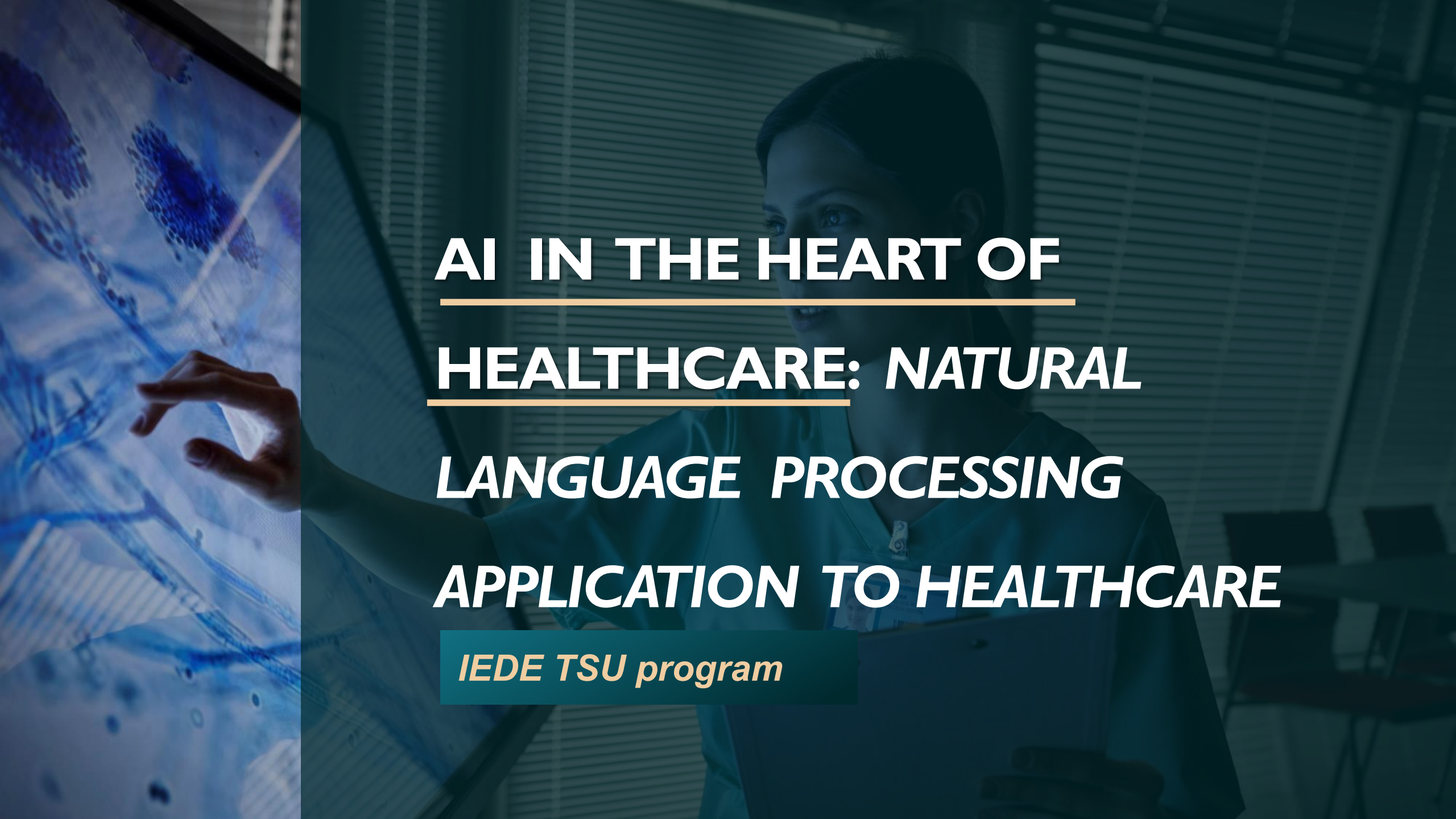
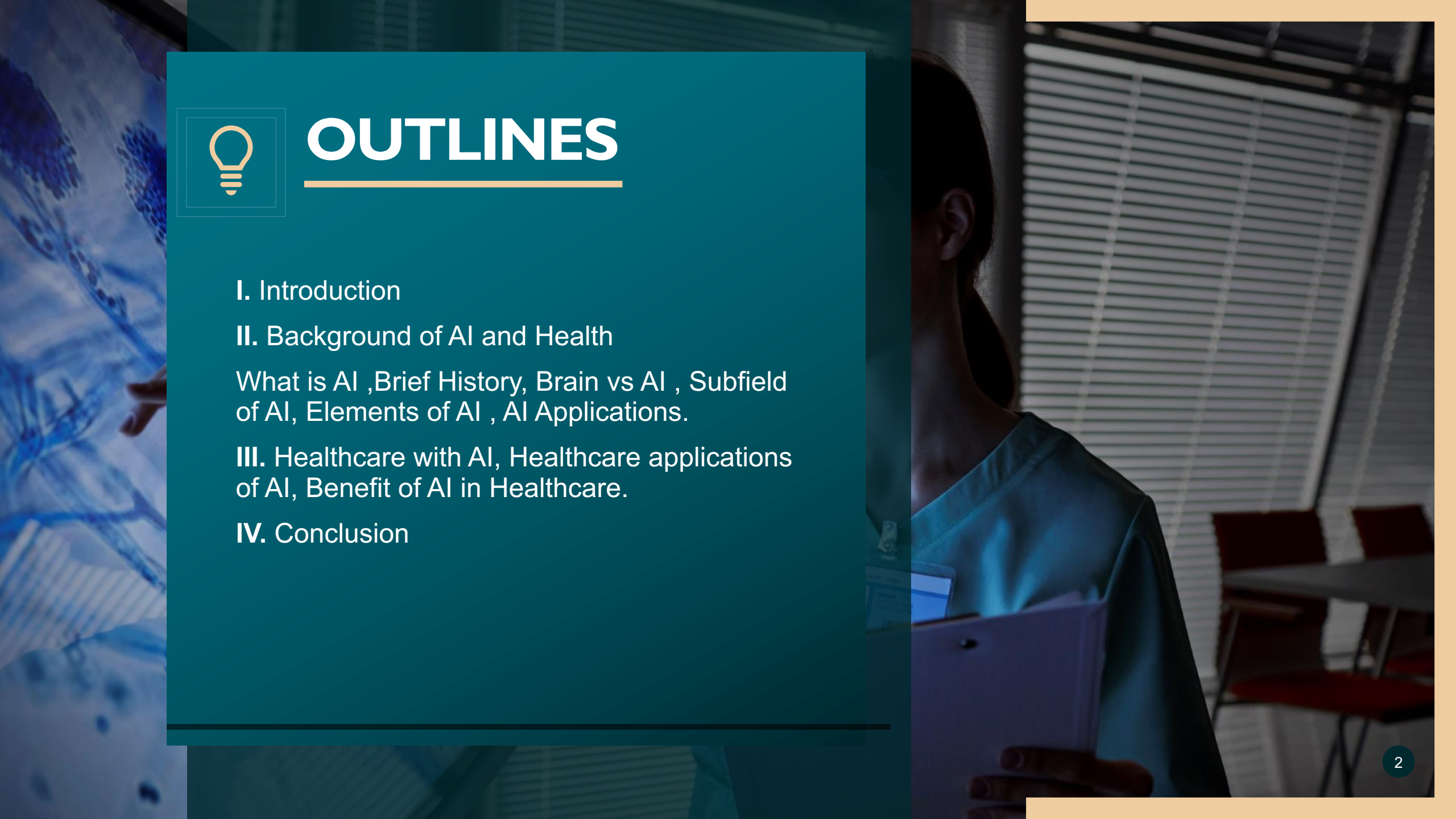


AI IN THE HEART OF HEALTHCARE: *NATURAL LANGUAGE PROCESSING APPLICATION TO HEALTHCARE*

IEDE TSU program



OUTLINES

I. Introduction

II. Background of AI and Health

What is AI ,Brief History, Brain vs AI , Subfield of AI, Elements of AI , AI Applications.

III. Healthcare with AI, Healthcare applications of AI, Benefit of AI in Healthcare.

IV. Conclusion

I.INTRODUCTION

AI transformative power is reverberating across many industries, but in one-Healthcare- its impact is being a truly life-changing.

