

- Linear Algebra

- Probability Theory and Statics
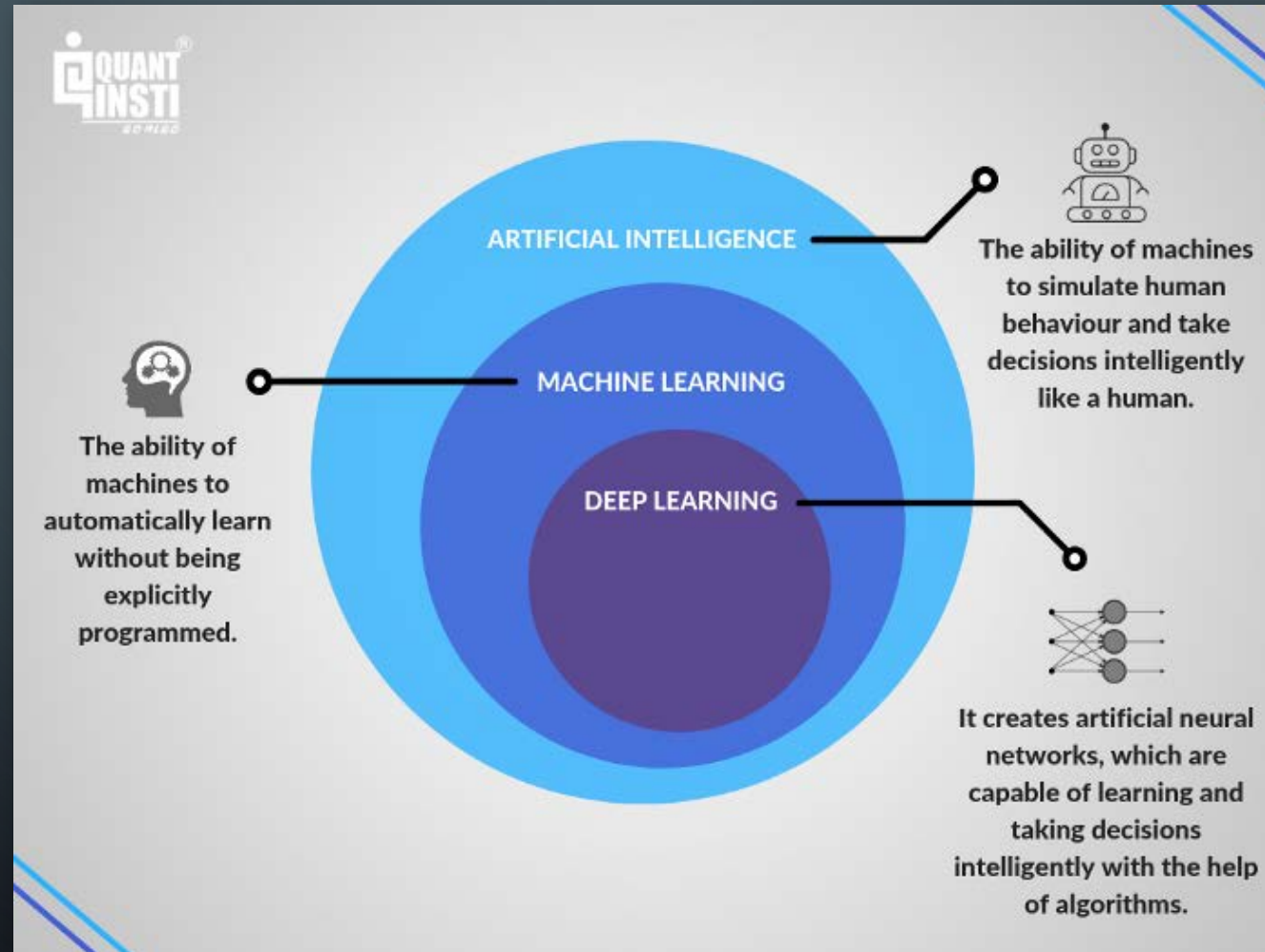
- Multivariate Calculus

- Other…

WHAT IS MACHINE LEARNING?

