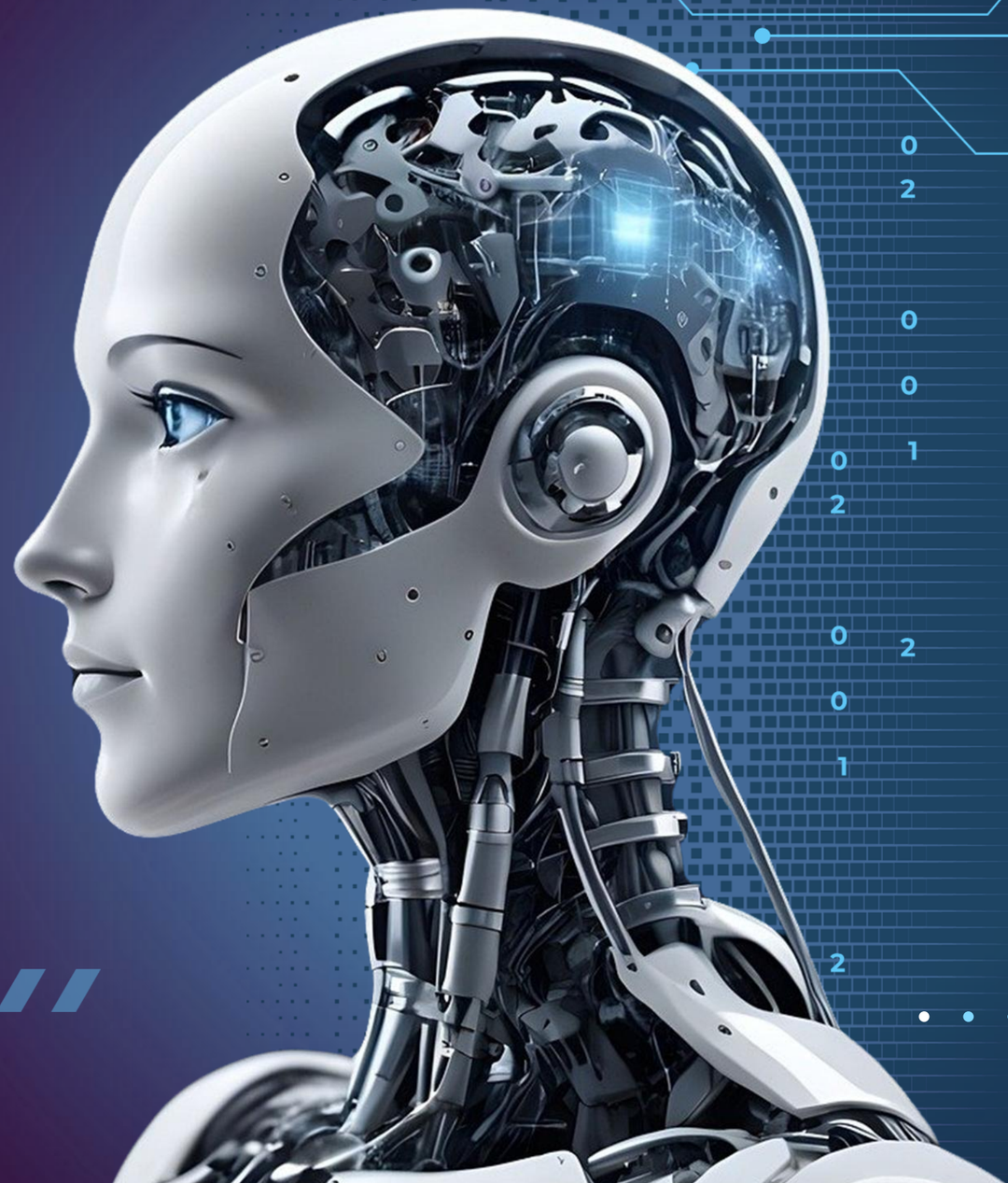
Artificial Intelligence in Medicine

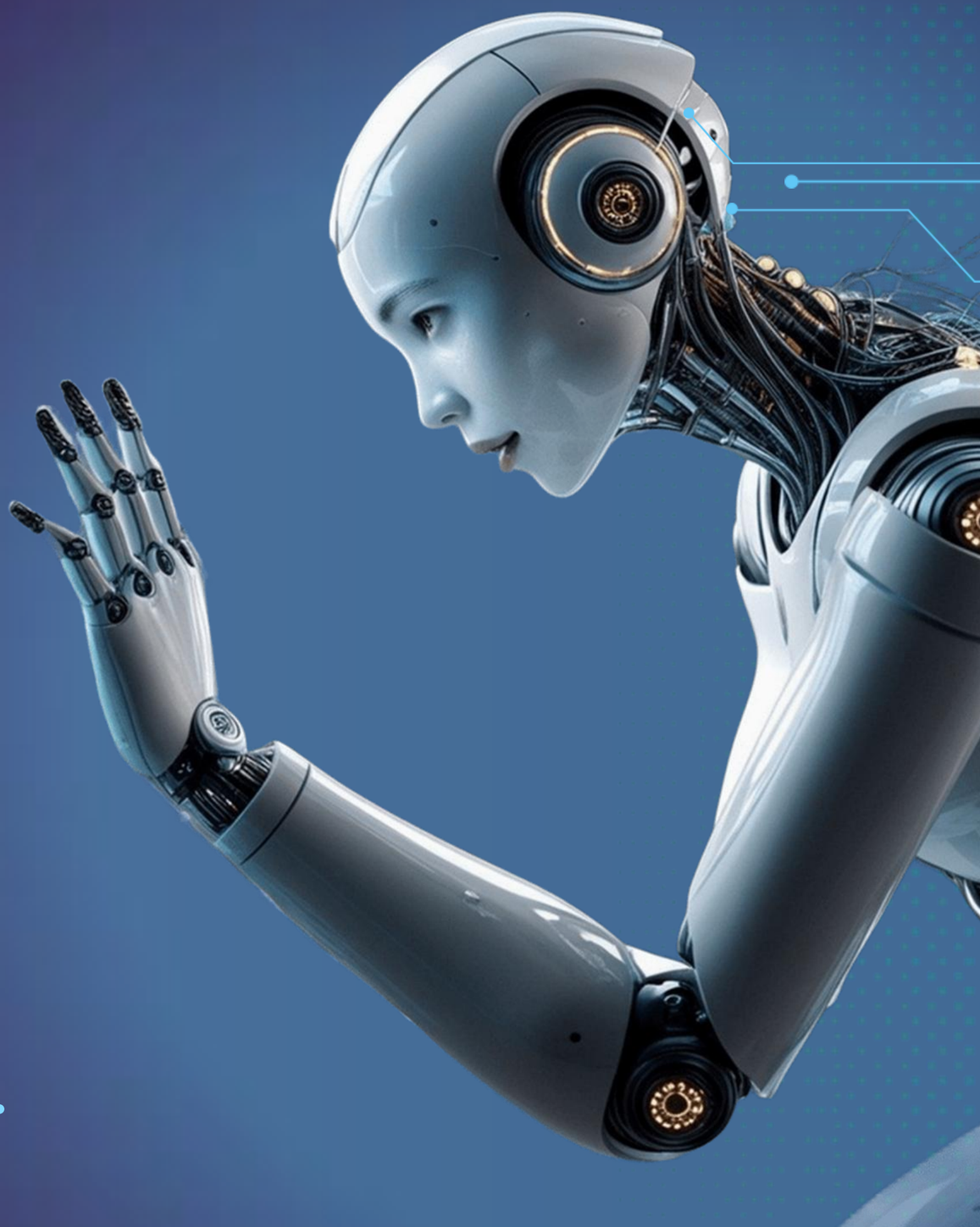
From Concept to Clinical Practice

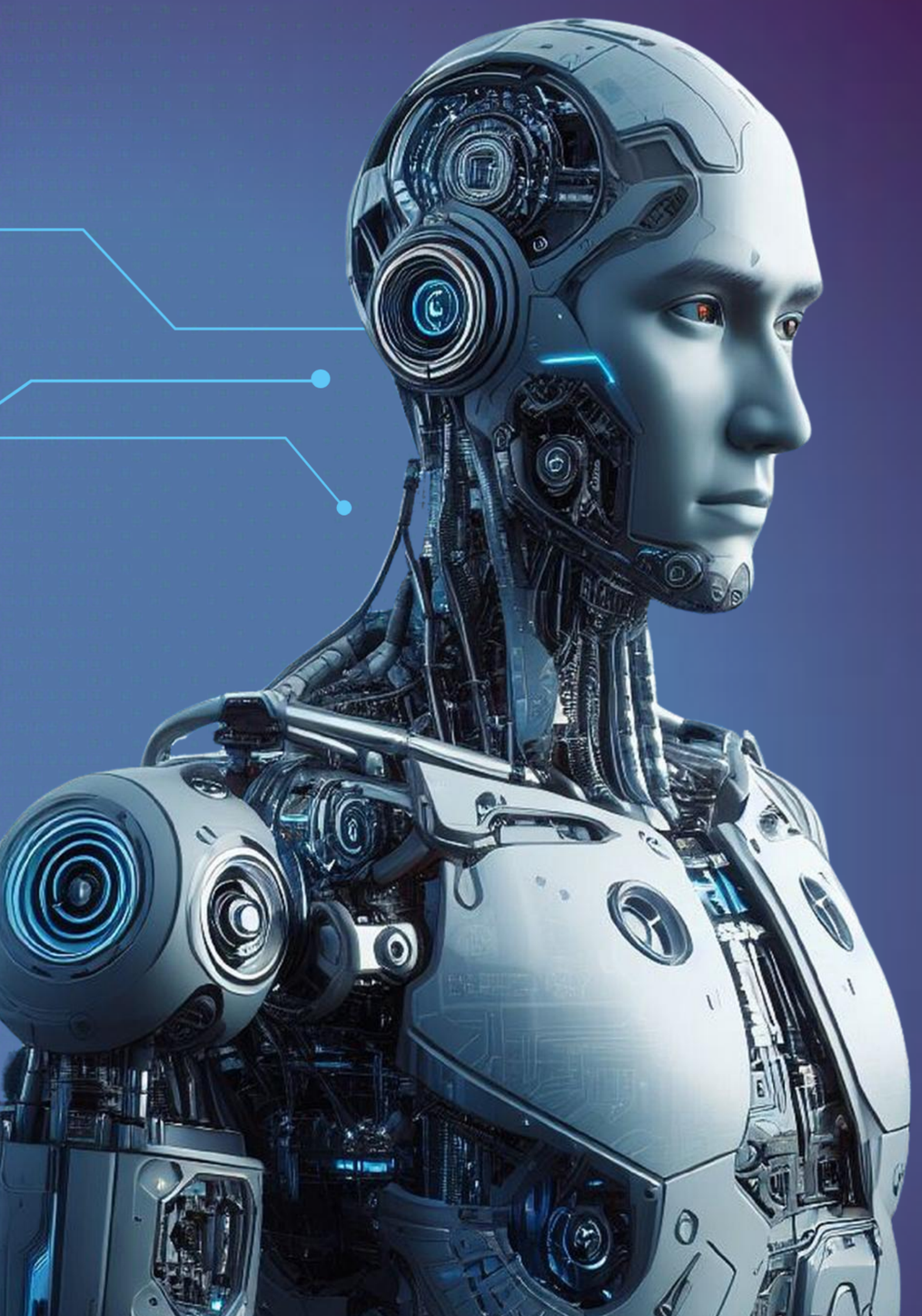
College of Pharmacy – University of Al-Ameed



Learning Objectives

- Understand core AI principles (data, algorithms, reasoning)
- Recognize major AI techniques (ML, DL, NLP, CV, Robotics)
- Identify clinical and pharmacy applications (diagnostics, therapy, safety)
- Explore limitations (data, ethics, real-world implementation)
- Debate ethical and legal issues (privacy, accountability)
- Predict the future impact on pharmacy roles