- **Hospital care**
- **Clinical research**
- **Drug development**
- **Insurance,**

AI applications are revolutionizing how the health sector works

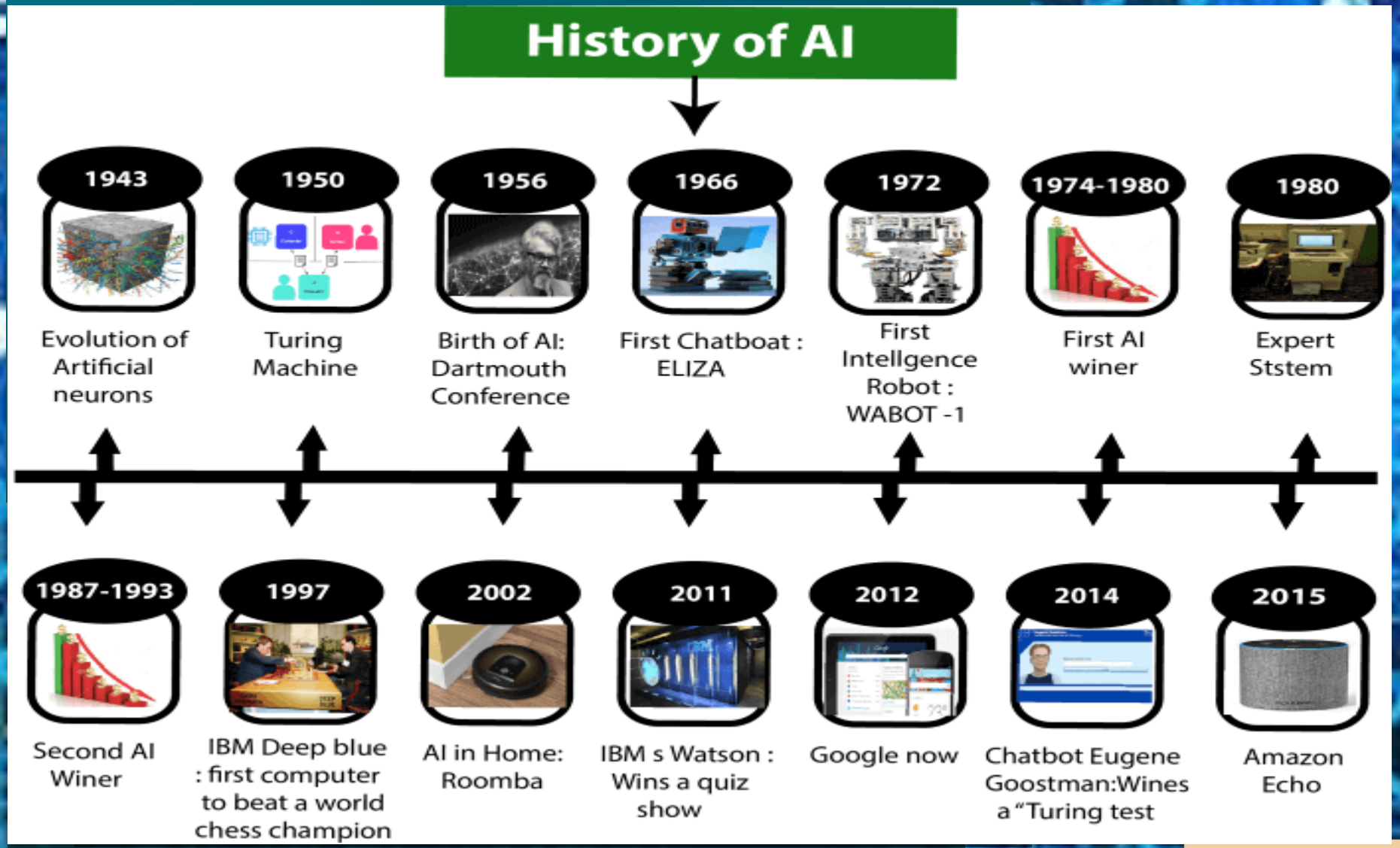
- ✓ **Reduce spending**
- ✓ **Improve patient outcomes.**

I.BACKGROUND OF AI & HEALTH CARE

A) What is AI?

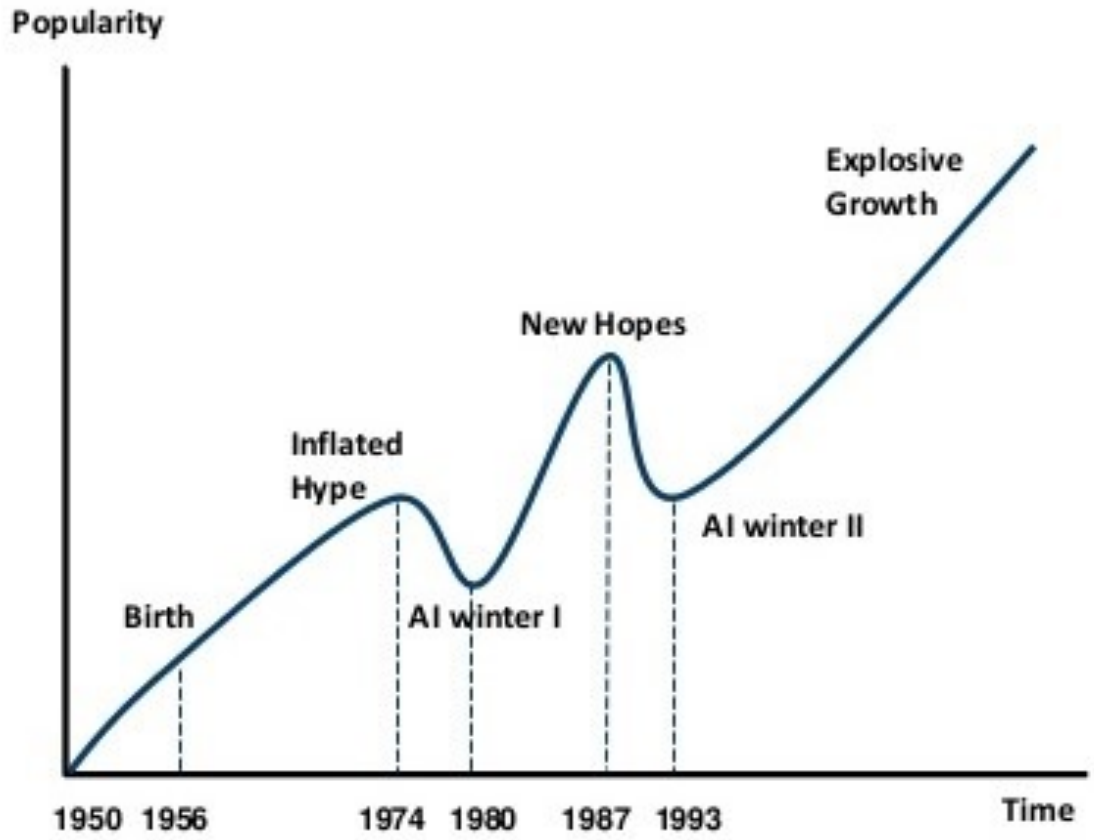
- AI is in simple words:
  - **“The science and engineering of making intelligent machines.”**
- **AI can also be defined as:** The development of computer systems that are capable of performing tasks that normally require human intelligence, such as
  - ***Decision making,***
  - ***Object detection***
  - ***Solving complex problem***
- Machines (or computers) that **mimic "cognitive" functions** that humans associate with the human mind, such as "learning" and "problem solving".

I. BRIEF HISTORY OF AI



I. BRIEF HISTORY OF AI

AI HAS A LONG HISTORY OF BEING "THE NEXT BIG THING"...