- Field of study that gives "computers the ability to learn without being explicitly programmed" (Arthur Samuel, 1959)

- A computer program is said to **learn** from experience E with respect to some class of task T and performance measure P, if its performance at task T, as measured by P, improves with experience E. (Tom Mitchell 1997)

WHAT IS MACHINE LEARNING?

WHAT IS MACHINE LEARNING

USAGES

Detection
- Text & Speech
- Image interpretation
- Human behavior & identity
- Abuse & Fraud

Prediction
- Recommendations
- Individual behavior & condition
- Collective behavior
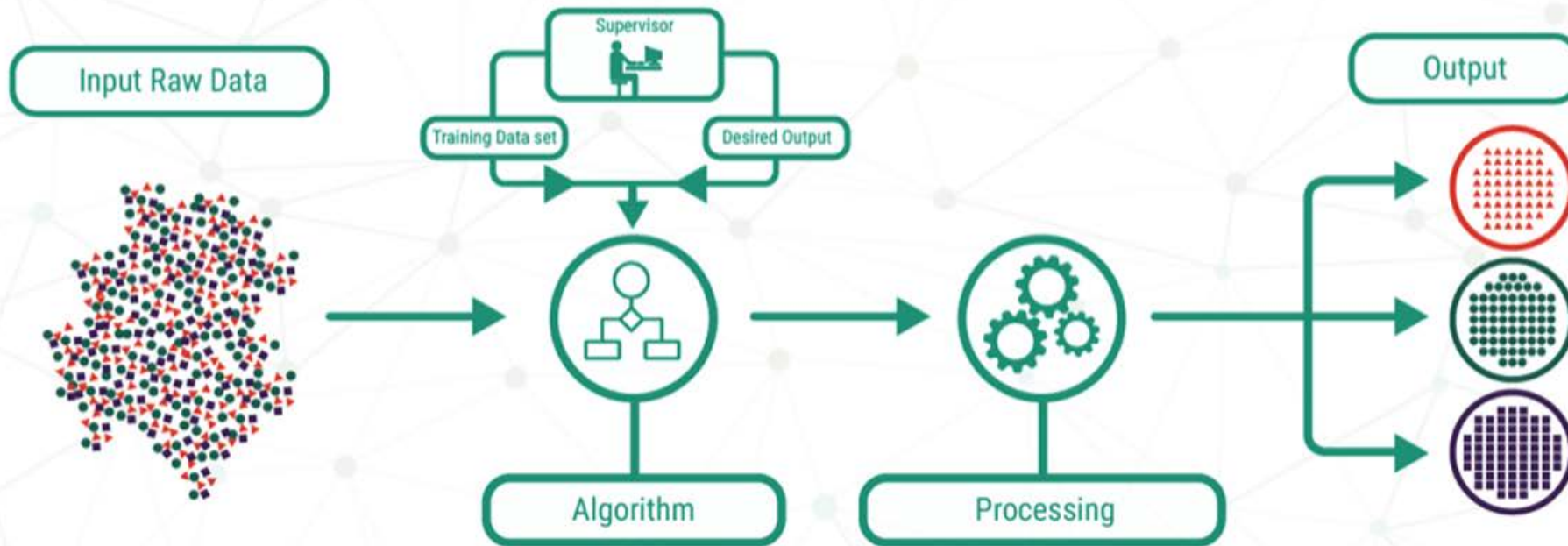
Generation
- Visual art
- Music
- Text
- Design

