

Intro to **AI**



Software Engineering Dept.
Salahaddin University-Erbil



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Artificial Intelligence (AI) is the creation of machines that can think, learn, and make decisions like humans, using technologies such as machine learning and natural language processing. It enables machines to perform tasks that require human.

Foundations of AI



Mathematics:

- Statistics
- Probability
- Calculus
- Linear Algebra

Foundations of AI

Computer Science

- Programming
- Data Structures
- Algorithms
- Software Development

Foundations of AI



Data Sets

- Collection
- Processing
- Analysis
- Management

4

3

2

1



History of **AI**

4

3

2

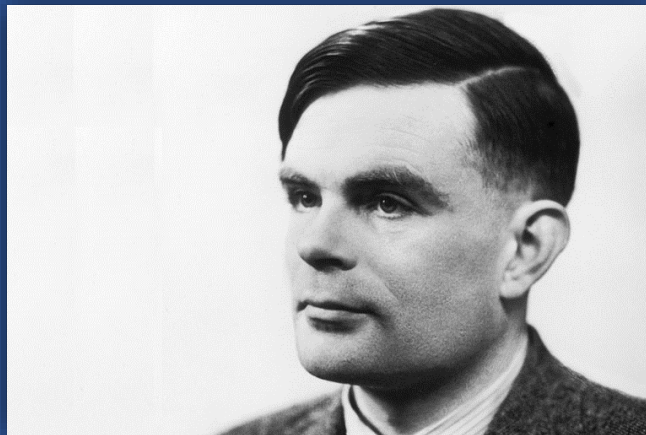
1950s

Theoretical Foundation

1950: Turing Test

1956: Logic Theorist

1956: Dartmouth Conference



History of

AI

1

4

3

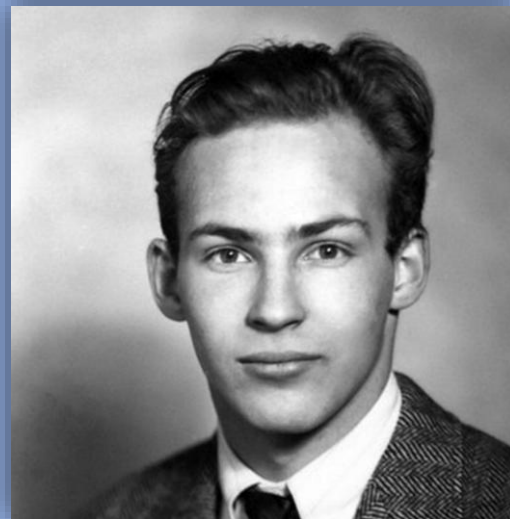
1960s

Early AI Programs

Early 1960s: Perceptrons

1964: ELIZA

Late 1960s: Shakey the Robot



2

1

History of **AI**

4

1990s

Machine Learning

1995: Support Vector Machines

1997: Boosting Algorithms

1997: Long Short-Term Memory



3

2

1

History of

AI

2010s

Deep Learning

2012: AlexNet

2014: Generative Adversarial Net

2015: Residual Networks



4

3

2

1

History of

AI

**So, What made the
Deep Learning
Revolution
happen?**



**So, What made the
Deep Learning
Revolution
happen?**





PASCAL



TURING TENSOR CORES

FP16



TURING TENSOR CORES

INT8



TURING TENSOR CORES


INT4





THANK YOU!

Engineering and **AI**

The background of the slide features a conceptual illustration. On the left, a white and blue robotic hand is shown in profile, reaching towards the center. On the right, a human hand is shown in profile, also reaching towards the center. Between the two hands is a glowing, spherical wireframe structure composed of interconnected nodes and lines, resembling a globe or a data sphere. The sphere is surrounded by faint, glowing lines and particles, suggesting a digital or networked environment. The overall color palette is light blue and white, with a soft, ethereal glow emanating from the central sphere.

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Engineering and **AI**



Software Engineering Dept.
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Machine Learning

Natural Language
Processing

Computer Vision

Robotics

Expert Systems

Neural Networks and
Deep Learning

AI Disciplines



Machine Learning

Focuses on developing algorithms that enable computers to learn from and make predictions or decisions based on data.