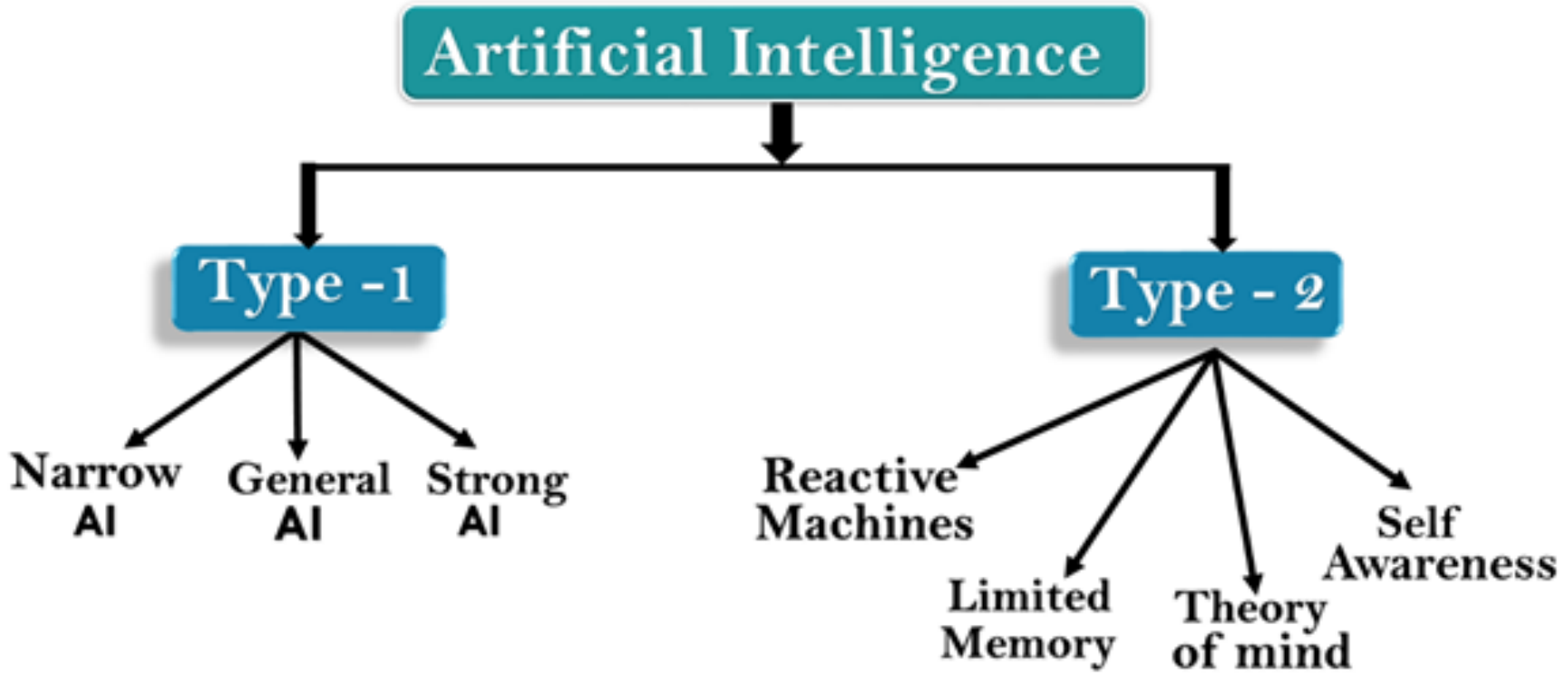


Timeline of AI Development

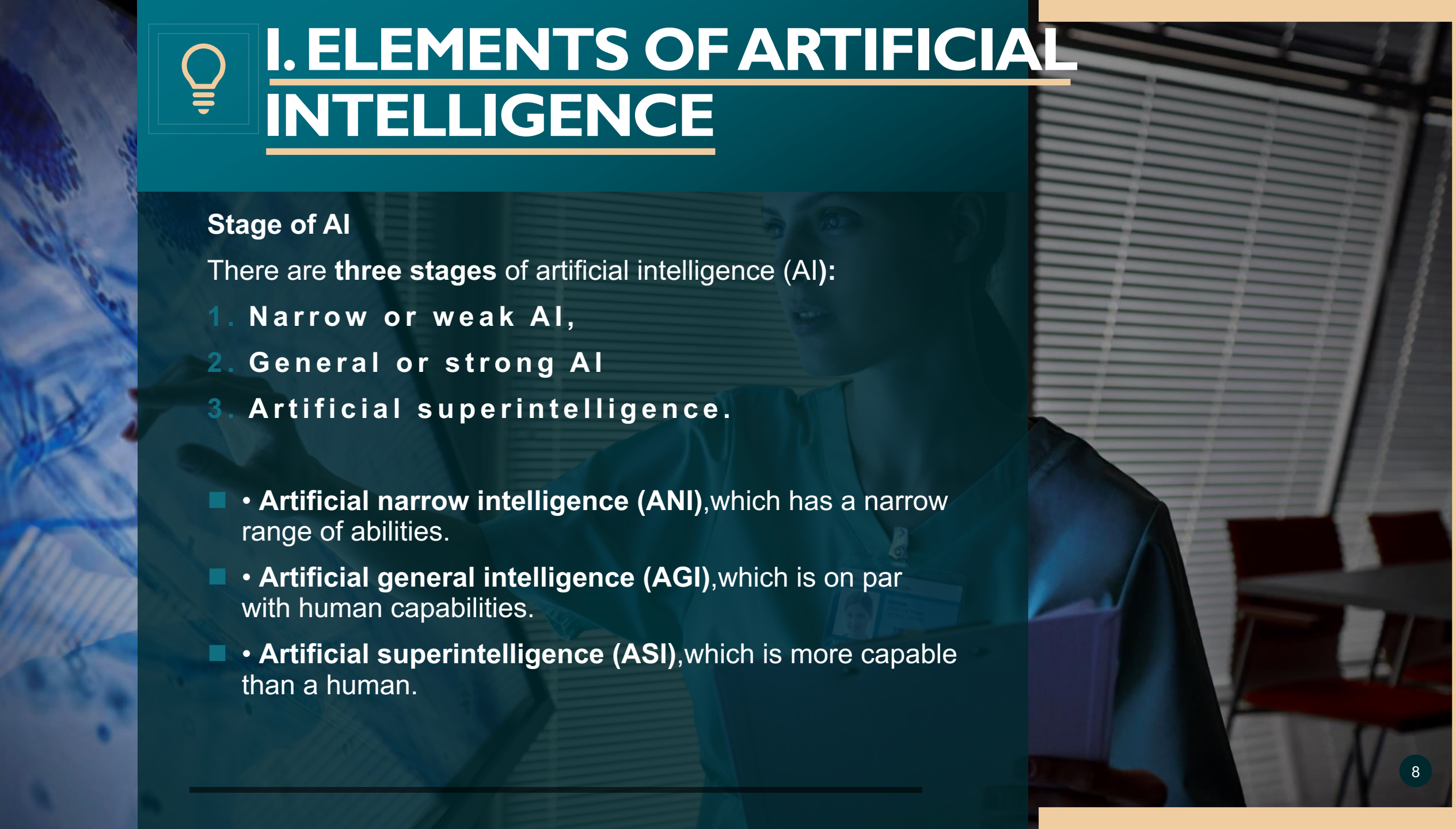
- **1950s-1960s**: First AI boom - the age of reasoning, prototype AI developed
- **1970s**: AI winter I
- **1980s-1990s**: Second AI boom: the age of Knowledge representation (appearance of expert systems capable of reproducing human decision-making)
- **1990s**: AI winter II
- **1997**: Deep Blue beats Gary Kasparov
- **2006**: University of Toronto develops Deep Learning
- **2011**: IBM's Watson won Jeopardy
- **2016**: Go software based on Deep Learning beats world's champions