TYPES OF MACHINE LEARNING

- Supervised Learning
- Unsupervised Learning
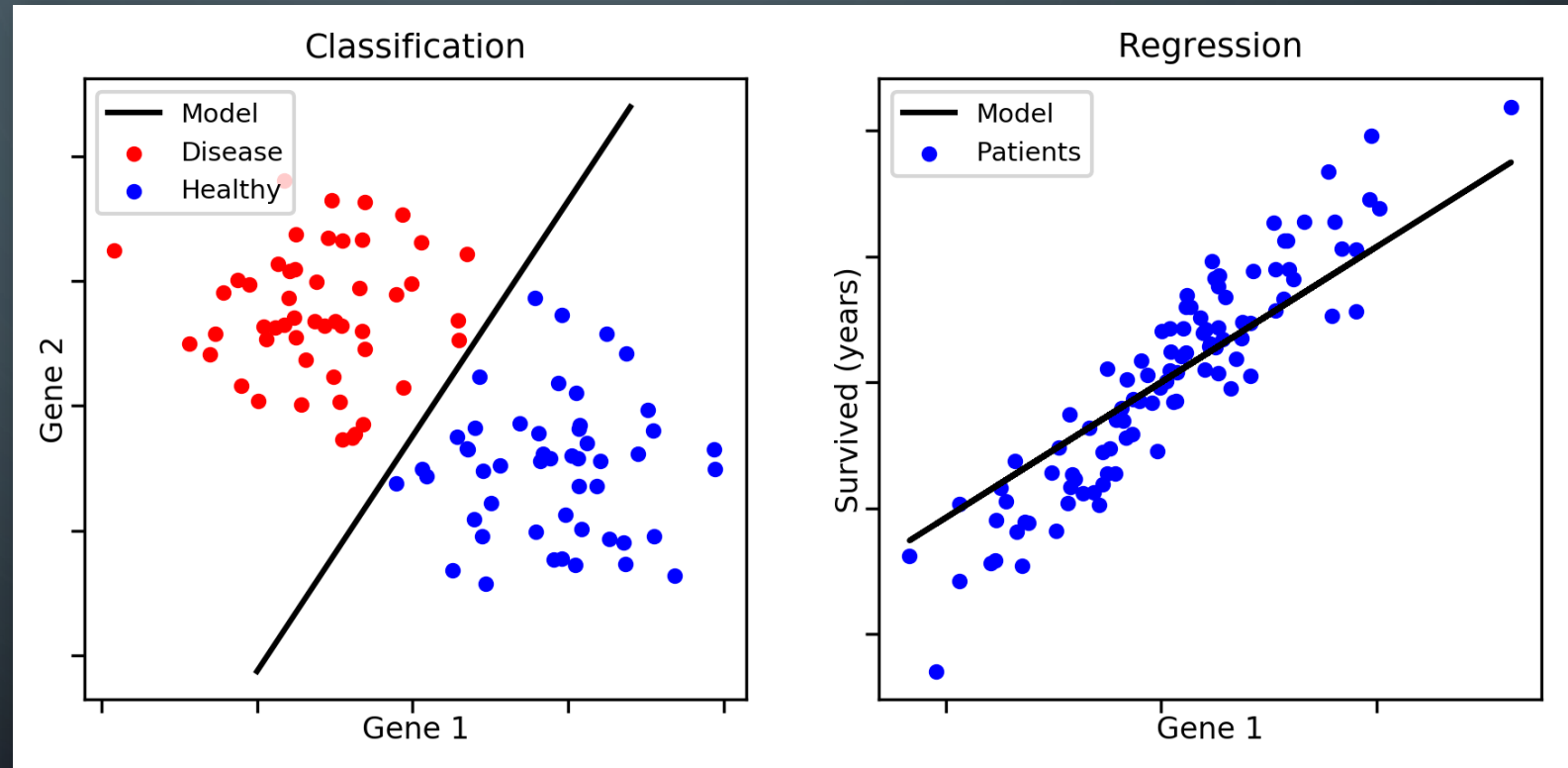- Semi-Supervised Learning
- Reinforcement Learning