Introduction – AI in Everyday Life

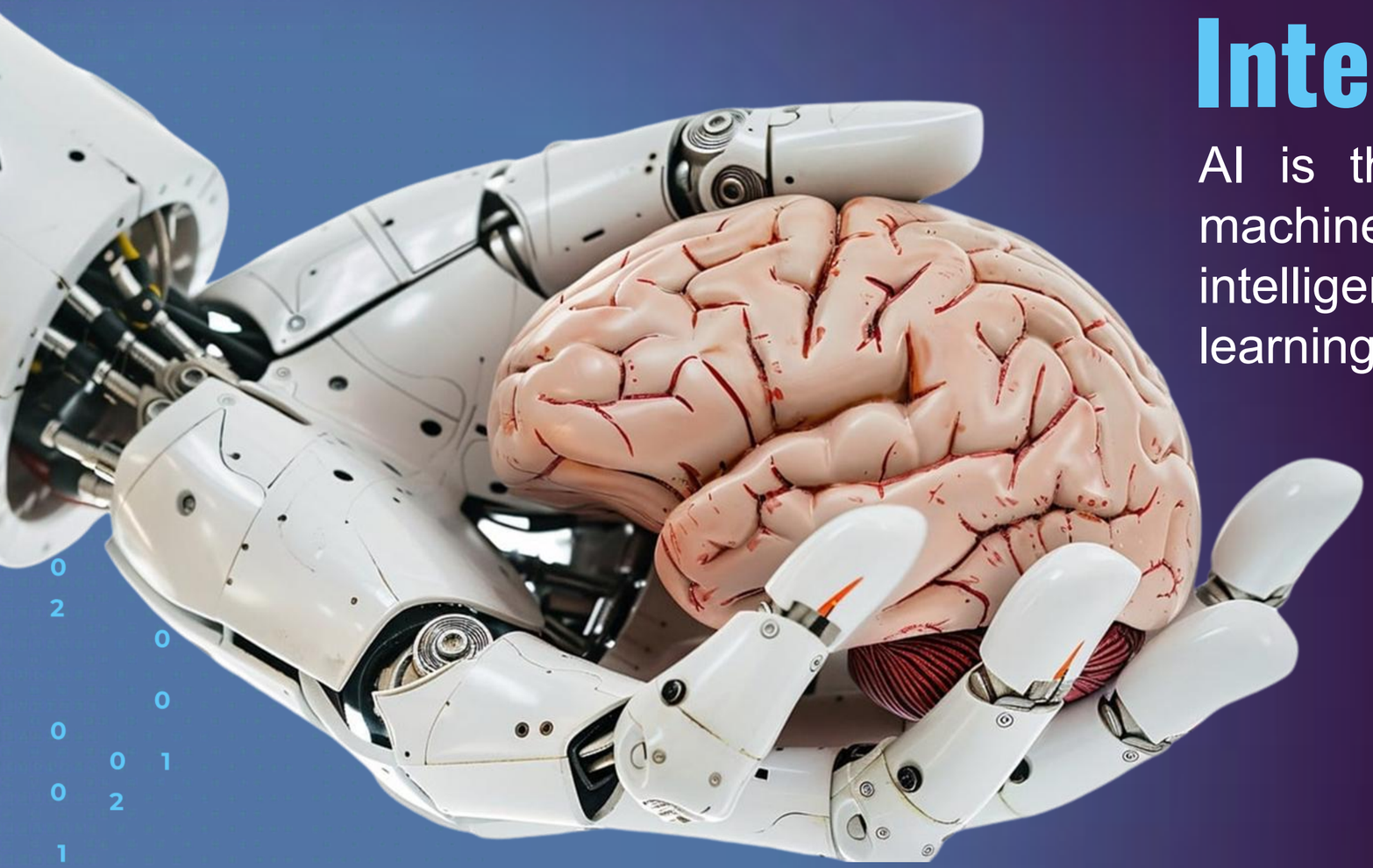
AI is everywhere: It powers voice assistants, recommends online shopping products, improves photos, and filters emails.

Healthcare: AI tracks fitness, reminds you to take medicine, and helps diagnose symptoms through apps and smart devices.

Transportation: Navigation apps use AI for the fastest routes, and ride-sharing services match drivers and riders.

