Lecture #0

Artificial Intelligence

INT404

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What is Artificial Intelligence ?

What is Artificial Intelligence ?

To make the computers

do things which, at the moment, people do better.

Better in the terms of physical strength?

Better in the terms of physical strength?

No

Then in what terms ?

Then in what terms ?

In the terms of thinking power..

Then in what terms ?

Not just in the terms of thinking power..

but think intelligently also.

Is every robot in industry have artificial intelligence ?

What is Artificial Intelligence ?

To make the machine

think and act/behave intelligently.

What is Human Intelligence?

It's a composition of abilities like:

LEARNING

What is Human Intelligence?

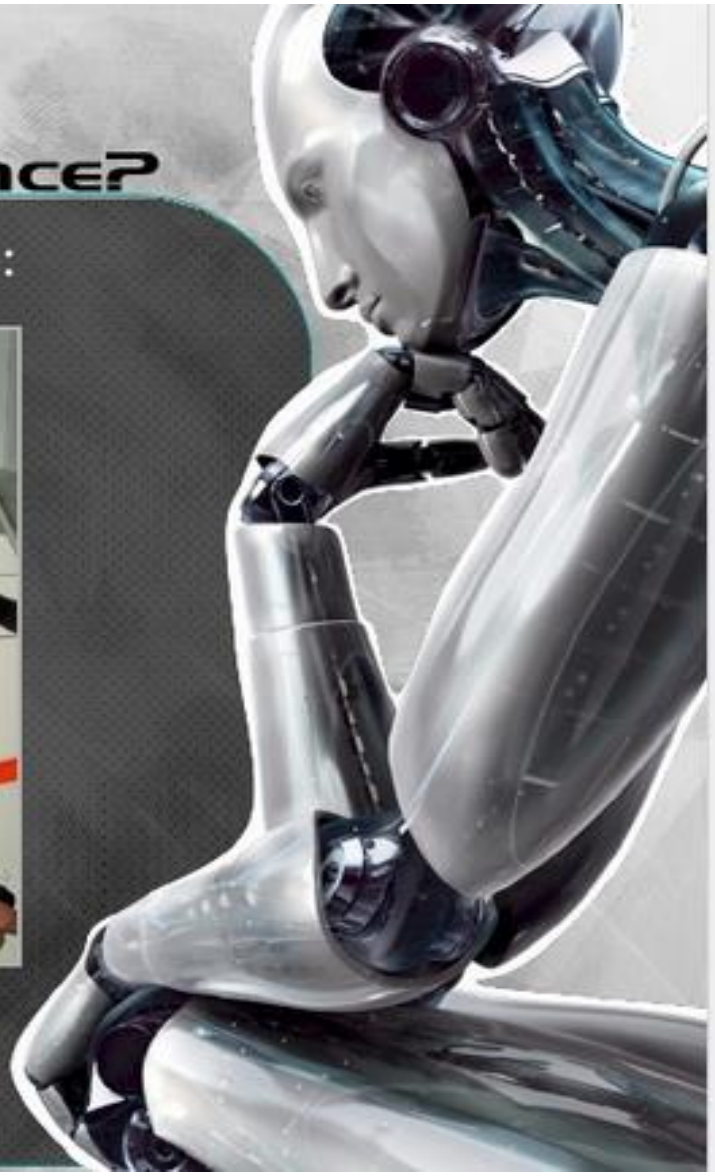
It's a composition of abilities like:

REASONING

What is Human Intelligence?

It's a composition of abilities like:

PERCEIVING



What is Human Intelligence?