Natural Language
Processing

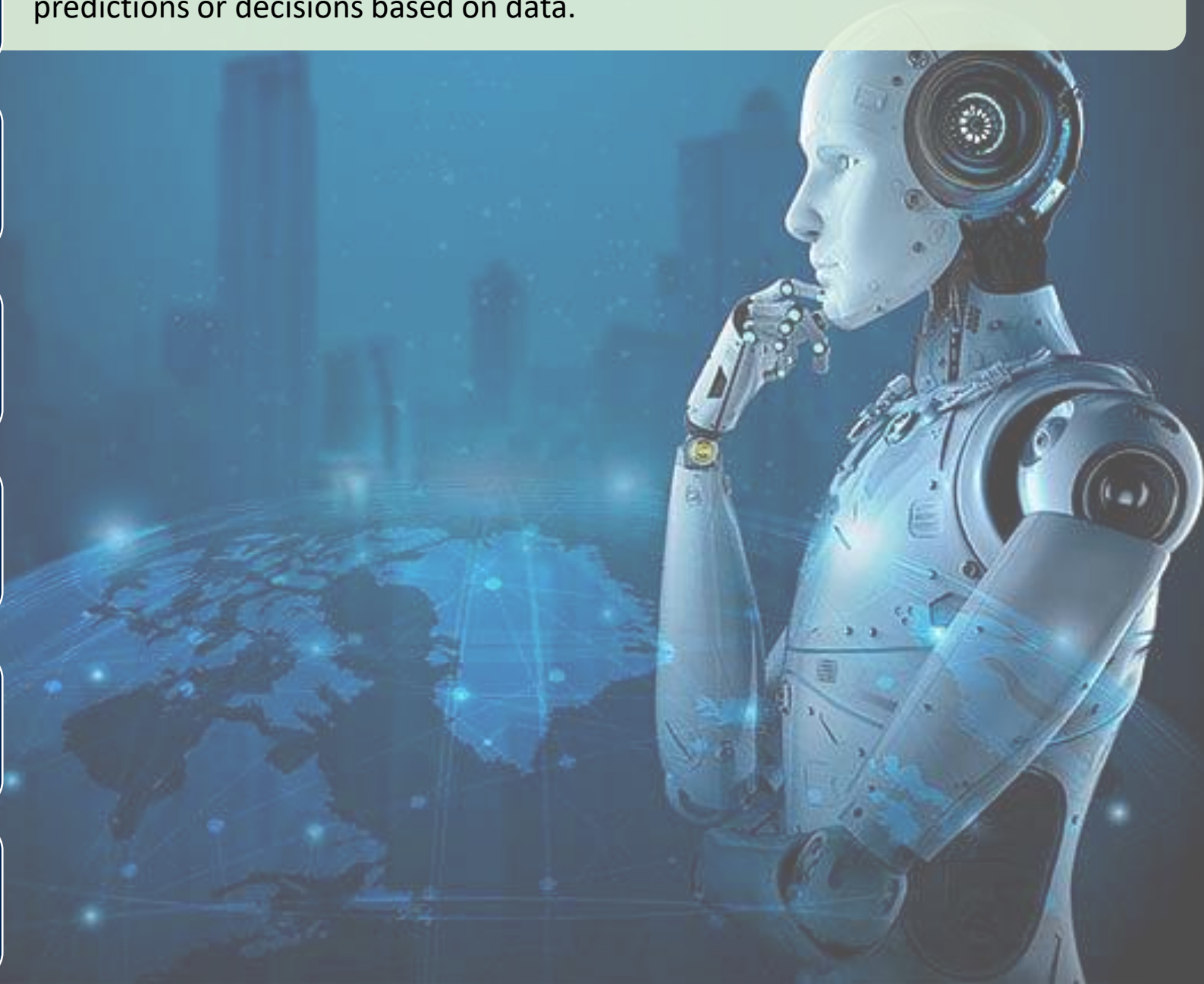
Computer Vision

Robotics

Expert Systems

Neural Networks and
Deep Learning

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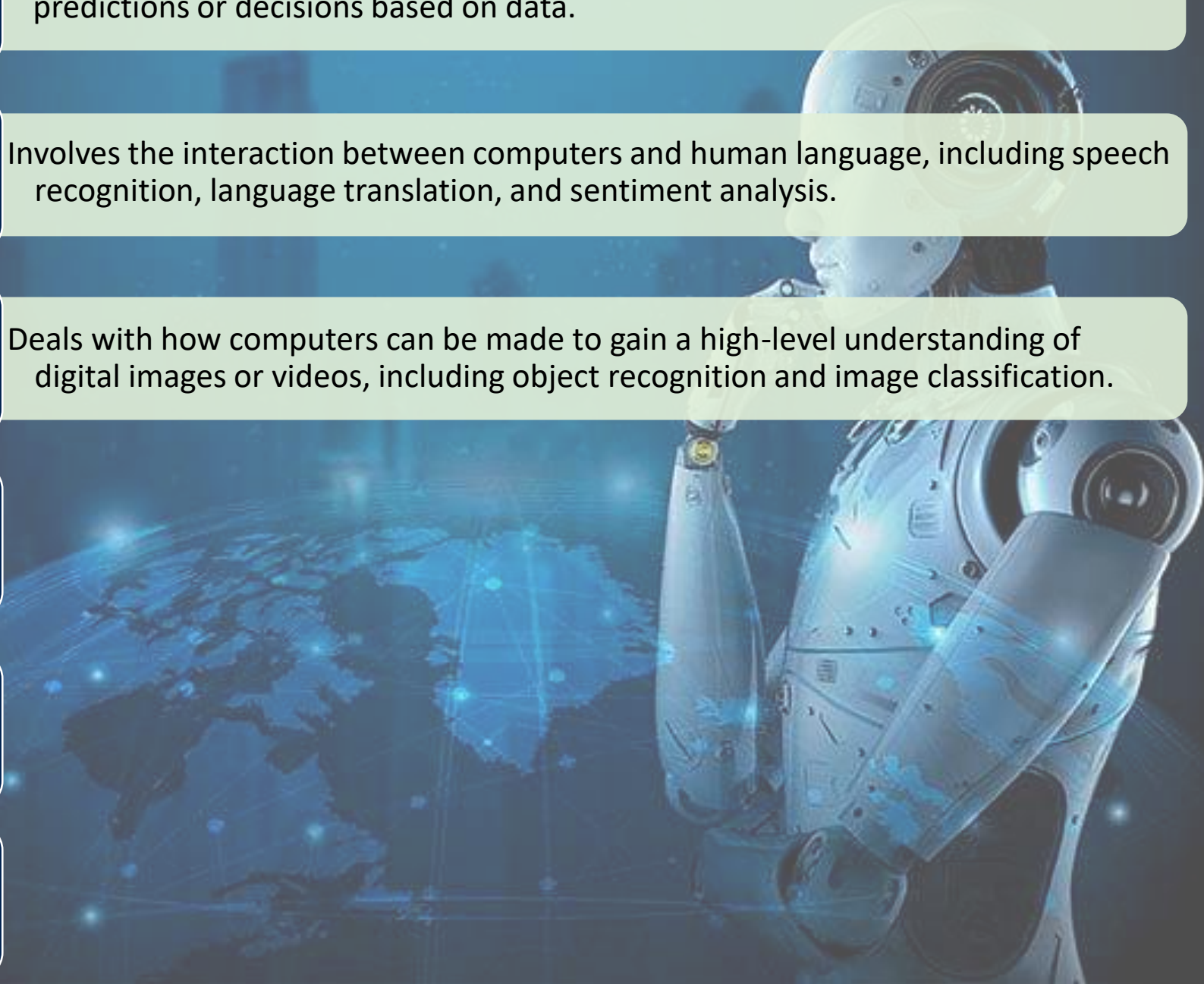
Deals with how computers can be made to gain a high-level understanding of digital images or videos, including object recognition and image classification.