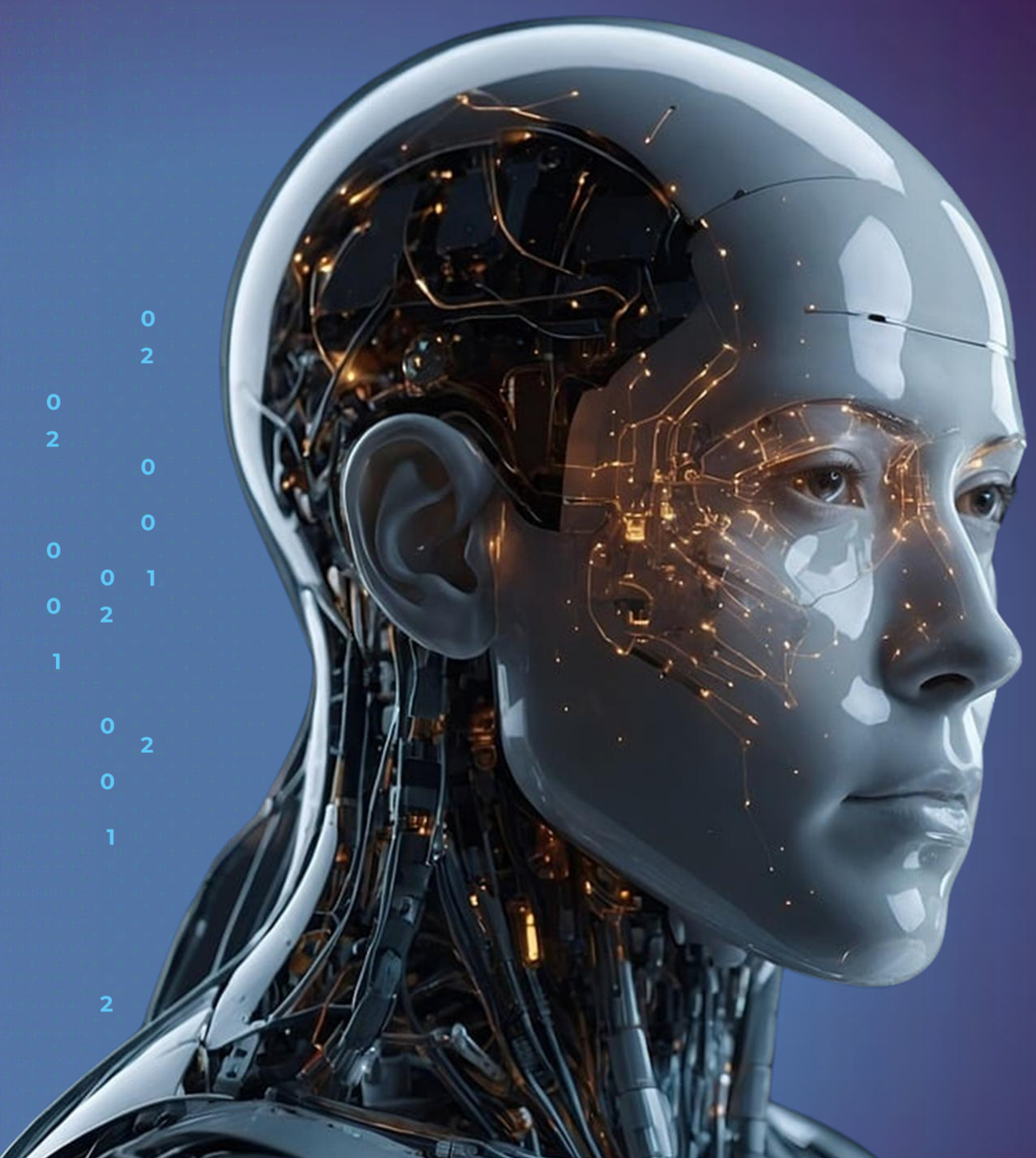
Banking and security: AI detects fraud and helps answer questions through chatbots.

Social media and entertainment: AI curates news, music, and video recommendations.



What is Artificial Intelligence?

AI is the science of creating machines that mimic human intelligence through reasoning, learning, and self-correction.



The Evolution of AI

- 1950s – Turing Test and first AI experiments
- 1980s – Expert systems (MYCIN)
- 2000s – Rise of Machine Learning
- 2010s–2020s – Deep Learning revolution

Machine Learning

Data-driven learning

Deep Learning

Neural Networks

Computer Vision

Image Interpretation

Branches of AI

NLP

Understanding Human Language

Robotics

Elaborate on what you want to discuss.