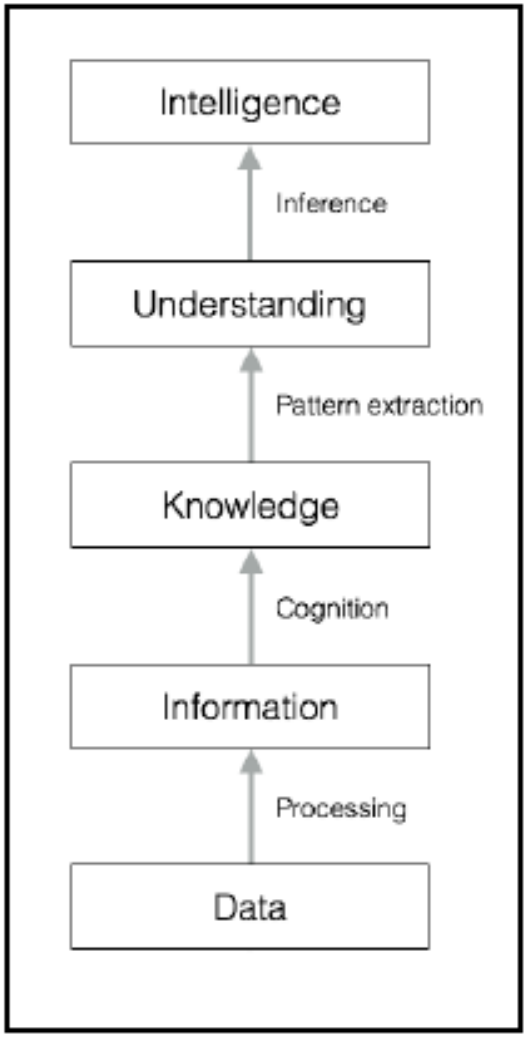
It's a composition of abilities like:

UNDERSTANDING OF LANGAUGE

What is Human Intelligence?

It's a composition of abilities like:

FEELING


Intelligence
Inference
Understanding
Pattern extraction
Knowledge
Cognition
Information
Processing
Data

What is Artificial Intelligence?