I. ELEMENTS OF ARTIFICIAL INTELLIGENCE

Stage of AI



I. ELEMENTS OF ARTIFICIAL INTELLIGENCE



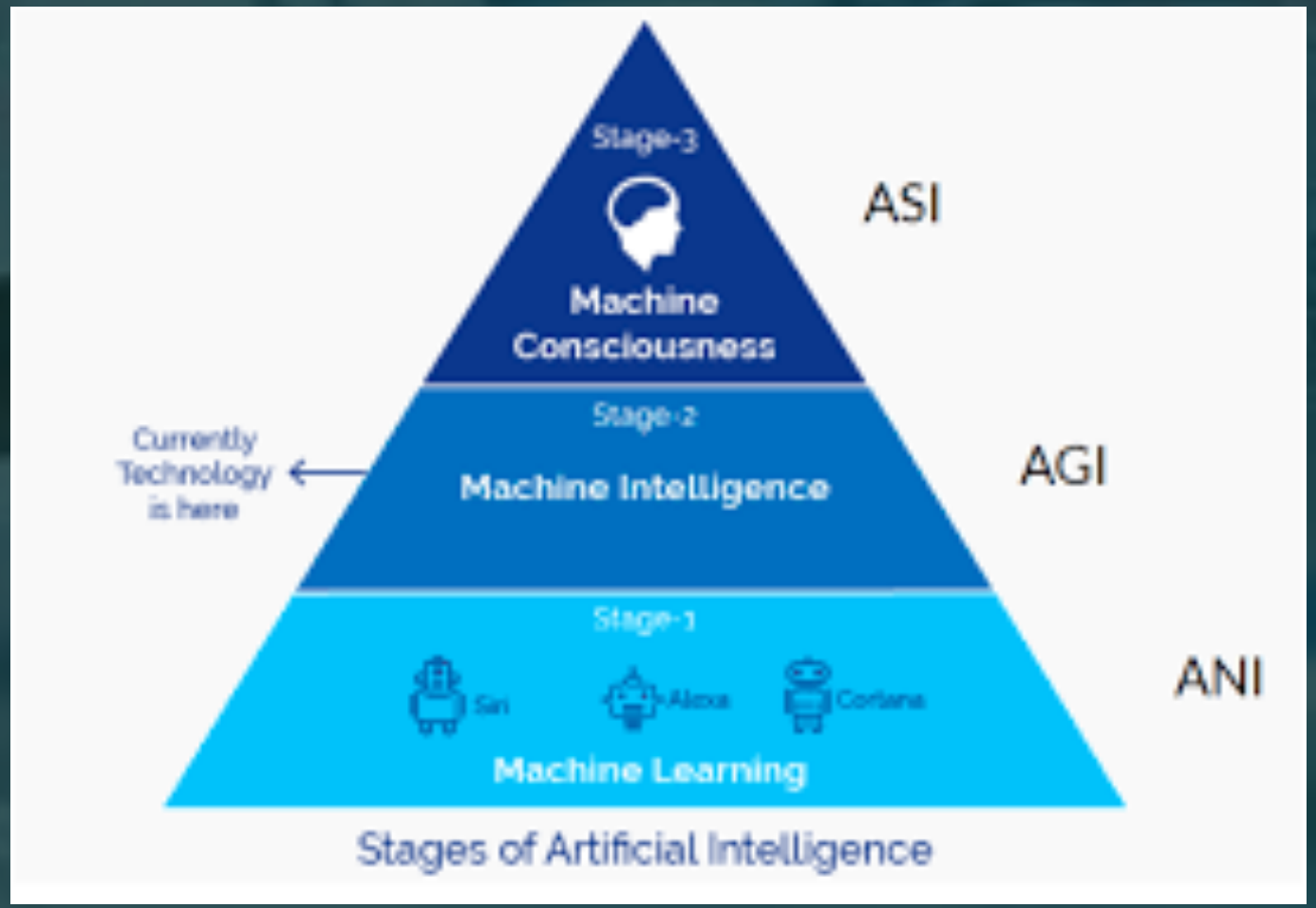
Stage of AI

There are **three stages** of artificial intelligence (AI)**:**

1. **Narrow or weak AI,**
2. **General or strong AI**
3. **Artificial superintelligence.**

- **Artificial narrow intelligence (ANI)**,which has a narrow range of abilities.
- **Artificial general intelligence (AGI)**,which is on par with human capabilities.
- **Artificial superintelligence (ASI)**,which is more capable than a human.