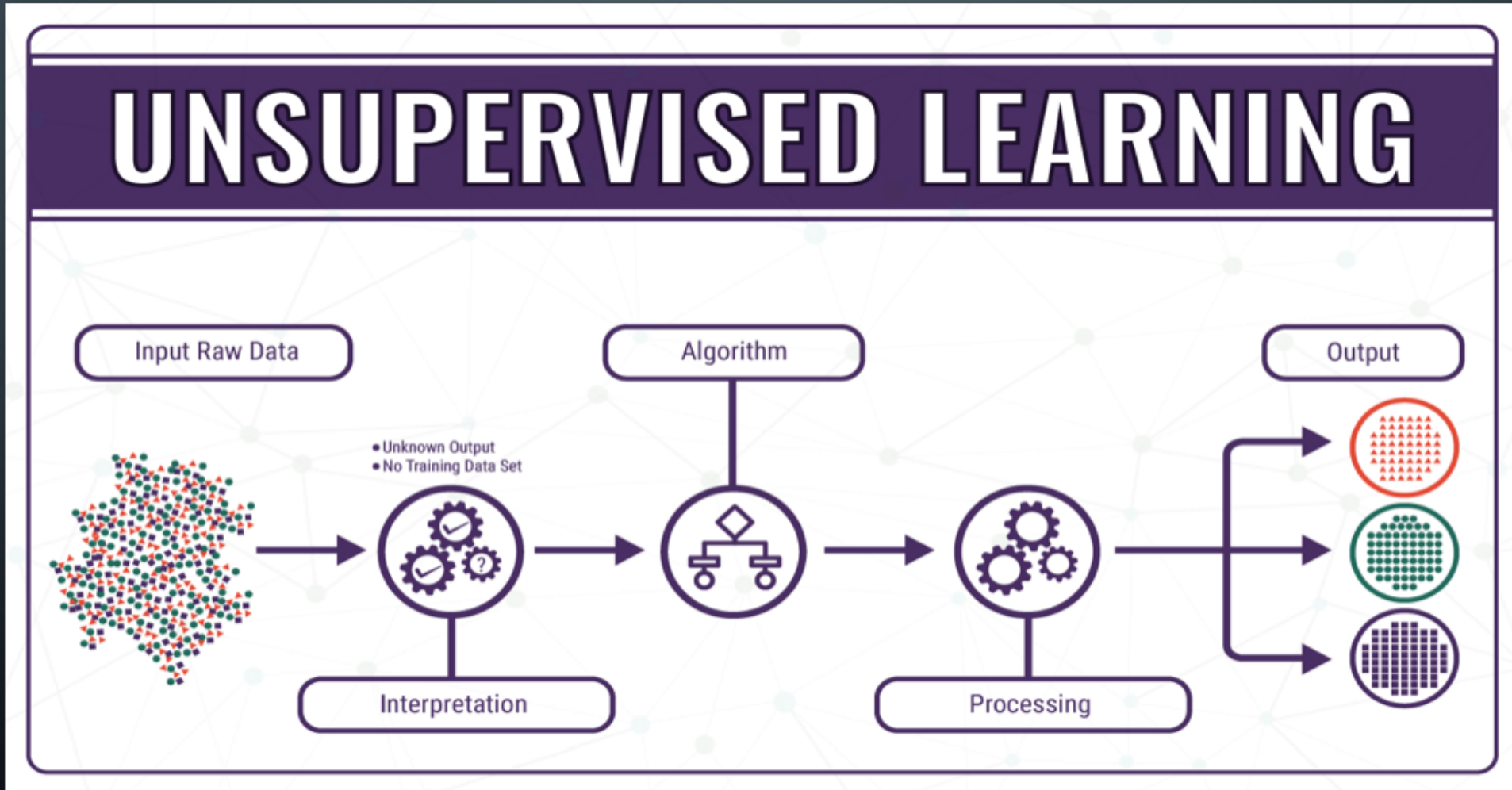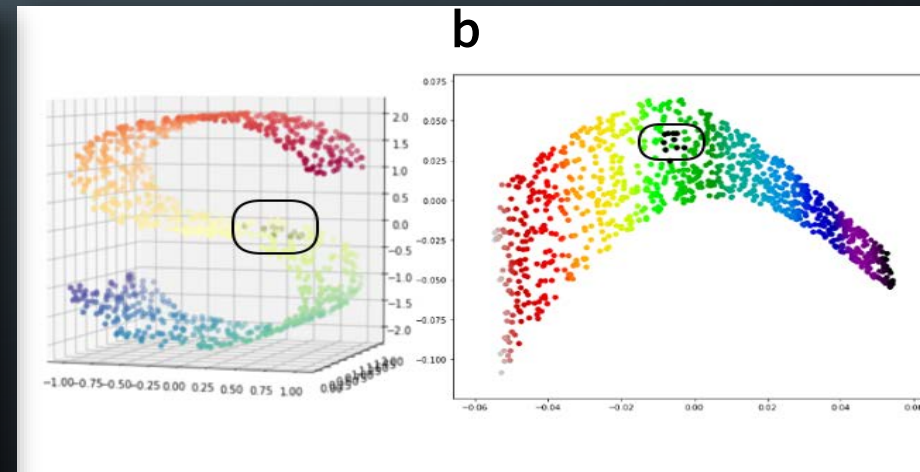# SUPERVISED LEARNING