Robotics

Expert Systems

Neural Networks and Deep Learning

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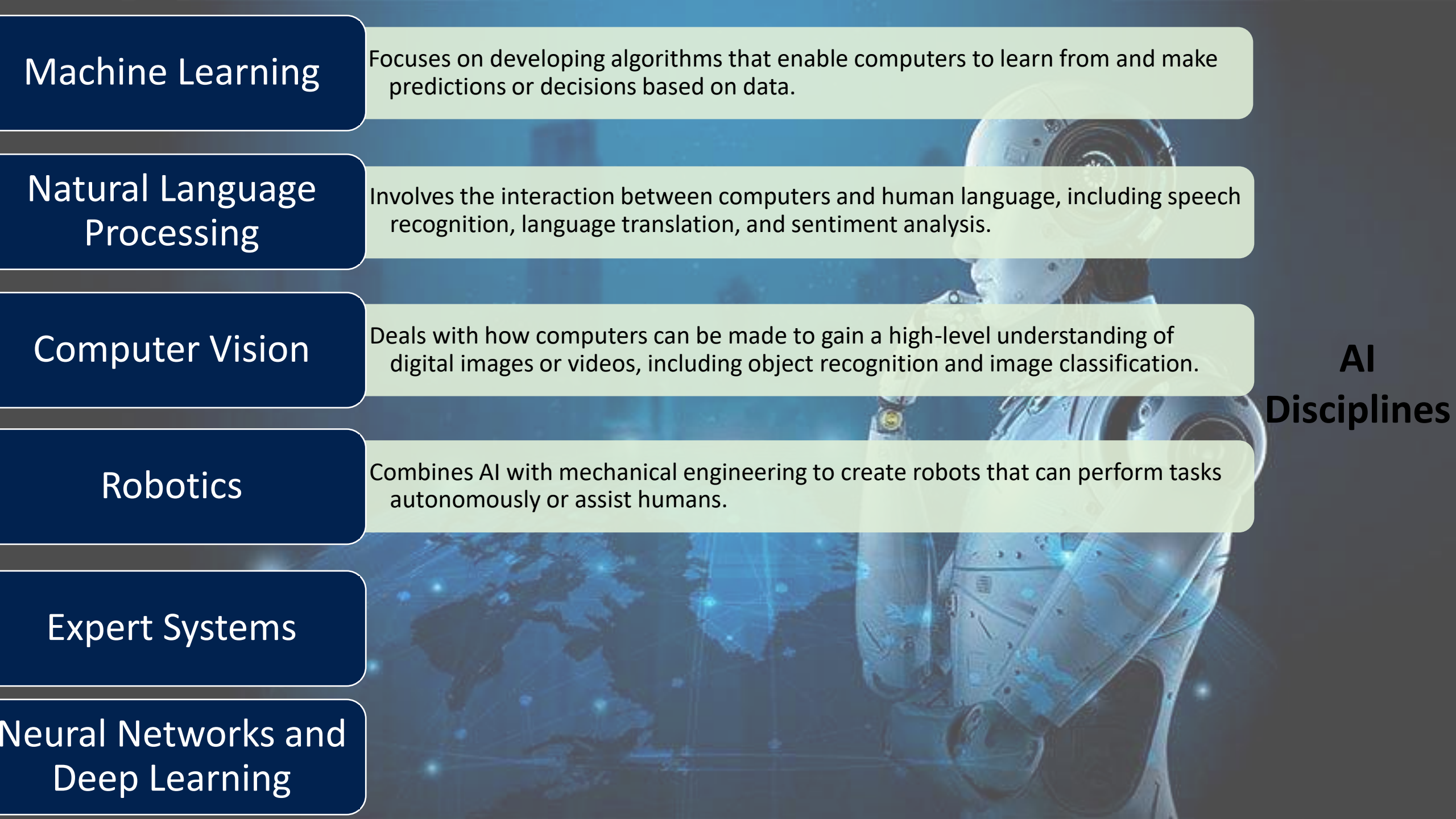
Robotics

Combines AI with mechanical engineering to create robots that can perform tasks autonomously or assist humans.