I. ELEMENTS OF ARTIFICIAL INTELLIGENCE

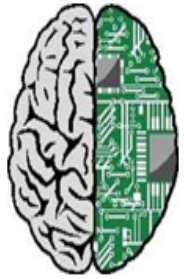


Stages of Artificial Intelligence

I. DIFFERENCE BETWEEN HUMAN AND MACHINE INTELLIGENCE

Computing wins

- Input and output
- Information processing and memory



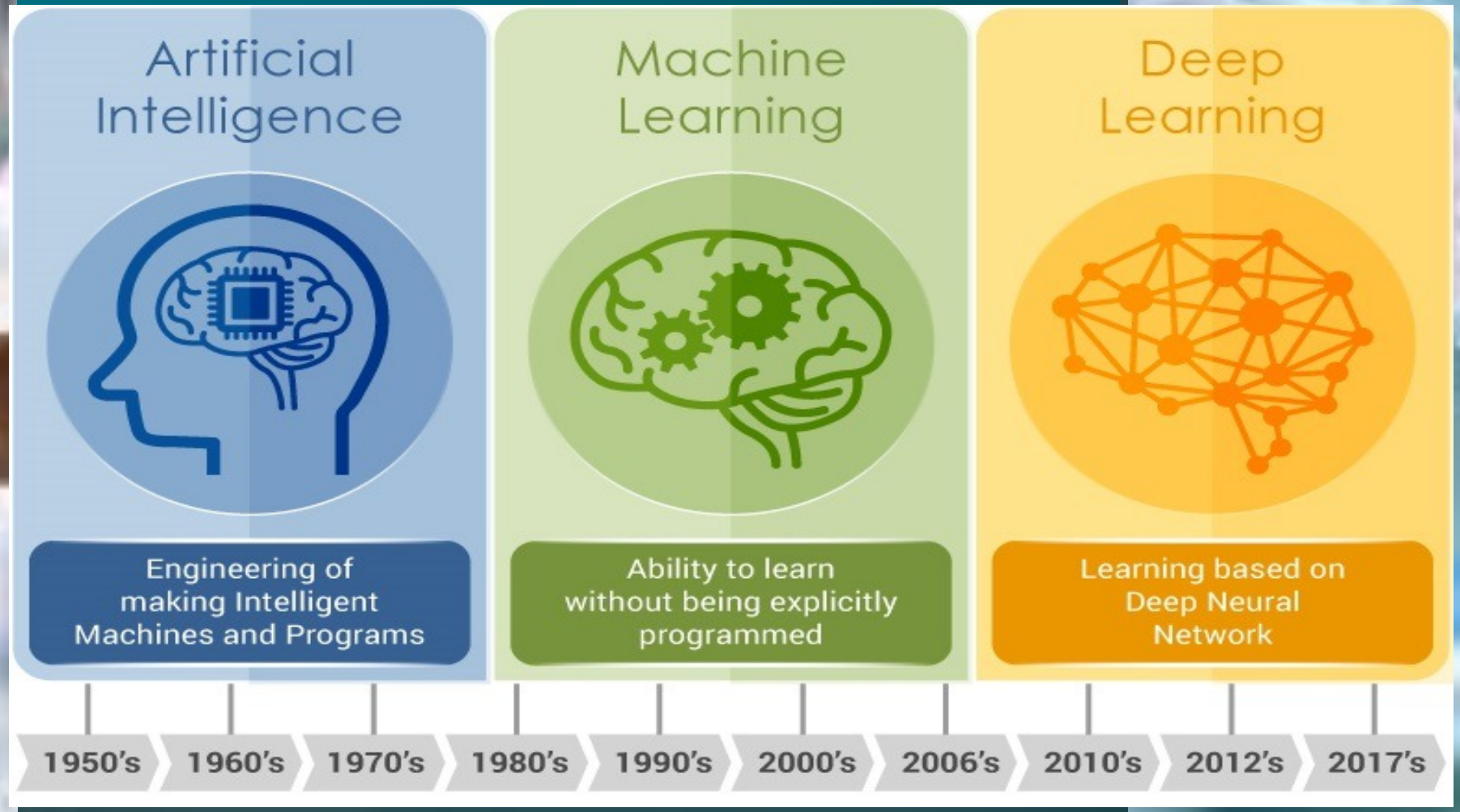
Closely matched

- Complex movement
- Vision
- Language
- Structured problem solving

Brain still wins

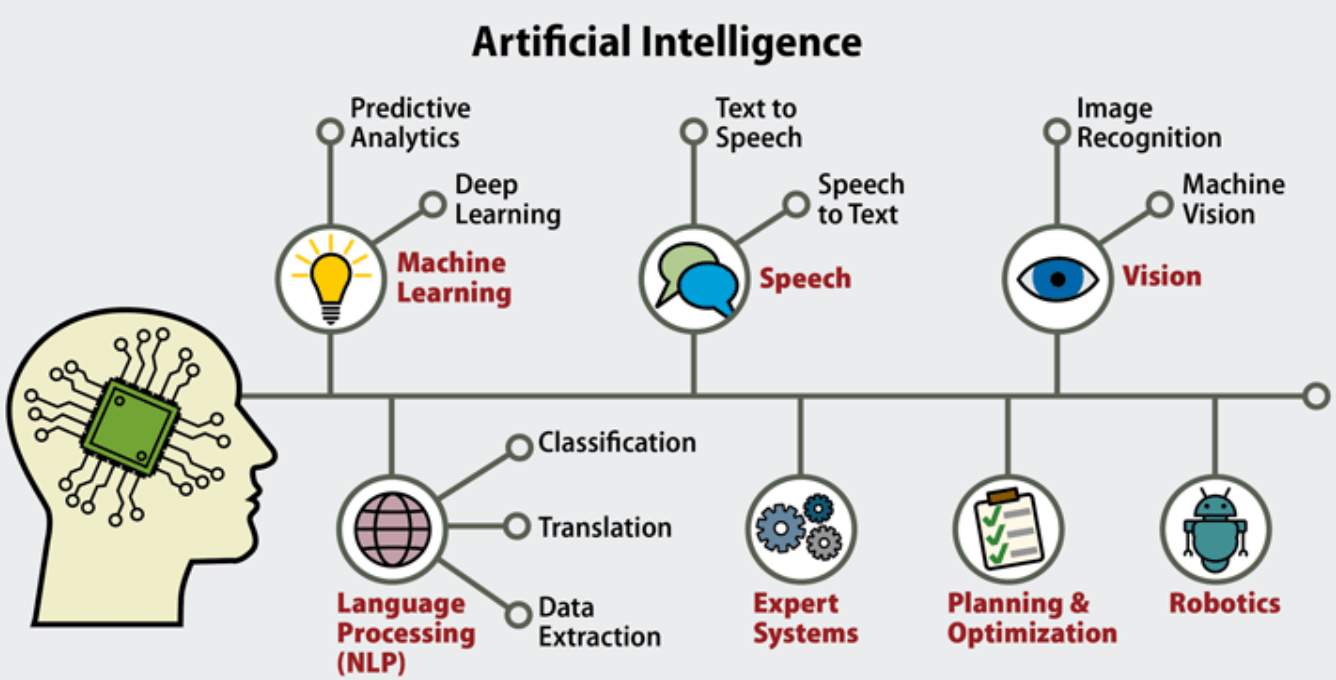
- Creativity
- Emotion and Empathy
- Planning and Executive Function
- Consciousness

I. SUBFIELDS OF AI

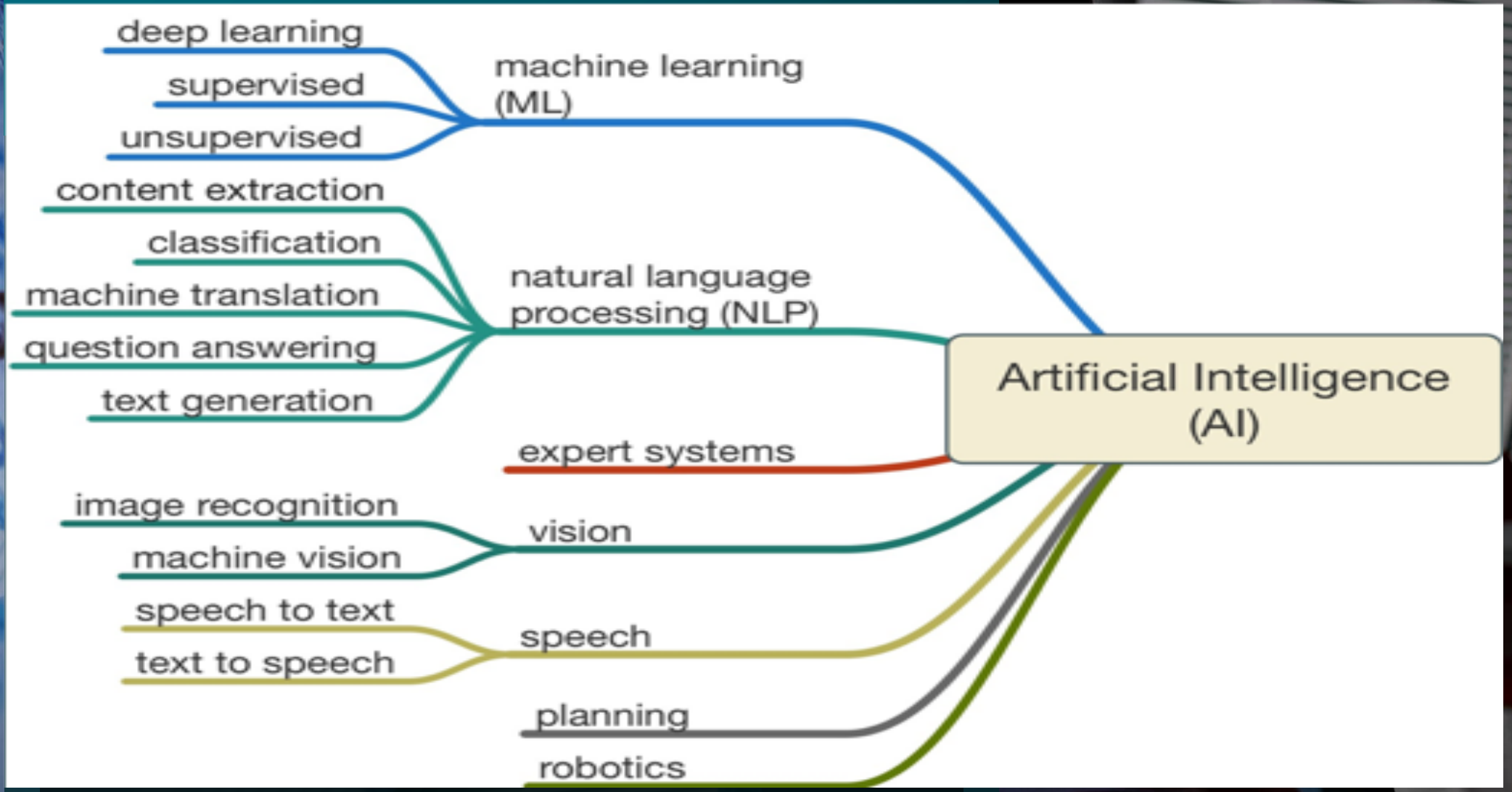


I. SUBFIELDS OF AI

Major sub-fields of AI now include: *Machine Learning, Neural Networks, Evolutionary Computation, Vision, Robotics, Expert Systems, Speech Processing, Natural Language Processing, and Planning.*