Machine Learning in Medicine

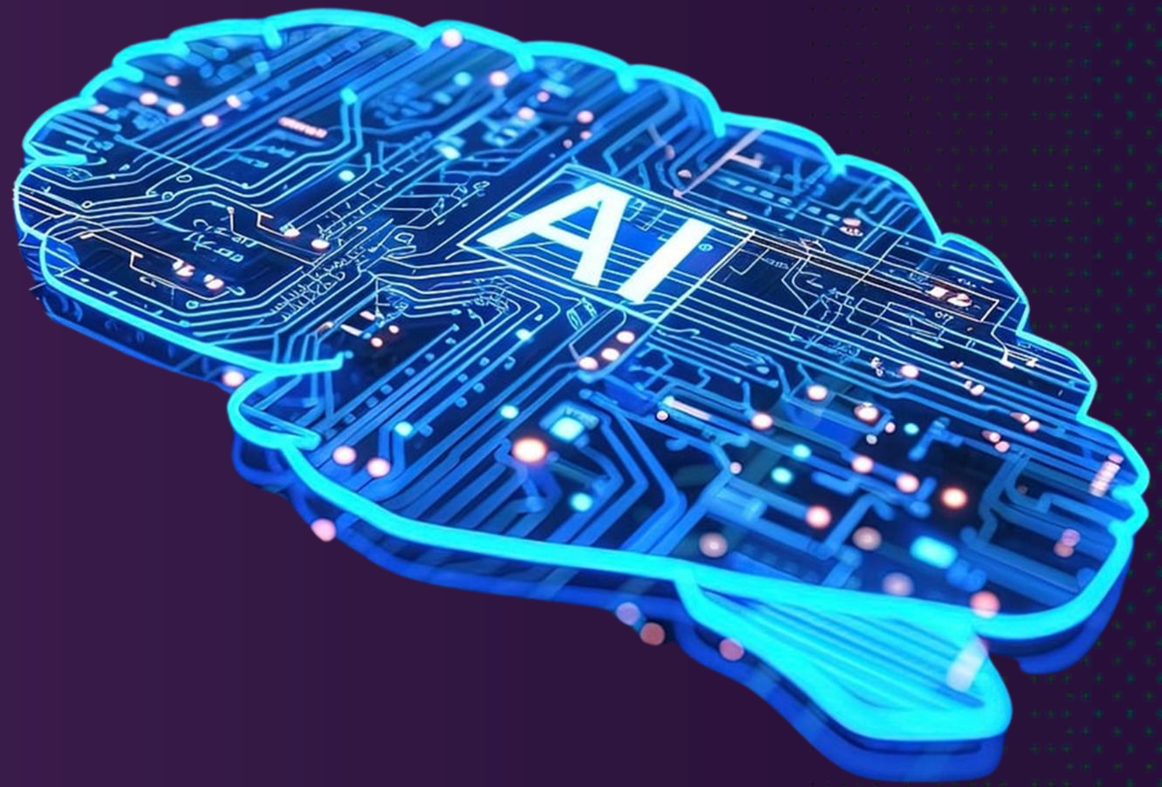
AI learns patterns from medical data to assist diagnosis and prognosis.

Example: Predicting diabetes or heart disease risk.

Deep Learning and Neural Networks

AI models with multiple layers can recognize complex visual patterns.

Example: Detecting tumors in MRI scans.



Natural Language Processing (NLP)

AI that processes human language.
Example: Extracting key information from clinical notes, summarizing patient records.

CASE STUDIES

AI in Radiology

AI algorithms detect fractures, nodules, and lesions in medical images.

Case: Chest X-ray pneumonia detection.

AI in Cardiology

AI interprets ECGs and echocardiograms to predict arrhythmias and heart failure.

CASE STUDIES

AI in Oncology

AI enables early cancer detection and personalized therapy selection.

Example: Mammogram analysis, genomic data.

AI in Pathology & Dermatology

Automated cell analysis and skin lesion classification for cancer detection.