a) A field that aims to make humans more intelligent

b) A field that aims to improve the security

c) A field that aims to develop intelligent machines

d) A field that aims to mine the data

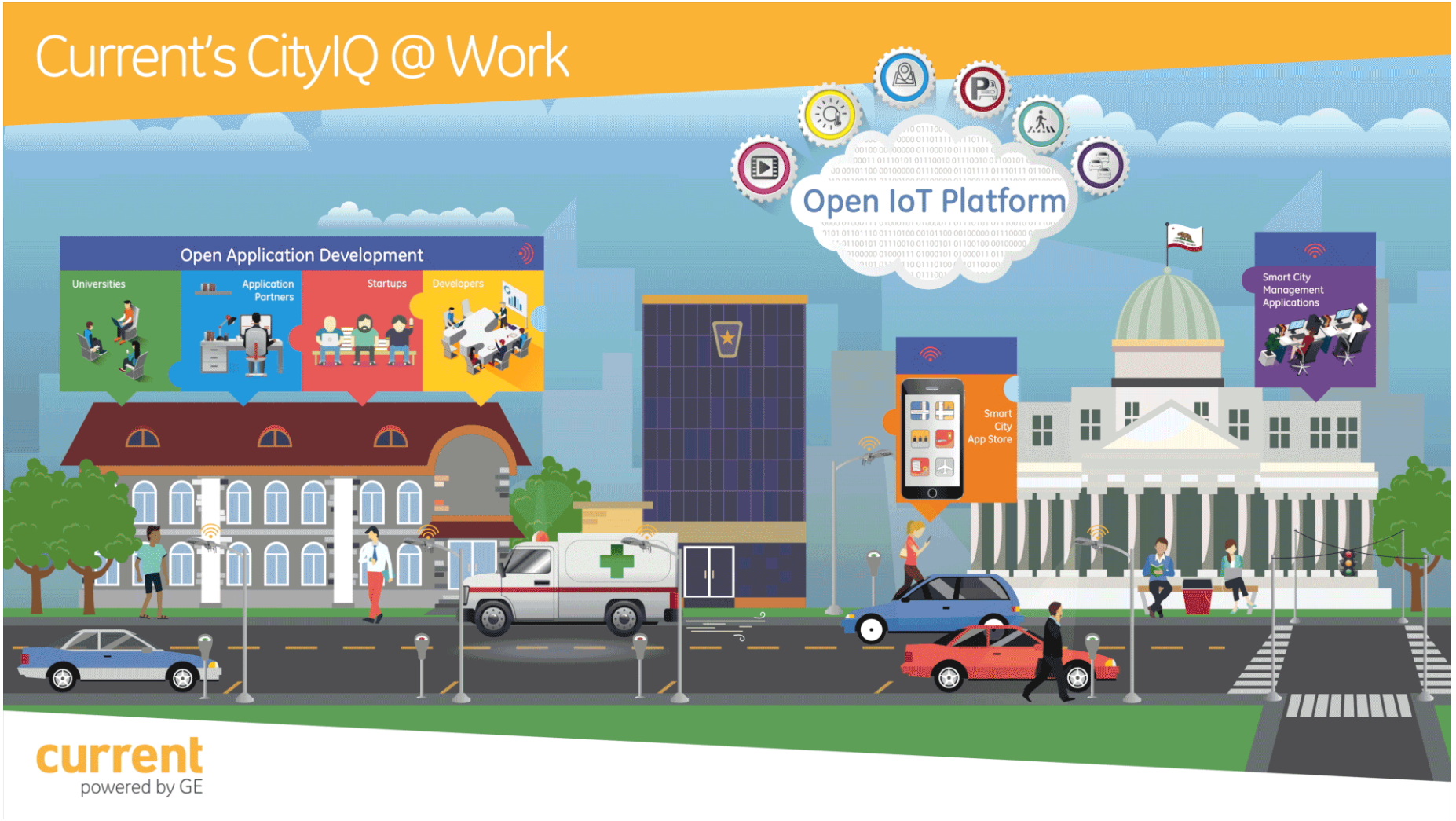

Why are we talking about
AI now?!


The Global AI Market is expected to reach a revenue of $118.6 billion by 2025
Tractica