I. SUBFIELDS OF AI

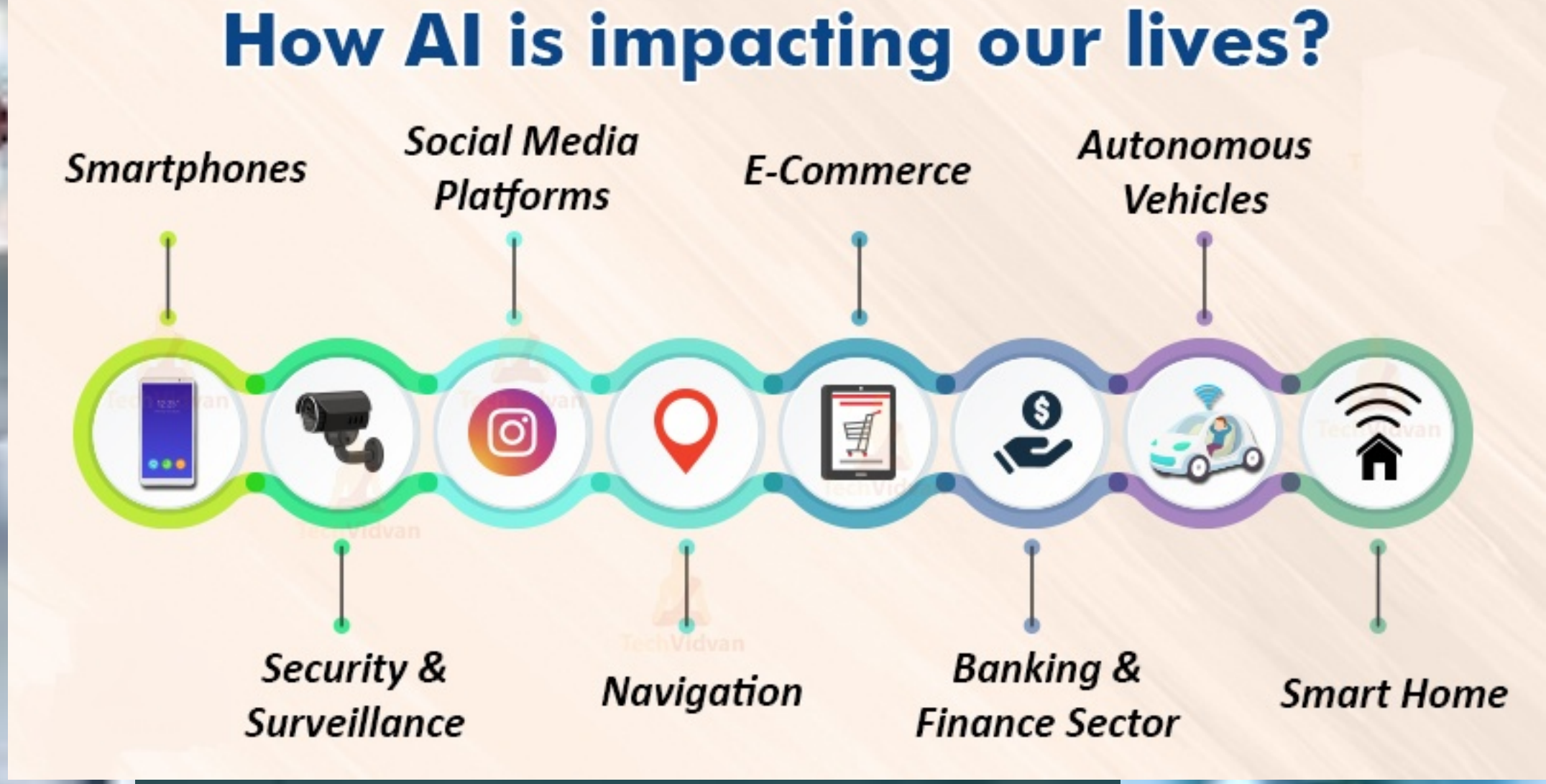


I.AI APPLICATIONS

In the last years we can watch how AI is starting to disrupt different industries. As a result, this will radically change the nature of work and the workplace

- AI in healthcare
- AI in business
- AI in education
- AI in finance
- AI in manufacturing
- AI in banking
- AI in law
- AI in transportation

I.AI APPLICATIONS



I. HEALTH CARE

Definition: Healthcare is defined as the maintenance or improvement of health *via the prevention, diagnosis, treatment, recovery, or cure* of disease, illness, injury, and other physical and mental impairments in people.

I. HEALTH CARE

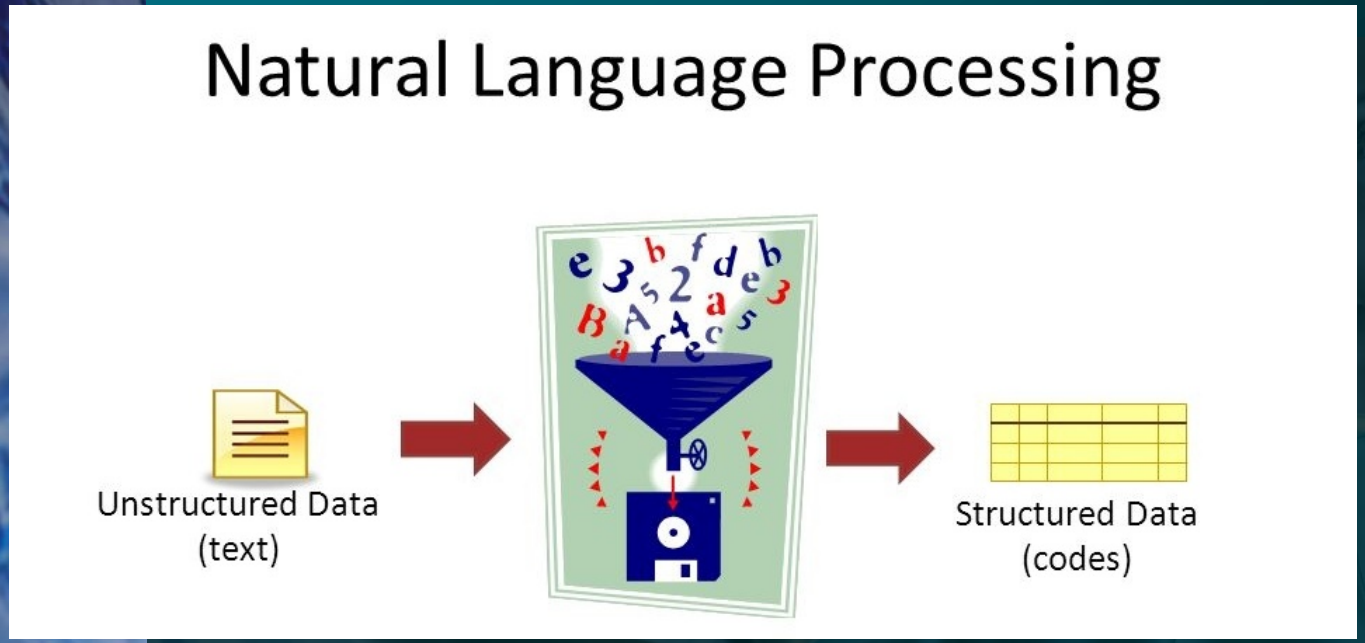
Artificial intelligence in healthcare and medicine means **using data** more ***efficiently*** through **machine learning algorithms** to produce positive outcomes for patients.

AI offers a number of **advantages** over traditional analytics and clinical decision-making techniques.

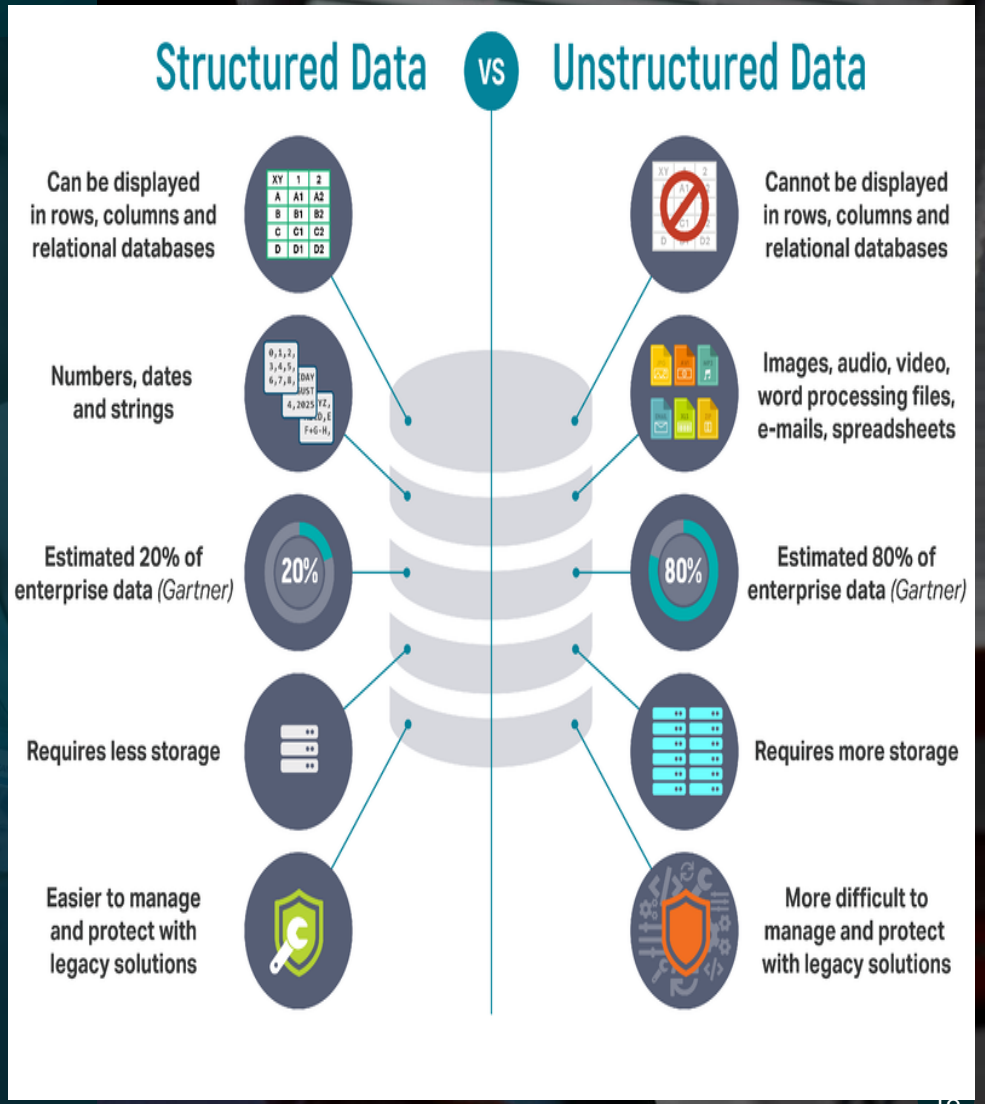
Learning algorithms can become :