Expert Systems

Neural Networks and Deep Learning

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Neural Networks and Deep Learning

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Neural Networks and Deep Learning

Focuses on algorithms inspired by the structure and function of the brain, which are particularly effective for complex tasks like image and speech recognition.

**AI
Disciplines**



Supervised Learning



Unsupervised Learning



Reinforcement Learning



Deep Learning

AI and Language

Mechanical
Engineering

Electrical
Engineering

Aerospace
Engineering

Civil
Engineering

Chemical
Engineering

Architecture
Engineering

Predictive Maintenance

Urban Planning

Material Science

Robotics

Construction Planning

Smart Grids

Automation

Environmental Monitoring

Simulation and Design

Construction Mangmnt

Energy Efficiency

Autonomous Aircraft

Flight Simulation

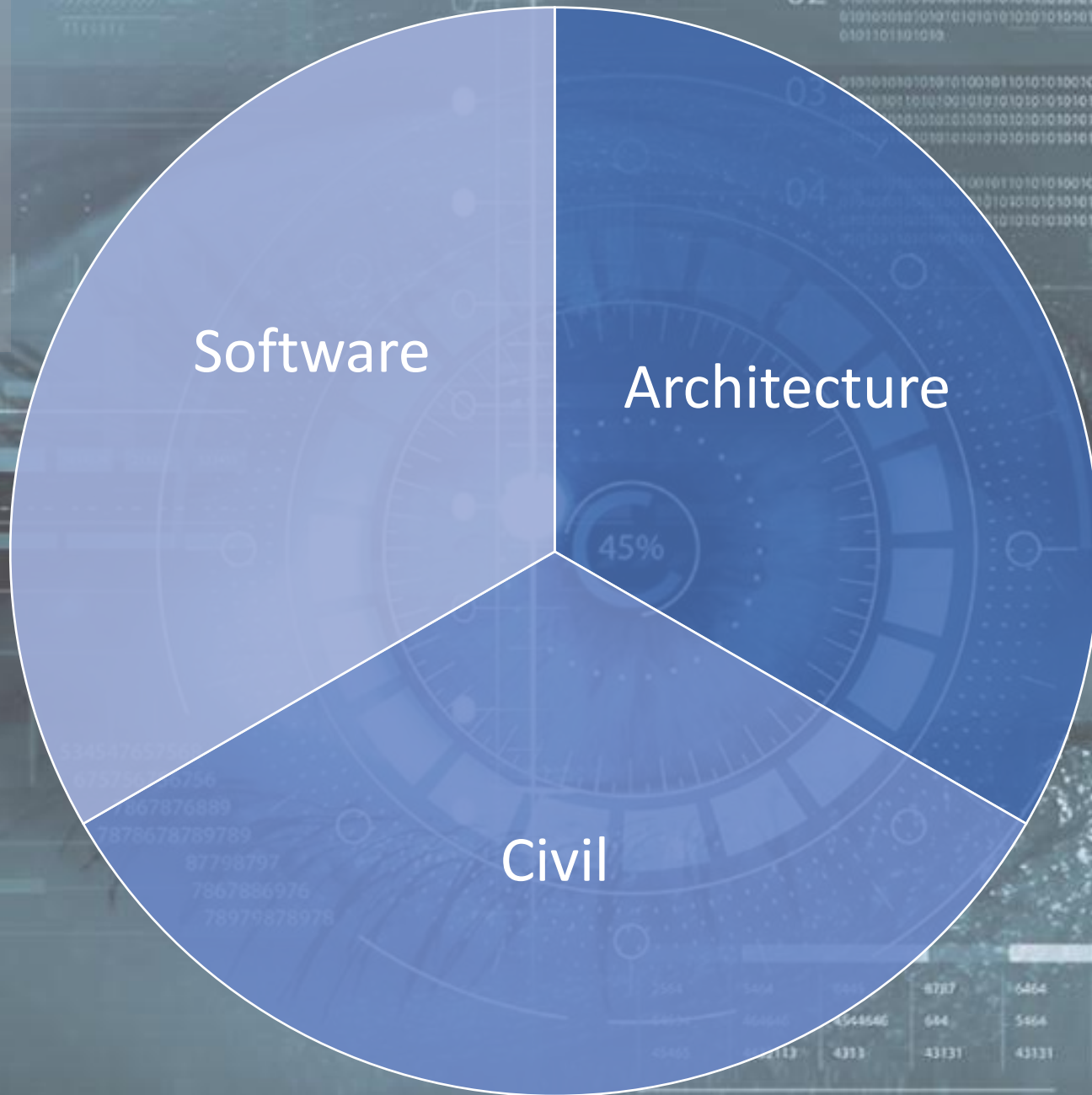
Signal Processing

Infrastructure Analysis

Process Optimization

Generative Design

Urban Planning

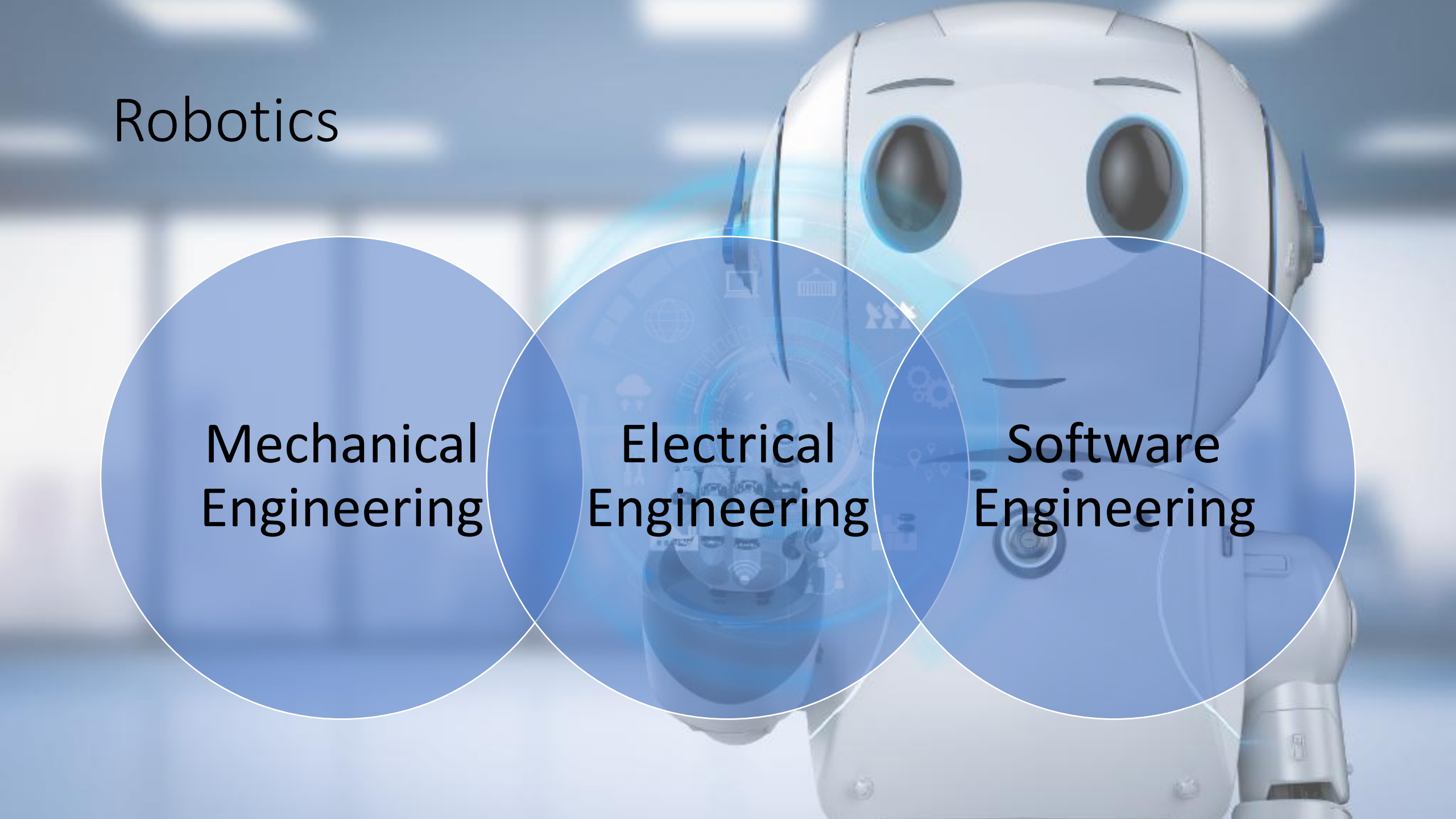


Robotics

Mechanical
Engineering

Electrical
Engineering

Software
Engineering





Falls Detection in a Wheelchair Using Wearable IMU Sensor and Machine Learning Techniques



**Optimization of parameters in rotary
friction welding process of dissimilar
austenitic and ferritic stainless steel
using finite element analysis**