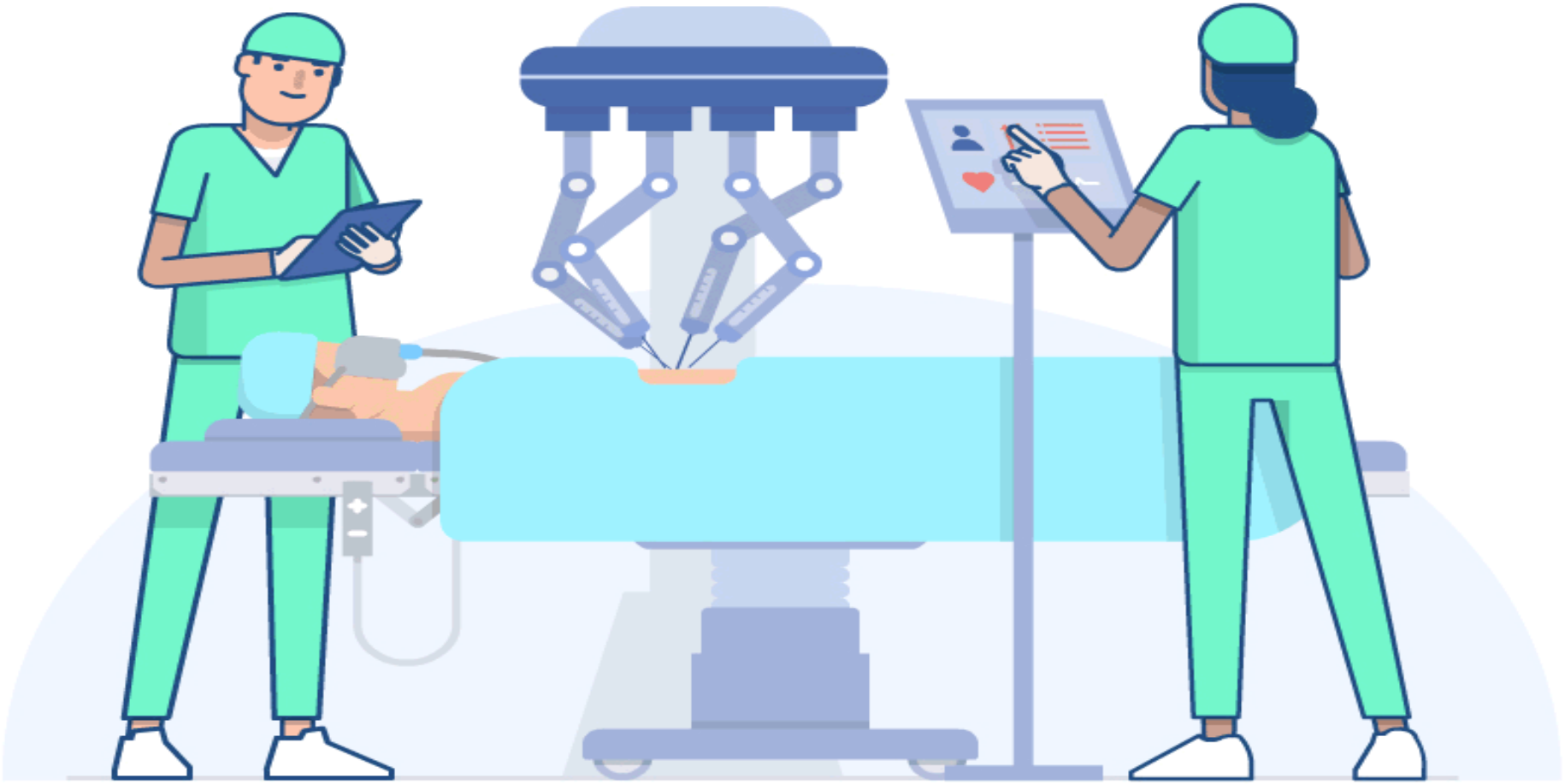

AI usage has grown by 270% in the last four years
Gartner

AI Applications: Smart Home

AI Applications: Smart City



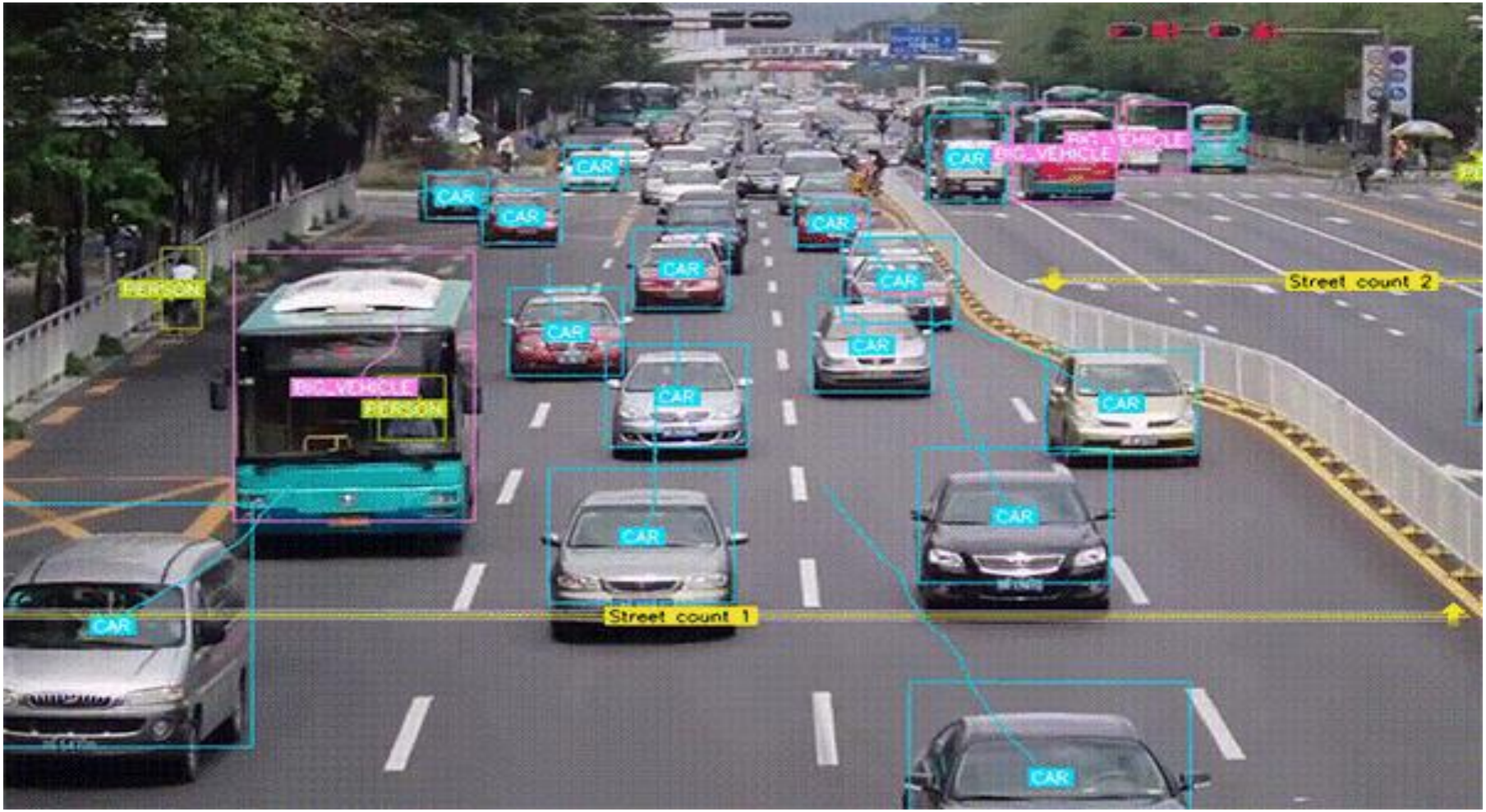
AI Applications: Medical



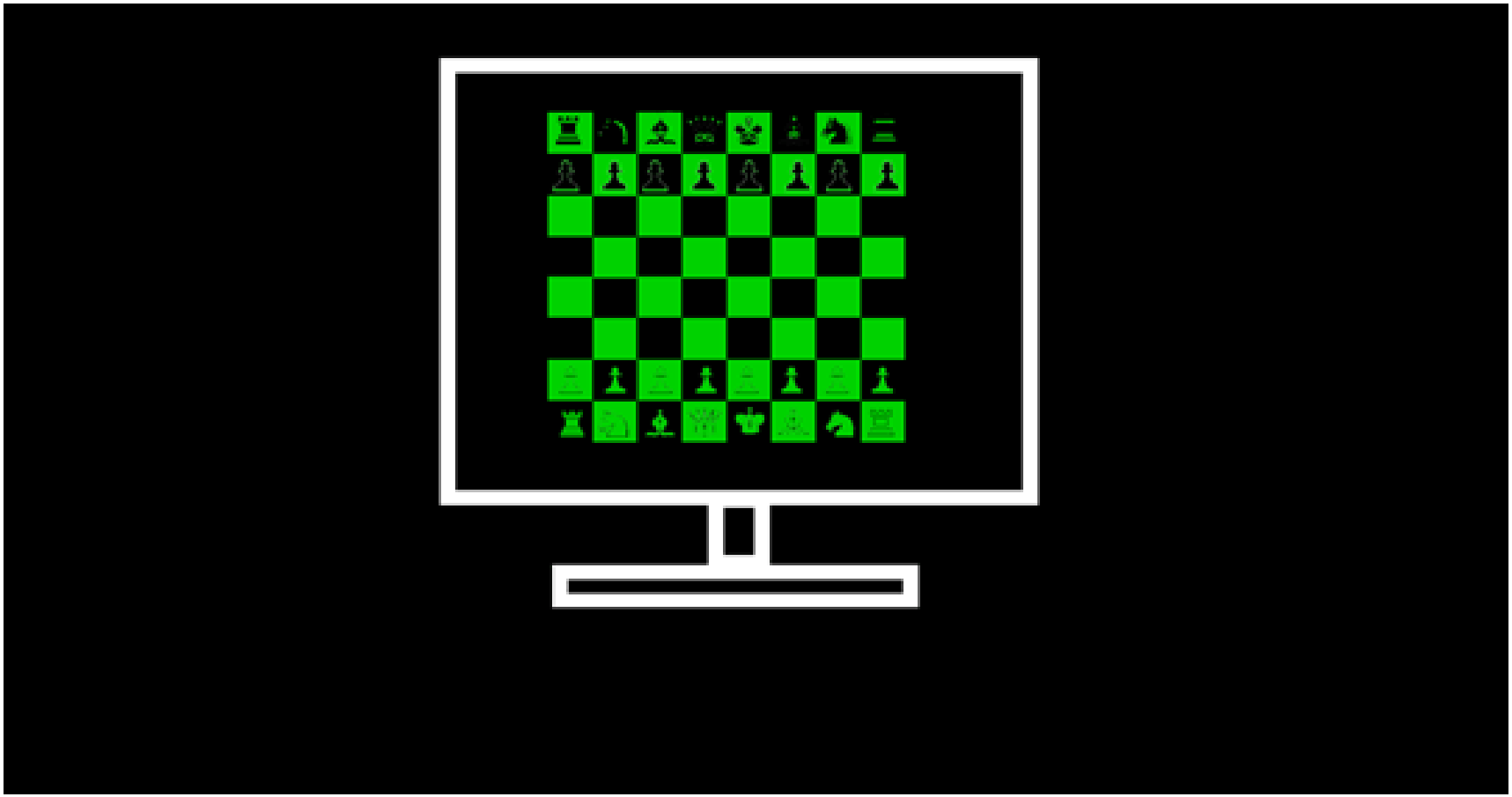
AI Applications: Agriculture