- More **precise and accurate** as they interact with training data.
- Allowing humans to gain unprecedented insights into ***diagnostics, care processes, treatment variability, and patient outcomes***.

I. HEALTH CARE



- NLP technology also saves time for clinicians by visualizing the patient's data in the form of charts.
- Visualization can help clinicians in easily grasping the data an be able to spend more time on patient care.



I. HEALTH CARE

-AI can work as a

- ✓ Fast
- ✓ Accurate,
- ✓ **Long-term cost-effective** method to help human experience and intuition through predictive analytics.

AI is not meant to replace physicians but but rather to

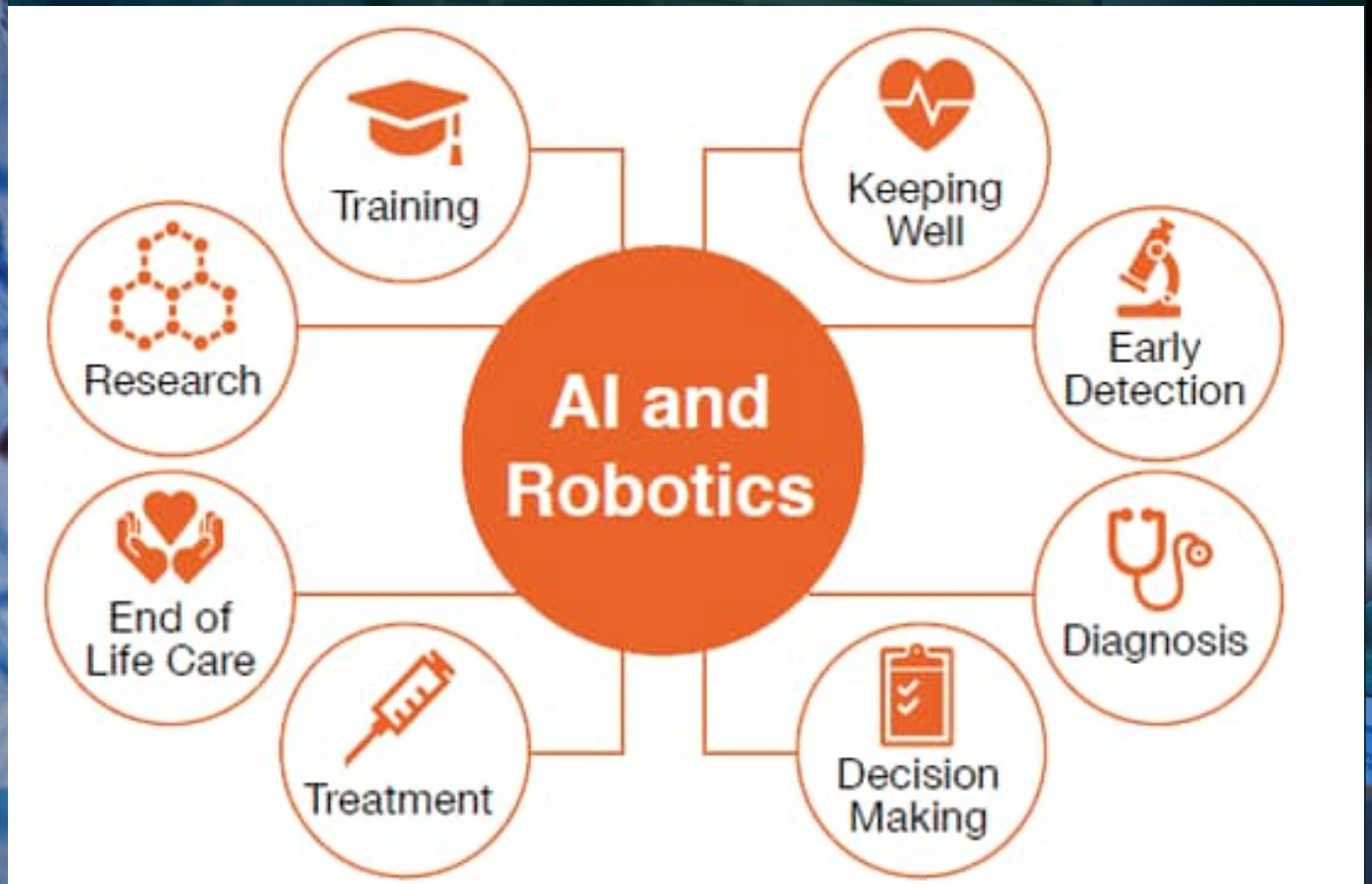
- Empower healthcare professionals by adding a **data-driven context**
- Delivers the right **information** at the right **time**, enabling them to make more informed decisions

I. HEALTH CARE

-**Healthcare applications** that take advantage of artificial intelligence could be used to make:

- More accurate diagnoses.
- Identify populations at risk.
- Manage and allocate administrative resources.
- Predict the potential value of research projects.
- Better understand how patients will respond medications and treatment protocols.

I. HEALTH CARE



I. HEALTH CARE

-**AI programs** have been developed and applied to practices such as:

- Diagnostic processes.
- Treatment protocol development.
- Drug development.
- Personalized medicine.
- Patient monitoring and care.

-**Companies** are developing **predictive analytics solutions.**

- ✓ Help healthcare managers improve business operations
- ✓ Increasing utilization
- ✓ Reducing patient on-board
- ✓ Reducing length of stay and optimizing staffing levels.

I. HEALTH CARE

- Early diseases diagnosis
- Radiology
- Skin cancers
- Diabetes and cardiovascular disease (CVD),
- Telehealth
- Psychiatry
- Alzheimer

-Radiology

-The rise of **telemedicine** has shown the rise of possible **AI applications like:**

- Wearable devices
- Chatbots
- Healthcare trackers

- Machine learning algorithms
- Deep learning algorithms
- Electronical Health Recording

I. HEALTH CARE

AI in Healthcare

Patient-Facing

AI Chatbots

buoy, Your.MD, medwhat, GYANT, Dr.AI

Wearables & Devices

physiQ, QARDIO, sano, QUANTTUS, kiwi.ai, BIOSERENITY, Jodytrak, DietSensor, Magnea, kinsa, SCANADU, aira, AliveCor, 19 Labs, CliniCloud

Personalized Genetics

iCarbonX 碳云智能, rthm, CG, DAY TWO, Positive Biosciences, LIFENOME, MEDICUS, 23andMe, VITAGENE, Arivale, habit FOOD. PERSONALIZED., Suggestic PRECISION EATING™, VIOME

Mental Health

Woebot, TOUCHKIN, BIOBEATS, Ginger.io, AURA, koko, NeuroLex

Women's Health

CYRCADIA HEALTH, bloomlife, celmatix, flutter, eva, Clue, elyse, 28, Natural Cycles

Skin

SkinVision, skinIO, skin analytics, SCANZ, skin, DOCTOR HAZEL, FIRST DERM™

Telehealth

Telemedicine

ada, SENSELY how are you feeling today?, babylon, anamnèse, Remedy, pager, spruce, Z

Lifestyle Management

AiCure, MedAware, ovia health, next IT Healthcare, Catalia Health, lucina, Health Next Gen, Doctella, NarrativeDx, cardiogram, Wellframe, Welltok, CareAngel Always Caring

