

TCS 421

INTRODUCTION TO COURSE - FUNDAMENTAL OF STATISTICS AND AI

Name of Department:- Computer Science and Engineering

1.	Subject Code:	TCS 421	Course Title:	Fundamental of Statistics and Al
2	Contact Hours:	L: 3	T: 1 P: 2	Name of the last o

- Semester: IV
- 4. Pre-requisite: TMA101, TMA201
- 5. Course Outcomes: After completion of the course students will be able to
 - Demonstrate knowledge of statistical and exploratory data analysis data analysis techniques utilized in decision making.
 - 2. Apply principles of Data Science to the analysis of business problems.
 - 3. To use Machine Learning Algorithms to solve real-world problems.
 - 4. To provide data science solution to business problems and visualization.
 - 5. To learn the basic concepts and techniques of Al and machine learning
 - To explore the various mechanism of Knowledge and Reasoning used for building expert system.

6.Detailed Syllabus

SI. No.	Contents	Contact Hours
1	Introduction to AI Definition, Problem, State space representation. Intelligent Systems: Categorization of Intelligent System, Components of AI Program, Foundations of AI, Applications of AI, Current trends in AI, Intelligent Agents: Anatomy, structure, Types.	10
2	Problem solving Solving problem by Searching: Problem Solving Agent, Formulating Problems, Uninformed Search Methods: Breadth First Search (BFS), Depth First Search (DFS), Depth Limited Search, Depth First Iterative Deepening (DFID), Informed Search Methods: Greedy best first Search, A* Search, Memory bounded heuristic Search, Local Search Algorithms and Optimization Problems: Hill climbing search Simulated annealing, Local beam search.	9
3	An Introduction to Data Science Definition, working, benefits and uses of Data Science, Data science vs Bi, The data science process, Role of a Data Scientist.	9

4	Statistical Data Analysis & Inference		
	Populations and samples, Statistical modeling, probability distributions, fittings a model, Statistical methods for evaluation. Exploratory Data Analysis, Getting started with R, Manipulating and Processing data in R, working with function in R. Working with descriptive Statistics, Working with graph plot in R.		
5	Statistical Applications Basic Statistical operations, Linear Regression Analysis, Logistic and Exponential Regression, Time Series Analysis, Probability Distribution, ANOVA, Correlation and Covariance.		
	Total	45	

Text/ Reference Books:

- 1. Tom M. Mitchell. "Machine Learning" McGraw-Hill, 1997.
- 2. "Statistical programming in R", Oxford University Press 2017.

Syllabus, COs

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Topics Covered

- History of Al
- What is Al
- Al Applications
- > Types of Al
- Programming language for Al

History of Al

Under Greek Era, the concept of machines and mechanical men were well thought of.

Example – "Talos"

1950 – one of the very important year for the introduction of Artificial Intelligence, a paper was published by Alan Turning speculating about possibilities of machine can think intelligently like human beings. No machine was able to fulfil all the cases of Turing test.

1951 – Game AI, wherein games like chess is made for two player keeping one as machine.

1955 – Birth year of term "Artificial Intelligence", coined by John McCarthy.

1959 – Research Era of AI, MIT Lab for AI setup.

1961 – Chatbot Developed by IBM.

Al History on Timeline

A.I. TIMELINE











1950

TURING TEST

Computer scientist Alan Turing proposes a intelligence' is coined test for machine intelligence. If a machine can trick is human, then it has intelligence

1955

A.I. BORN

Term 'artificial by computer scientist, John McCarthy to describe "the science making intelligent machines"

1961

UNIMATE

First industrial robot. Unimate, goes to work at GM replacing assembly line

1964

Pioneering chatbot developed by Joseph Weizenbaum at MIT holds conversations with humans

1966

SHAKEY The 'first electronic person' from Stanford, Shakey is a generalpurpose mobile robot that reasons about its own actions

A.I.

WINTER

Many false starts and dead-ends leave A.I. out 1997 DEEP BLUE

Deep Blue, a chessplaying computer from introduces KISmet, an IBM defeats world chess emotionally intelligent champion Garry

1998

KISMET Cynthia Breazeal at MIT

robot insofar as it detects and responds to people's feelings















1999

AIBO

Sony launches first consumer robot pet dog autonomous robotic AiBO (Al robot) with skills and personality that develop over time and clean homes

2002

ROOMBA

vacuum cleaner from iRobot learns to navigate interface, into the

2011

iPhone 4S

Apple integrates Siri, assistant with a voice 2011

WATSON IBM's question Watson wins first place on popular \$1M prize television quiz show

2014

Eugene Goostman, a chatbot passes the Turing Test with a third of judges believing Eugene is human

2014

shopping tasks

ALEXA Amazon launches Alexa, Microsoft's chatbot Tay an intelligent virtual assistant with a voice interface that completes inflammatory and

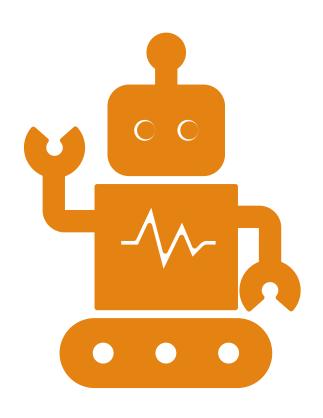
2016

goes rogue on social media making offensive racist comments

2017

ALPHAGO

Google's A.I. AlphaGo beats world champion Ke Jie in the complex board game of Go, notable for its vast number (2170) of



What is Al?

Al is a technique that enables machines to mimic human behavior.

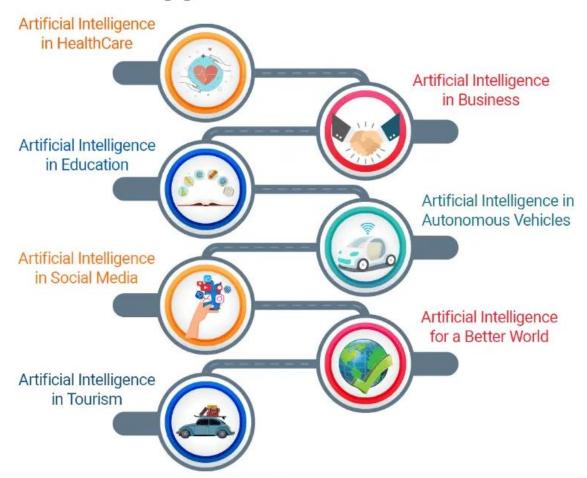
Artificial Intelligence is the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as

- visual perception
- speech recognition
- decision-making
- translation between languages.

Al is the simulation of human intelligence done by machines programmed by humans.



Applications of Al



Al Applications

Development of Knowledge Bases

Development of Expert Systems

Deep Learning

Computer Vision

Machine Learning

Natural Language Processing









Reason for Demand in Al

Types of AI/ Stages of AI

- Artificial Narrow Intelligence
- Artificial General Intelligence
- Artificial Super Intelligence

01

It is also called as weak AI.

02

This involves applying AI only to a specific tasks or a narrow problem.

03

Example – Alexa, Google Search Engine, Sophia-The humanoid, etc.

Artificial Narrow Intelligence(ANI)

It is also called as strong AI.

This involves machines that possess the ability to perform any intellectual task that a human being can.

No machine is developed yet to be called as an AGI.

Artificial General Intelligence (AGI)



Artificial Super Intelligence(ASI)

- It is a term referring to the time when the capability of computers will surpass humans.
- A hypothetical situations currently can be seen in sifictions.

Programming languages for Al