AI Applications: Stock Market

AI Applications: Transportation



AI Applications: Gaming



Course Overview

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Text Book:

- "ARTIFICIAL INTELLIGENCE", RICH, KNIGHT, McGraw HILL, 3rd Edition (2009)

Reference books:

- ARTIFICIAL INTELLIGENCE AND INTELLIGENT SYSTEM by N. P. PADHY, OXFORD UNIVERSITY PRESS

Exam Details

Continuous Assessment(C010203, One Mandatory, out of rest 3 best 2 will be selected):

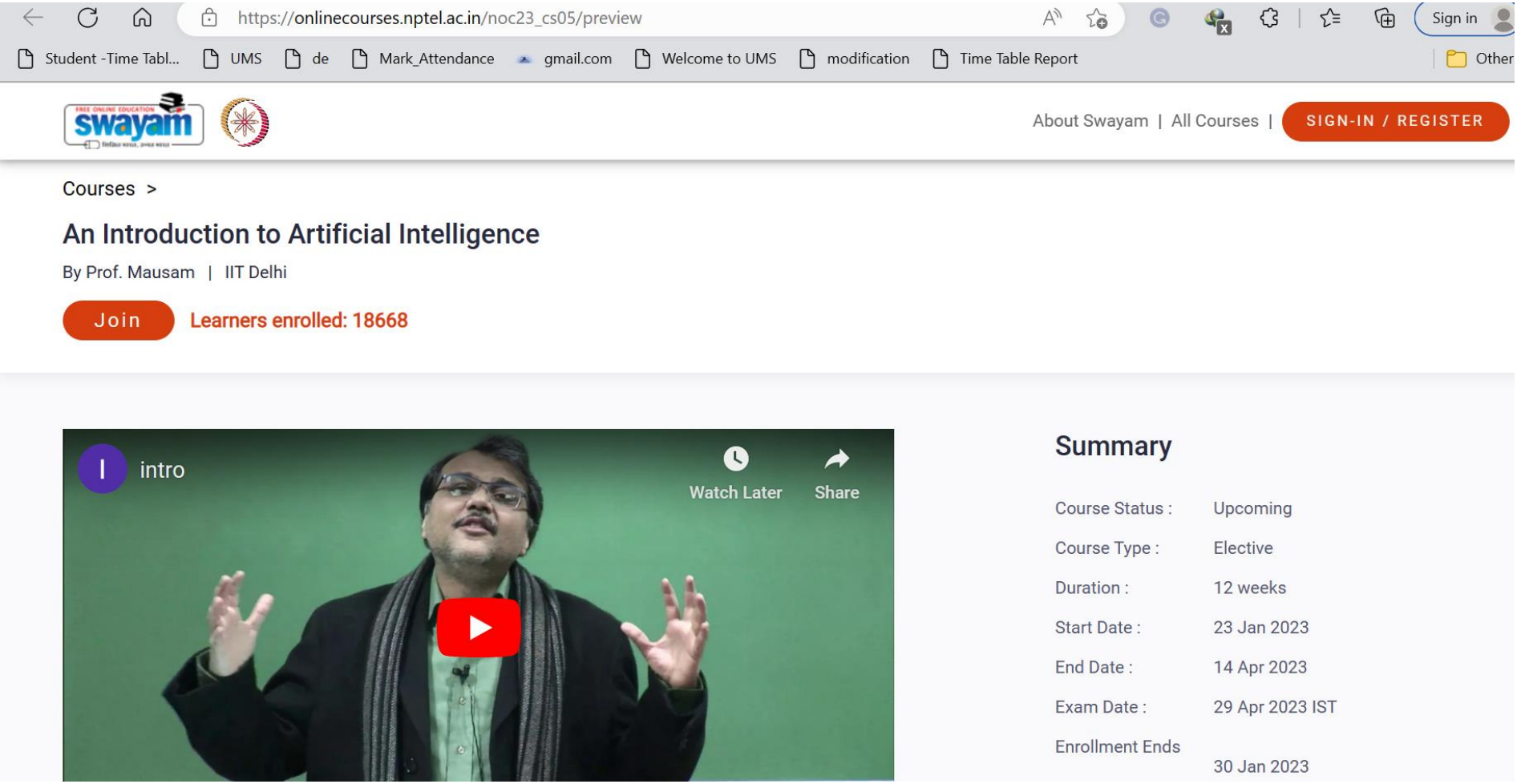
- Seminar 1 (Mandatory/Compulsory)
- MCQ
- Written Test 1
- Written Test 2