Disease Management

prognos, INFOBIONIC, HealthReveal, HF HEALTH FIDELITY, DIABNEXT, SENTRIAN Remote Patient Intelligence, FLASHBACK TECHNOLOGIES, TEMPUS, dreamed DIABETES, Healint, WIKAYA EMPOWER PREVENTION, RxPREDICT, BELONG Beating Cancer Together

Research

Drug Discovery

Mind the Byte, SagaS for Drug Discovery, DATAVANT, Quantitative Medicine, Standigm, ENVISAGENICS BioAnalytics, BERG, RECURSION pharmaceuticals, BenevolentAI, Athelas, Exscientia DRIVEN BY KNOWLEDGE, NuMedii, healx, transcriptic, Numerate, twoXAR, Atomwise Better medicines faster., INSILICO MEDICINE, CloudPharmaceuticals, Globavir

Information & Clinical Trials

trials.ai INTELLIGENT TRIALS MANAGEMENT, PathAI, BenchSci Where science happens, CYCLICA, Mendel.ai, Qrativ, peptone, Brite Health, iPLEXUS LIFE SCIENCES RESEARCH SIMPLIFIED, antidote, Plex Research, nference, RESULTCARE

Genetic Research

MolecularMatch, Blueprint Genetics, VERGE GENOMICS, NURITAS, diploid, HUMAN LONGEVITY, INC., SOPHIA GENETICS®, freenome, FDNA, PATHWAY GENOMICS®, deep genomics, DESKTOPGENETICS

Doctor-Facing

Medical Records

APIXIO, AUGMEDIX clinithink, MODERNIZING MEDICINE, nimblr, saykara, emr.ai, WellSheet, hCue inspired healthcare, patientory, SANSORO HEALTH, PROTENUS, BloomAPI

Data Analytics

ZEPHYR HEALTH, burstIQ, MD.ai, Infermedica Artificial Intelligence in Medicine, CLOUDMEDX®, jvion, CareSkore™, flatiron, ROAM, Hindsait artificial intelligence for better healthcare, PROFILITY, Oncora MEDICAL, lumiata, MEDALOGIX, GRAIL, ensodata, pulseData, healthcare.ai, KenSci, COMBINOSTICS, impacthealth, LYTICS

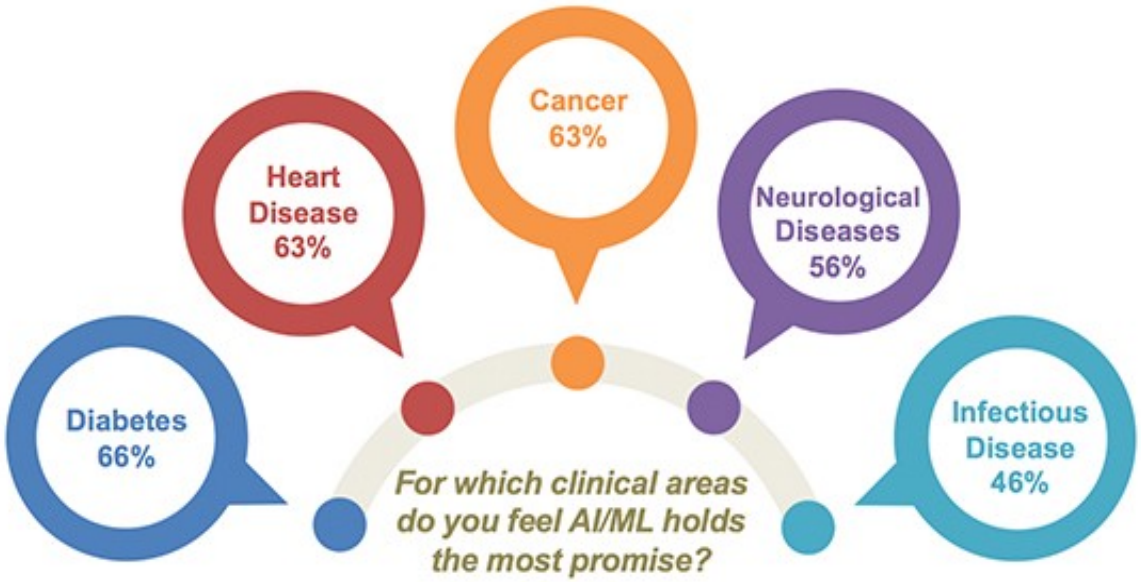
Medical Imaging

VIZ, AMARA HEALTH ANALYTICS, enlitic, zebra MEDICAL VISION, 推想科技 infervision, CureMetrix CAD That Works, BAYLABS, VUNO, ADVENIO Transforming Innovation, koios, SIGTUPLE, Behold.ai, BUTTERFLY Network, Inc., imagia, ARTERYS, IMAGEN, Mindshare MEDICAL, aidence, aidoc, Lunit, Cardiologs, Genetesis SCIENCE MADE PERSONAL, HubMedX, DIA IMAGING ANALYSIS, SemanticMD, Blackford analysis

Hospital

FORWARD, Qventus, MedyMatch, gauss, orgo.ai, MEDASENSE pain monitoring solutions, P3d, AURIS, VERB SURGICAL, Qualaris

I. HEALTH CARE

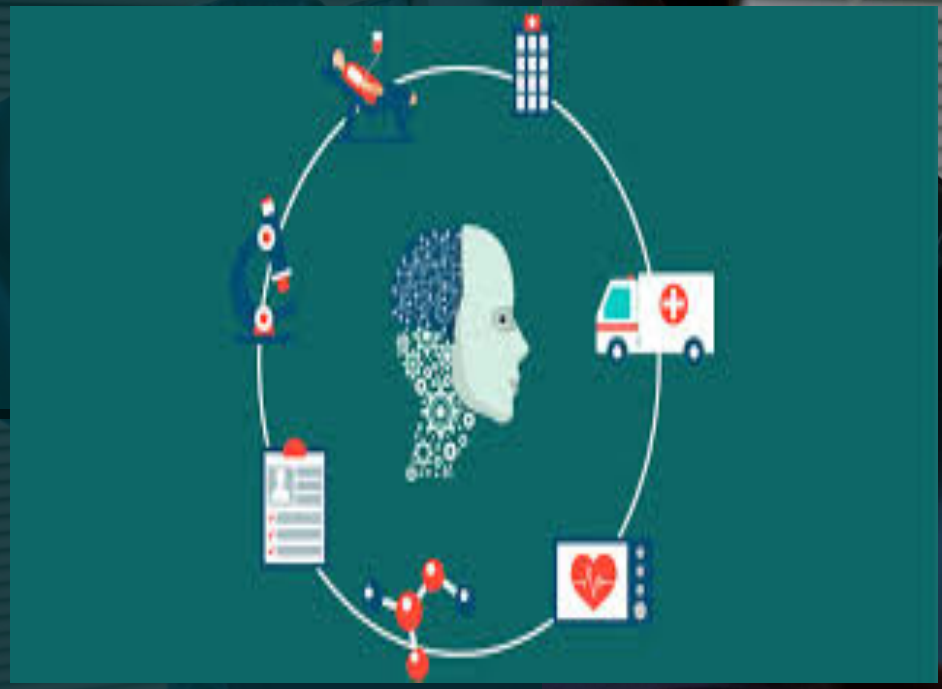


I. HEALTH CARE

Benefits of AI in healthcare :

-Some of **the present and future AI applications** in healthcare include:

- Robot-assisted surgery
- Virtual nurses
- Symptom checking and triage
- Treatment Plans
- Medication
- Precision medicine
- Health monitoring
- Healthcare system analysis



I. HEALTH CARE

Natural Language Processing in Healthcare is expected to grow from :
USD 1030.2 million in 2016
USD 2650.2 million in 2021
at a CAGR of 20.8 percent during the forecast period.

Integrating NLP with *electronic health record* systems will :

- Help take off workload from doctors -Radiology
- Make analysis easier.

Already, virtual assistants such **as Siri, Cortana, and Alexa** have made it into healthcare

- Empowering Patients with Health Literacy

I. HEALTH CARE

There are numerous applications of AI on the market today or awaiting approval that improve patient care and potentially save lives.

I. CONCLUSIONS

THANK YOU

Silvestre Zeballos

silves123@hotmail.com

Group 22