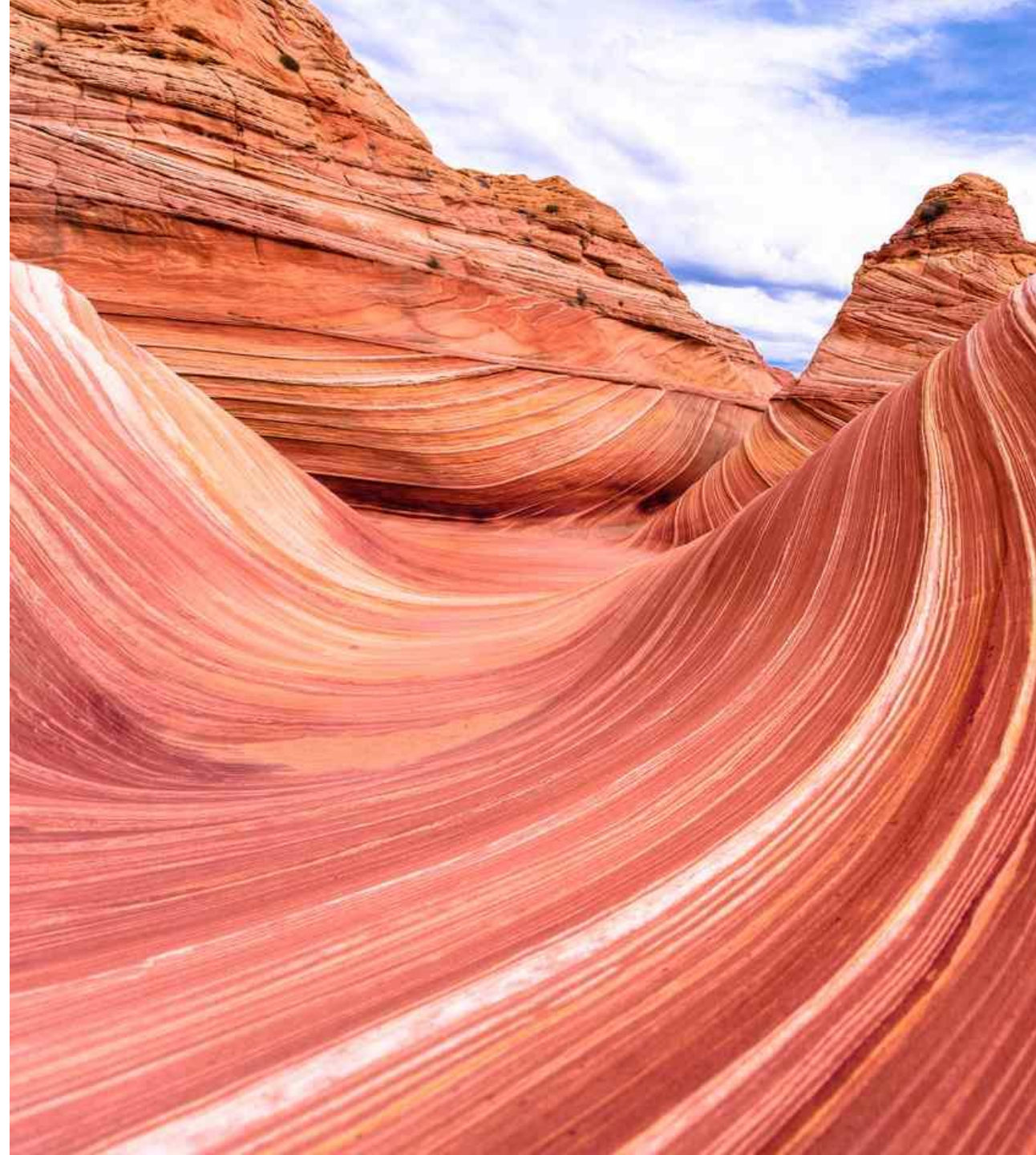




Road Pothole Detection Using Unmanned Aerial Vehicle Imagery and Deep Learning Technique



Forecasting Failure Load of Sandstone under