CASE STUDIES

AI in Surgery

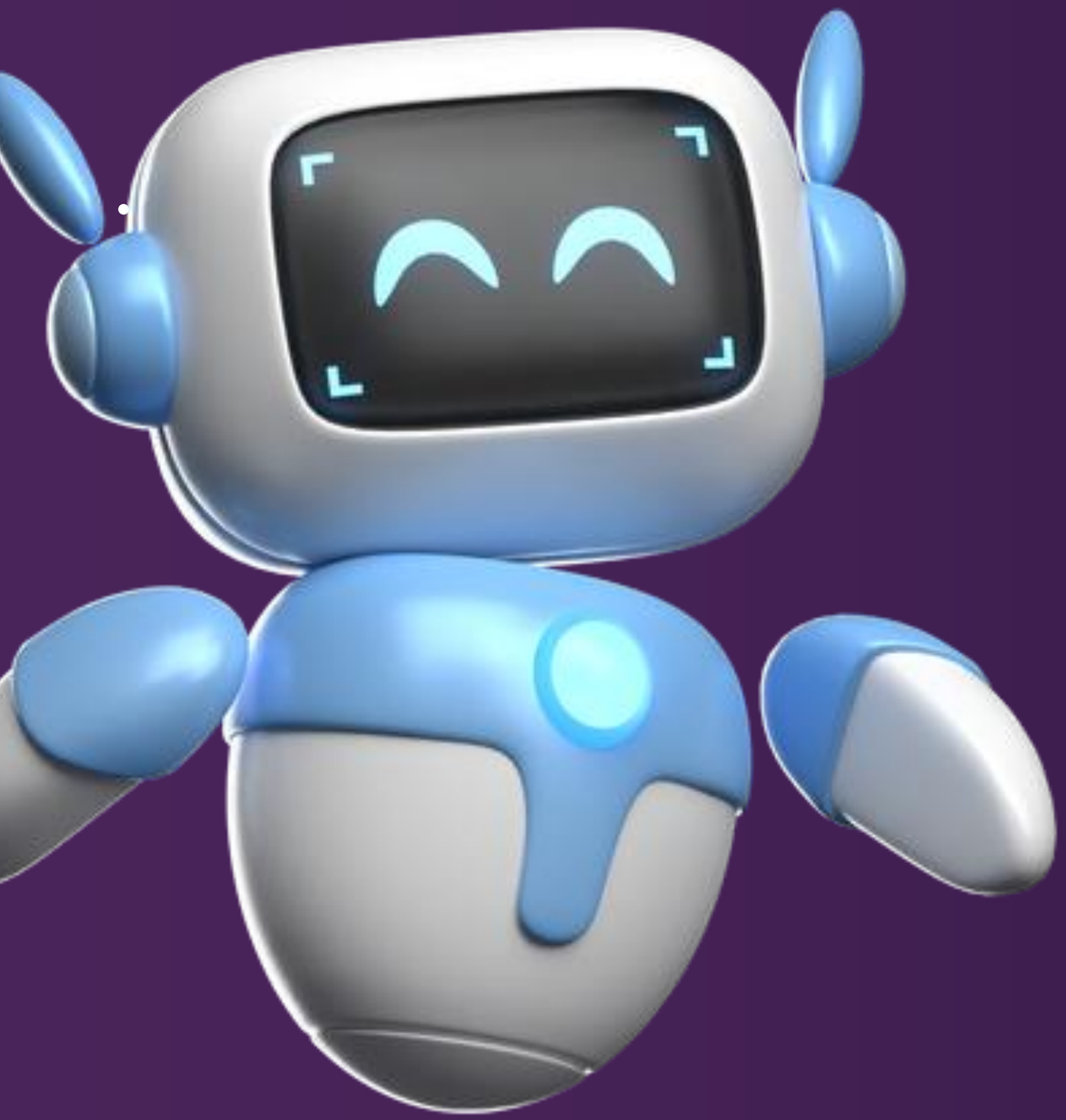
Robotic-assisted systems improve precision, reduce complications, and enhance outcomes.

Example: Da Vinci surgical system.

AI in Public Health

AI supports epidemic modeling, outbreak detection, and resource optimization.

Example: Predictive COVID-19 spread models.



THANKS