SUPERVISED LEARNING
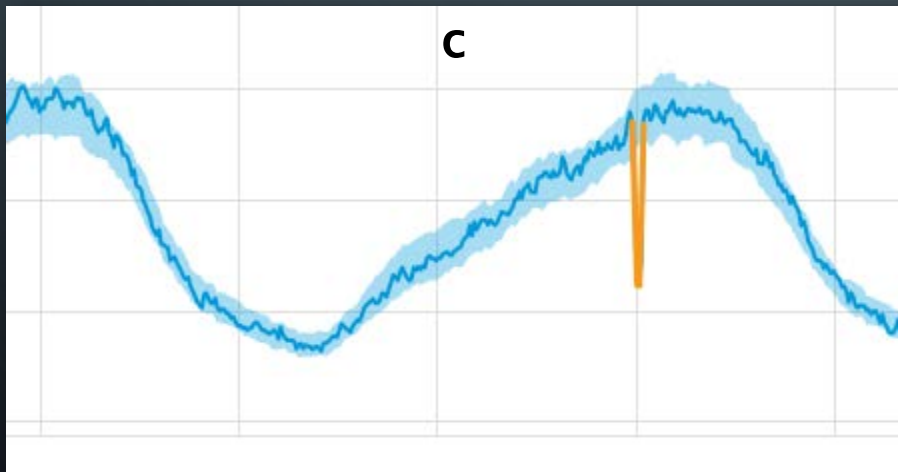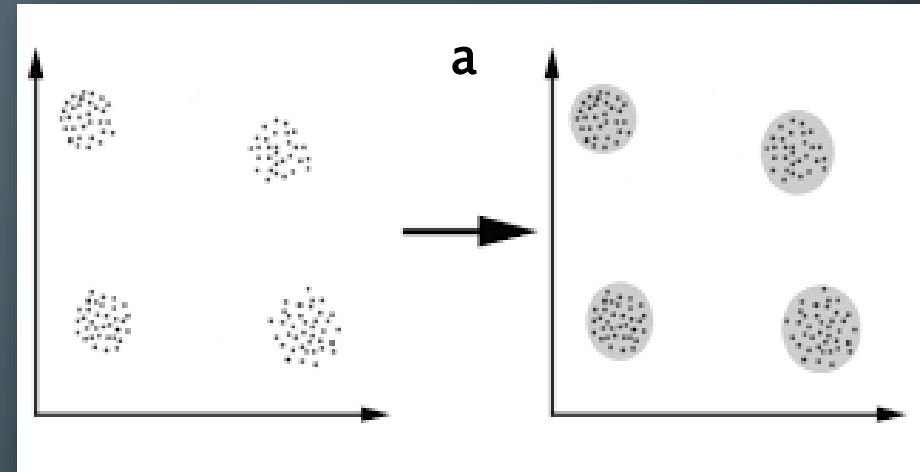