different Freezing- Thawing Cycles using Gaussian Process Regression Method and Grey Wolf Opti

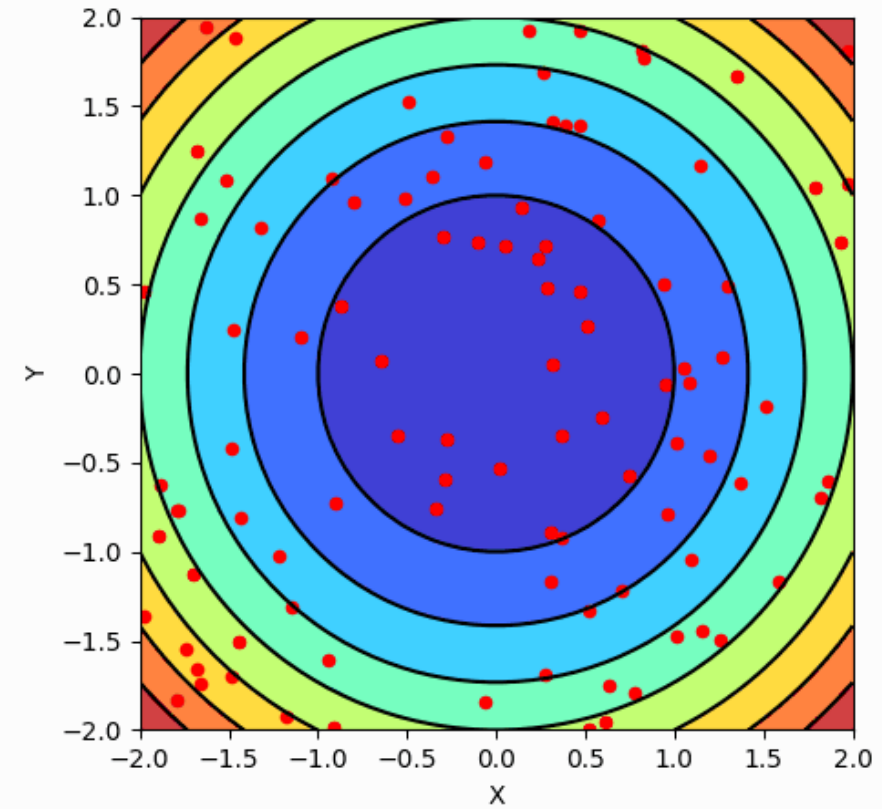
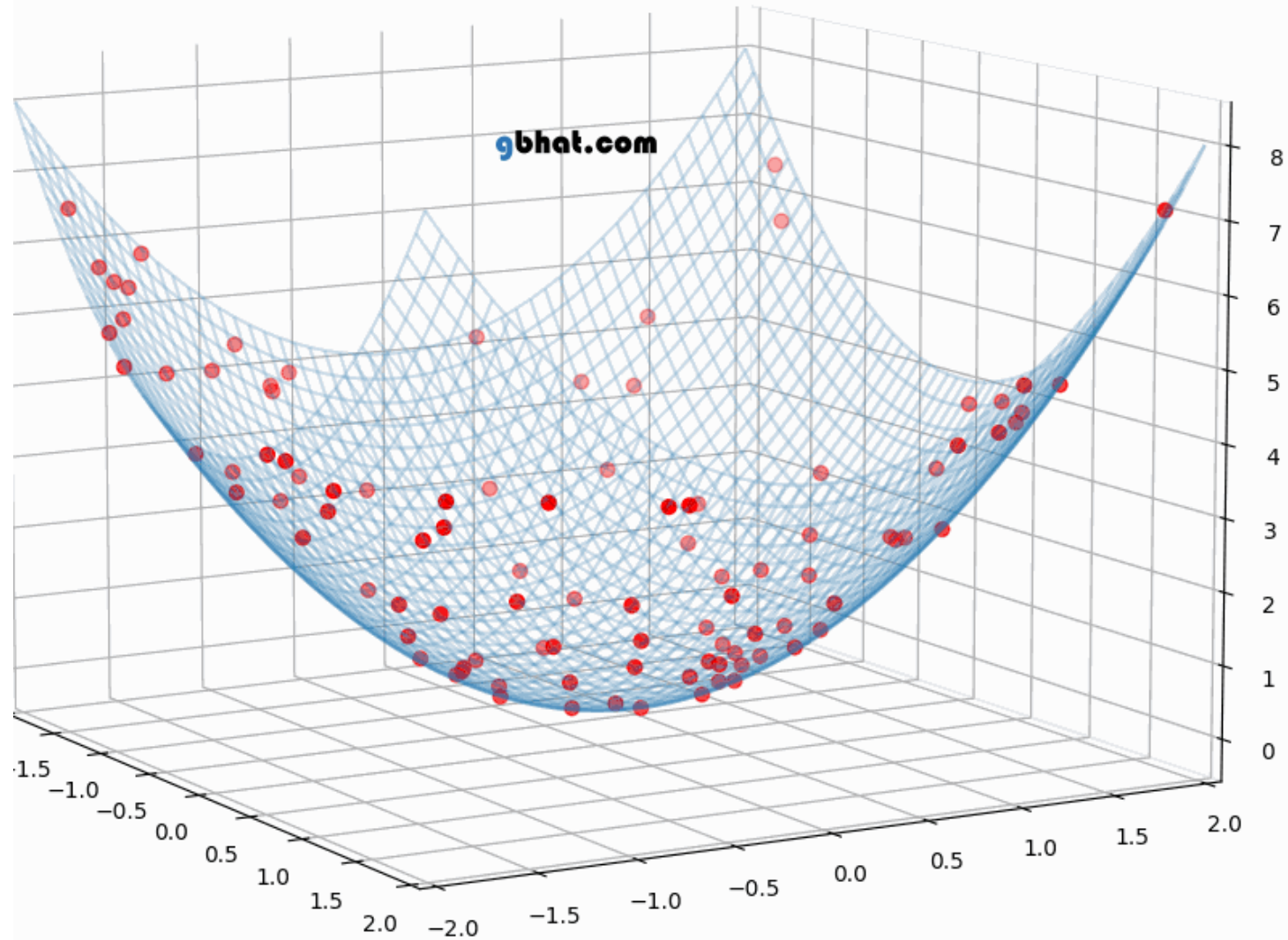




