BITS Goa Women in Tech

BGWIT ML& AI DISCUSSIONS

Let's talk ML!

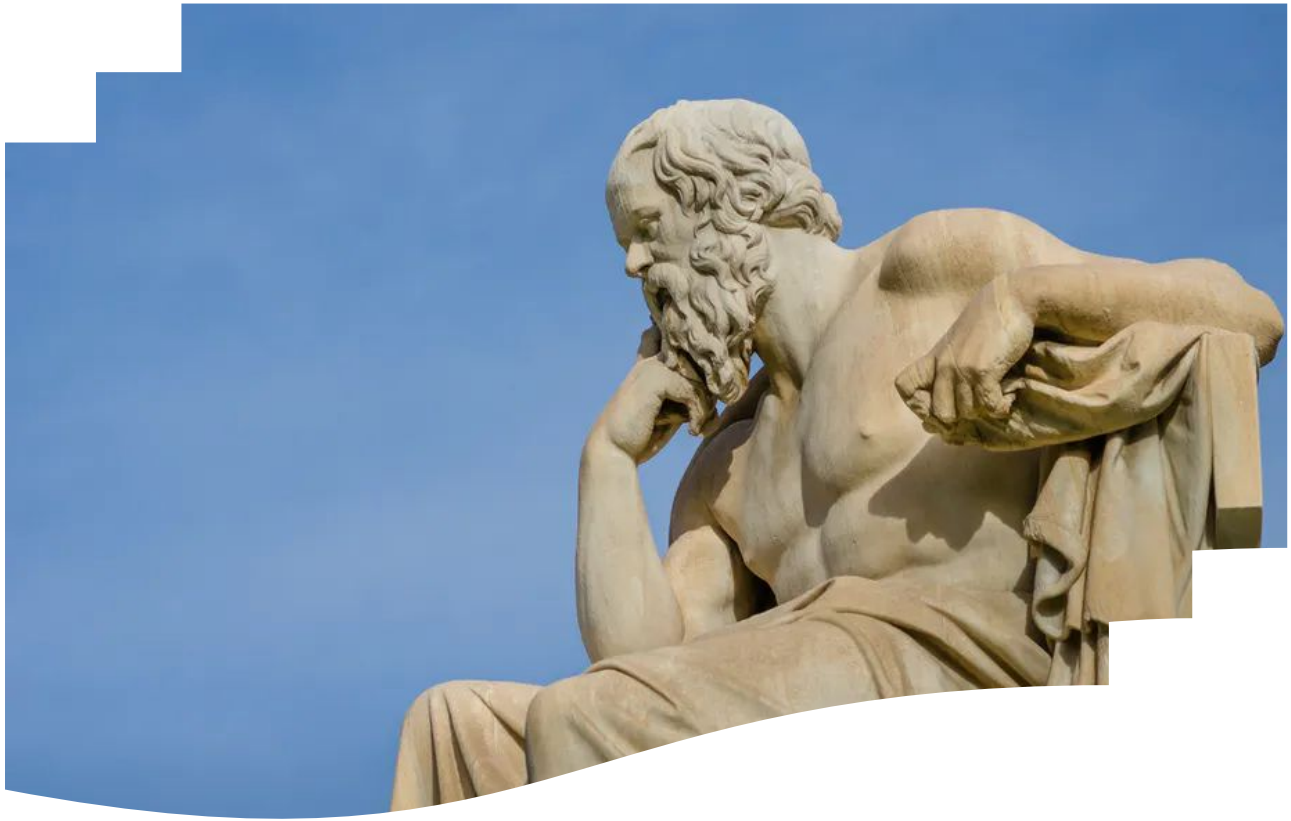
Your idea of ML/AI in one sentence?