- Regression
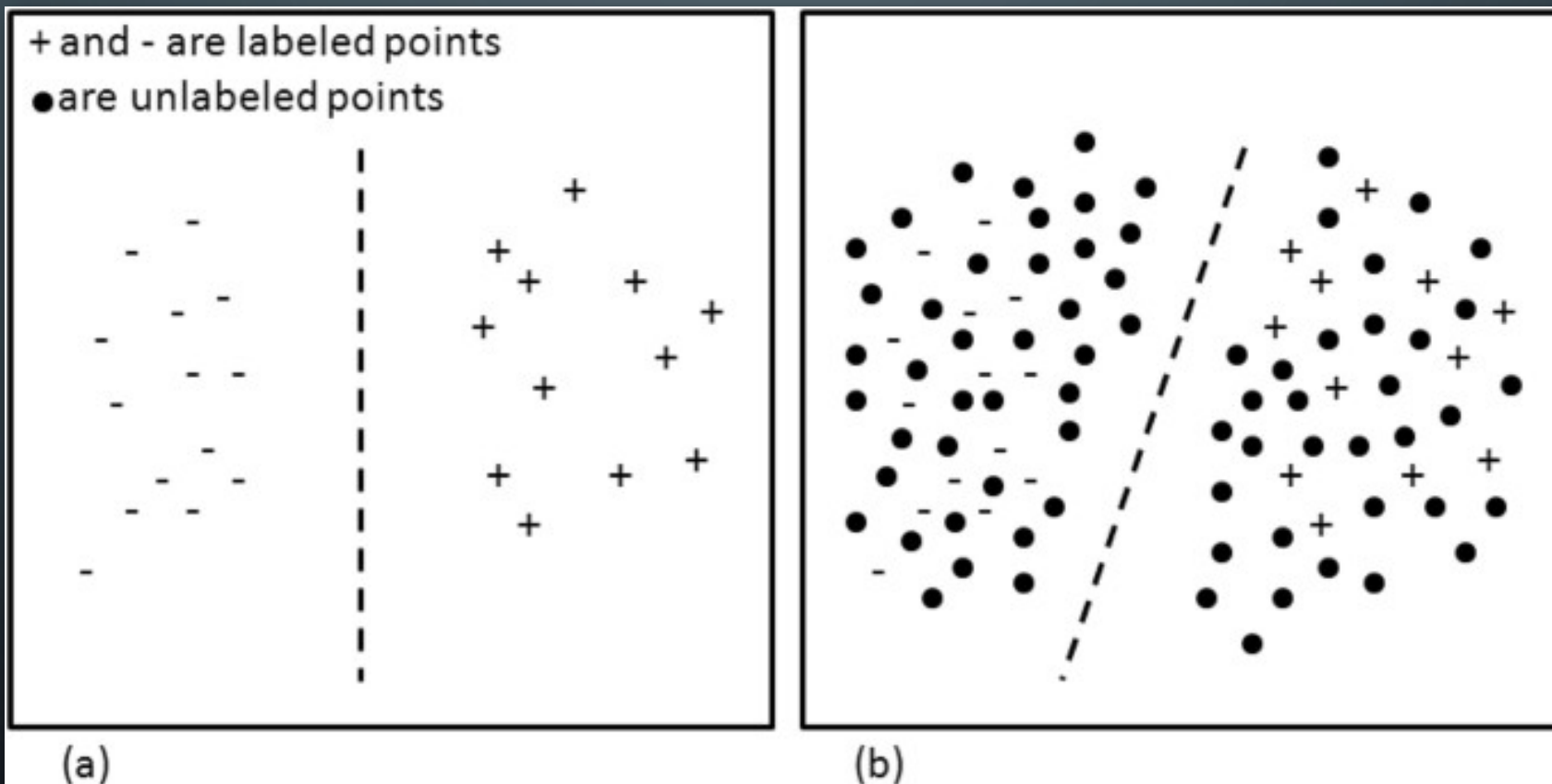- Classification