**DETERMINATION OF OPTIMAL SIZE AND
LOCATION OF STATIC SYNCHRONOUS
COMPENSATOR FOR POWER SYSTEM BUS
VOLTAGE IMPROVEMENT AND LOSS
REDUCTION USING WHALE OPTIMIZATION
ALGORITHM**



Optimization



Model Training

Deep Learning

Problem Solving

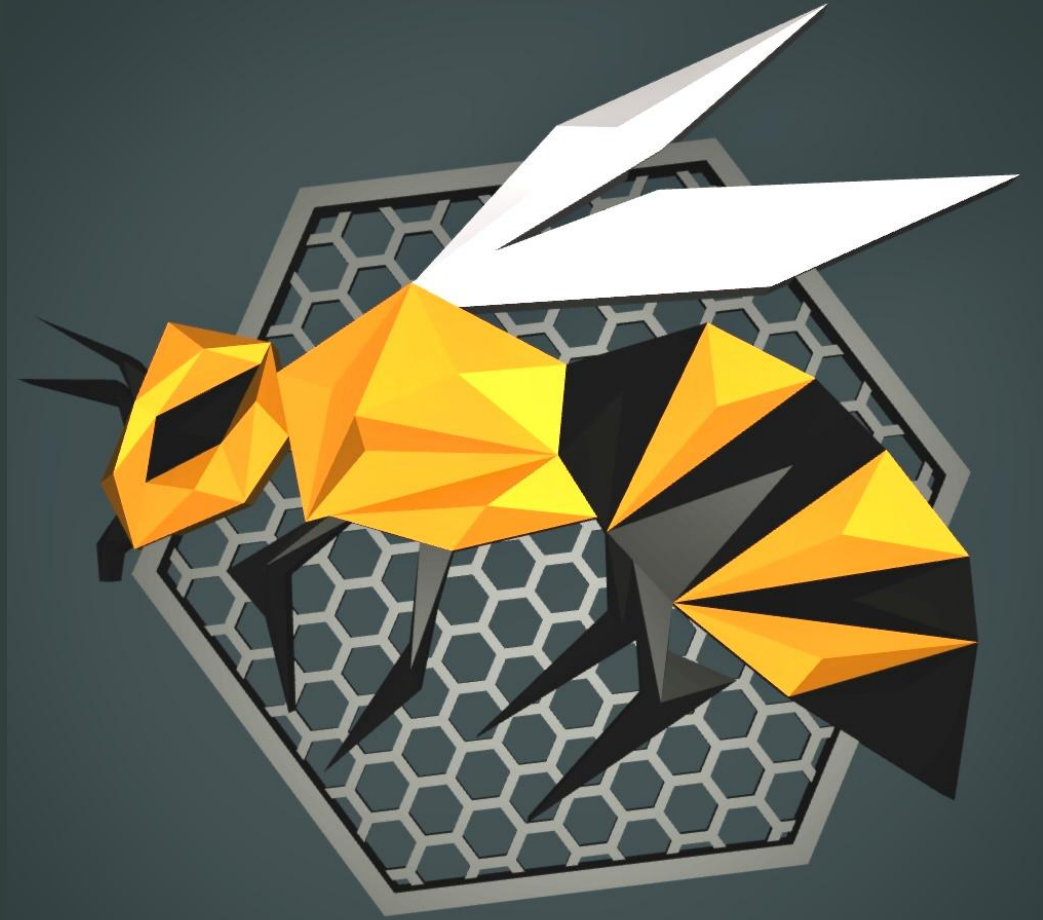
Importance of
Optimization

Feature
Selection

Hyperparameter
Tuning

Decision Making

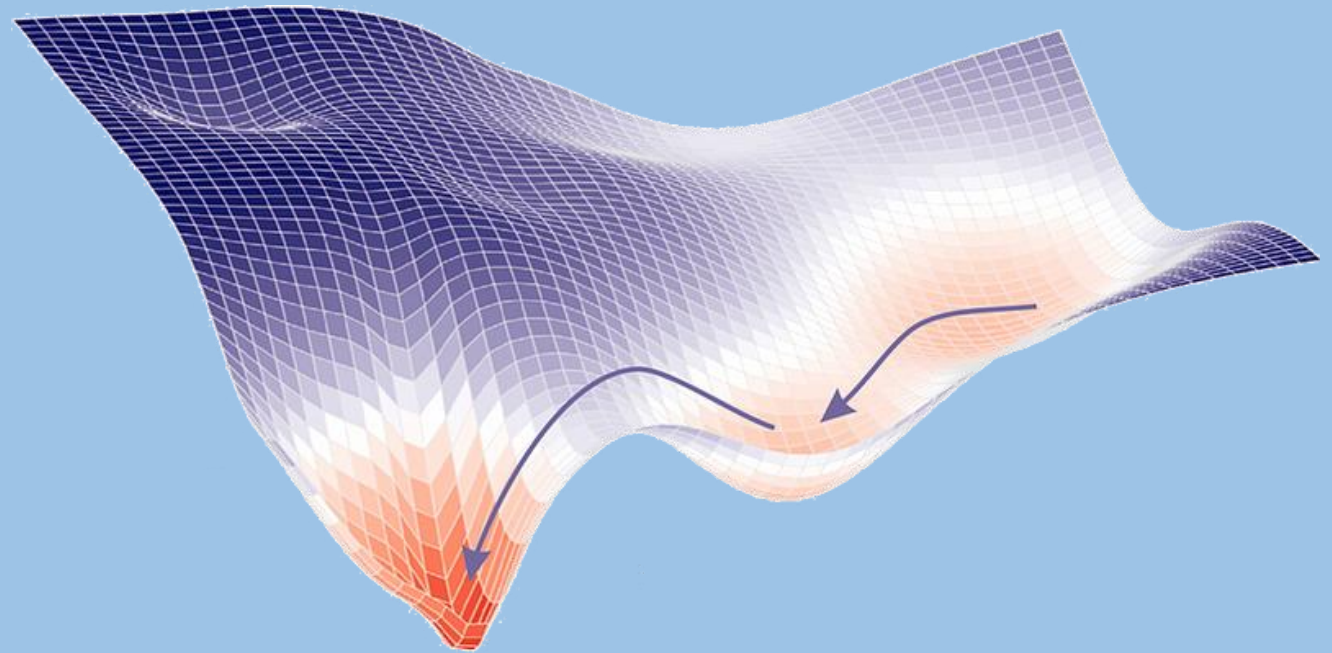
**Fitness dependent optimizer:
inspired by the bee swarming
reproductive process**



Gray Wolf Optimization



Gradient Descent is an optimization algorithm for finding a local minimum of a differentiable function



The **genetic algorithm** is a method for solving both constrained and unconstrained optimization problems that is based on natural selection, the process that drives biological evolution.



Supply Chain
Management



Logistics

Communication

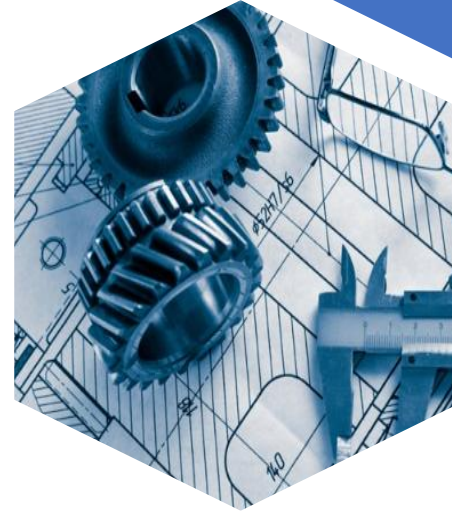


Problem Solving

Finance



Electrical



Mechanical



THANK YOU!