NO MTE

ETE(Full MCQ)

MOOCs

https://onlinecourses.nptel.ac.in/noc23_cs05/preview



Course Outcomes:

CO1 :: describe basic knowledge representation, problem solving, and learning methods of artificial intelligence.

CO2 :: compare various search techniques used to solve AI problems.

CO3 :: use analytical concepts for solving logical problems using heuristics approaches

CO4 :: examine the various statistical reasoning techniques to solve AI problems.

CO5 :: justify the performance of different game playing algorithms.

CO6 :: discuss the concepts of machine learning, fuzzy logic, genetic algorithms and NLP.

Introduction

What is intelligence?, What is AI?, Foundation of AI, History of AI, Basics of AI, AI problems, AI Techniques, Applications of AI

Problem Spaces and Search

Defining the problem as state space search, Production Systems, Production System characteristics, Problem characteristics, Issues in designing search problems, Breadth First Search, Depth First Search, Bi-directional Search, Iterative Deepening

Informed Search Strategies:

- Heuristic functions
- Generate and Test
- Hill Climbing
- Simulated Annealing
- Best First Search
- A* Algorithm
- Constraint Satisfaction

Knowledge Representation

- Representation and Mapping
- Approaches in Knowledge representation
- Issues in knowledge representation
- Propositional Logic
- Procedural versus declarative knowledge
- Logic programming
- Forward versus backward reasoning

Statistical Reasoning

Probability and Bayes theorem, Bayesian network, Dempster-Shafer theory, certainty factors and rule based systems.

Weak slot and filler structures

Semantic nets, frames

Strong slot and filler structures

Conceptual dependency, scripts

Game Playing

Evaluation function, Minmax Problem, The min-max search procedure, Alpha-beta cutoffs, Alpha-beta pruning

Natural Language Processing

Introduction to NLP, NLP phases, Spell checking, soundex algorithm, construction of parse tree, bag of words model, applications of NLP, Alexa, siri, cortana

Unit VI

Advanced Topics in Artificial Intelligence

- Introduction to machine learning
- Types of machine learning
- Overview of neural networks
- Overview of genetic algorithms
- Overview of fuzzy logic

Current trends in AI :

- The augmented workforce
- AI in cybersecurity
- Explainable AI
- AI and the metaverse
- autonomous vehicles

Any Question?