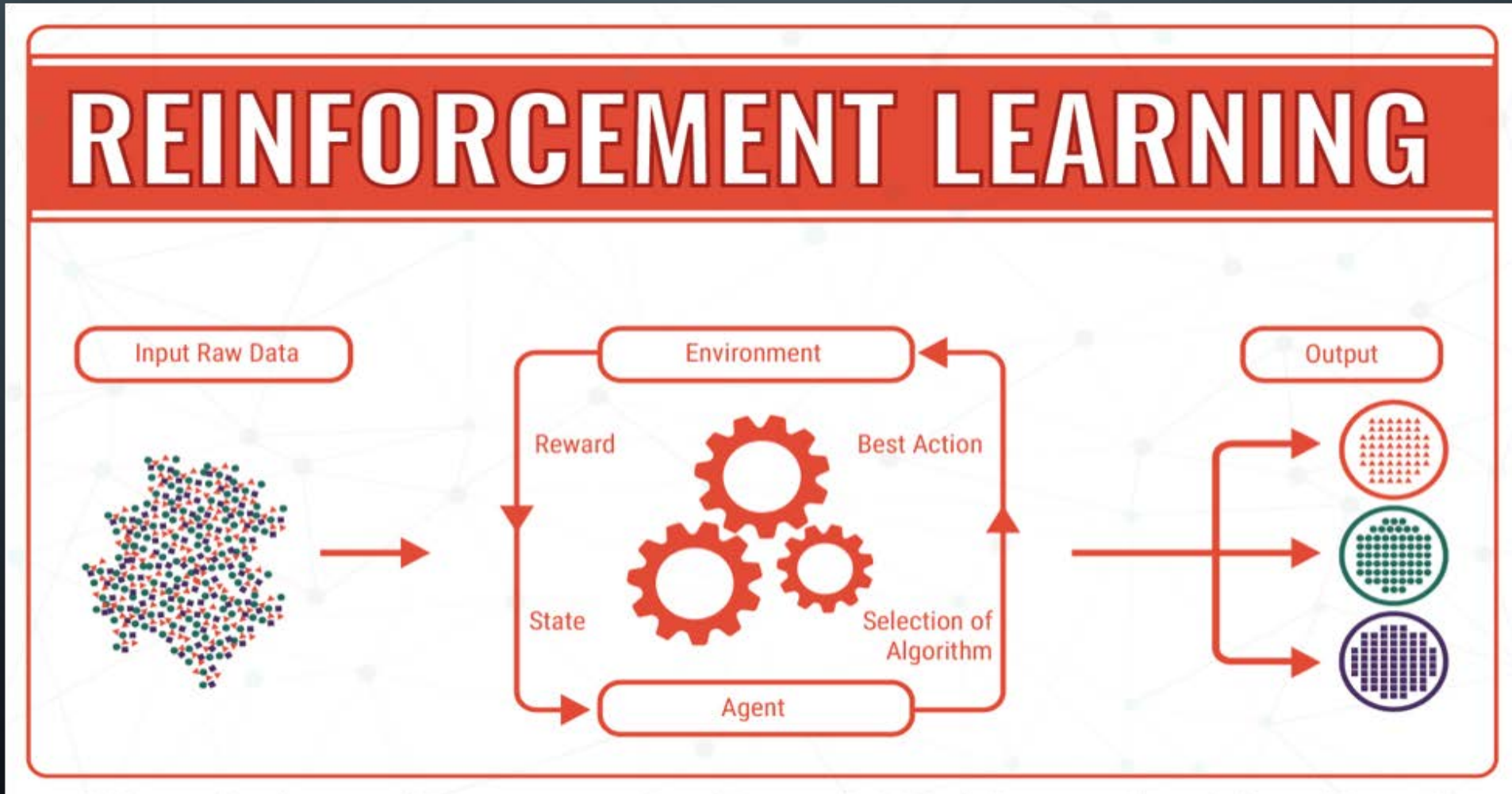# UNSUPERVISED LEARNING

UNSUPERVISED LEARNING

- Clustering
- Dimensionality Reduction
- Anomaly Detection

SEMI–SUPERVISED LEARNING

REINFORCEMENT LEARNING

WHY ML? WHERE?

- You don't know what you are looking for
- You can't write program explicitly
- You can write program explicitly but performance is not satisfactory
- Data is dynamic and it changes over time
- There is more than one solution