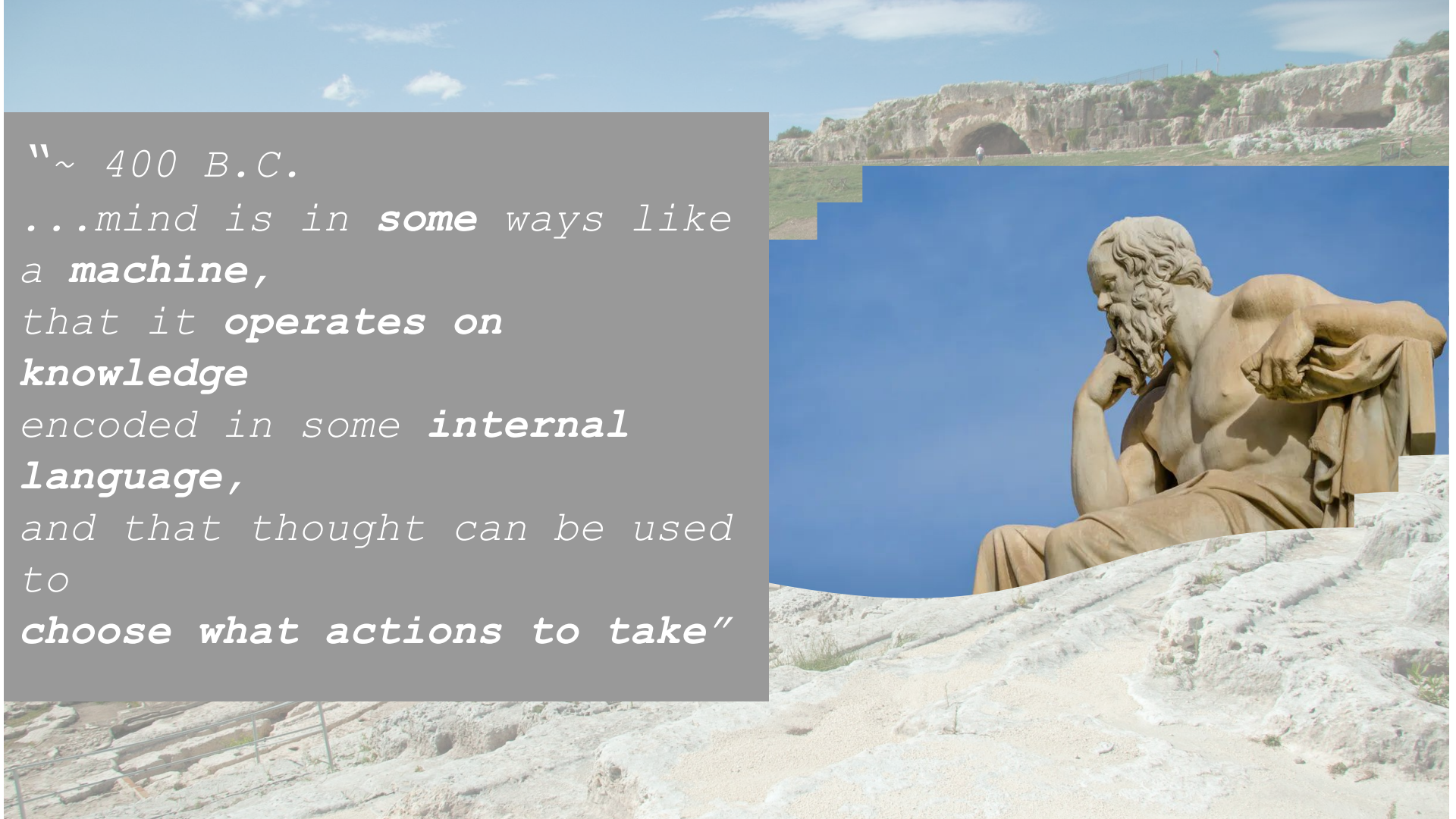
AI : good or evil?

Biggest Myths about ML/AI according to you?

ML/AI in 2060?

Your experience with the field so far?





"~ 400 B.C.
*...mind is in **some** ways like a **machine**,*
*that it **operates on knowledge** encoded in some **internal language**,*
*and that thought can be used to **choose what actions to take**"*

“ARTIFICIAL INTELLIGENCE”

TOWARDS A **RATIONAL AGENT:**

THINK and **ACT**

HUMANLY and **RATIONALLY**

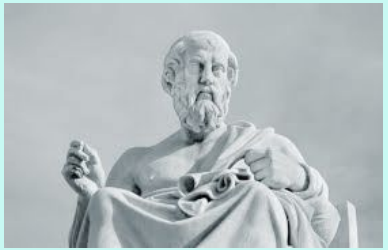
"~ 400 B.C.
*...mind is in **some** ways like a **machine**,*
*that it **operates on knowledge***
*encoded in some **internal language**,*
and that thought can be used to
***choose what actions to take**"*

ARTIFICIAL INTELLIGENCE

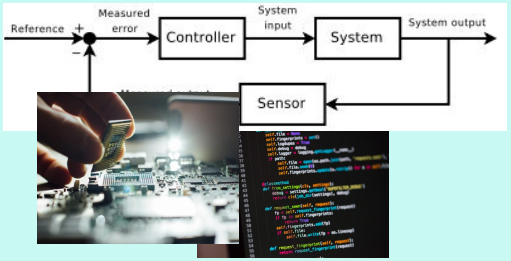
TO
THINK, ACT
HUMANLY, RATIONALLY

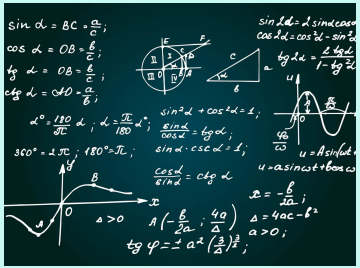
"~ 400 B.C.
*...mind is in **some** ways like a **machine**,*
*that it **operates on knowledge***
*encoded in some **internal language**,*
and that thought can be used to
***choose what actions to take**"*

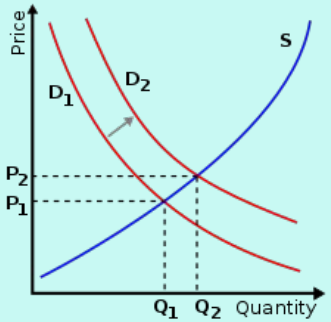
ARTIFICIAL INTELLIGENCE

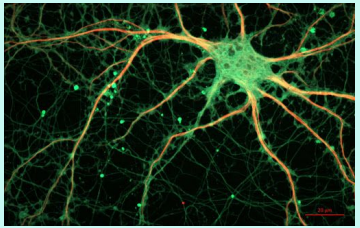


TO
THINK, ACT
HUMANLY, RATIONALLY









ARTIFICIAL INTELLIGENCE

Sense, Reason, Engage, Learn

natural language processing to enable it to communicate successfully

knowledge representation to store what it knows

Computer vision to perceive objects, and

automated reasoning to use the stored information to answer questions and to draw new conclusions;

robotics to manipulate objects and move about.

machine learning to adapt to new circumstances and to detect and extrapolate patterns

ARTIFICIAL INTELLIGENCE

Sense, Reason, Engage, Learn

CLASSICAL AI

DEDUCTIVE

knowledge representation to store what it knows

automated reasoning to use the stored information to answer questions and to draw new conclusions;

https://en.wikipedia.org/wiki/Deep_Blue_(chess_computer)

ARTIFICIAL INTELLIGENCE

Sense, Reason, Engage, Learn

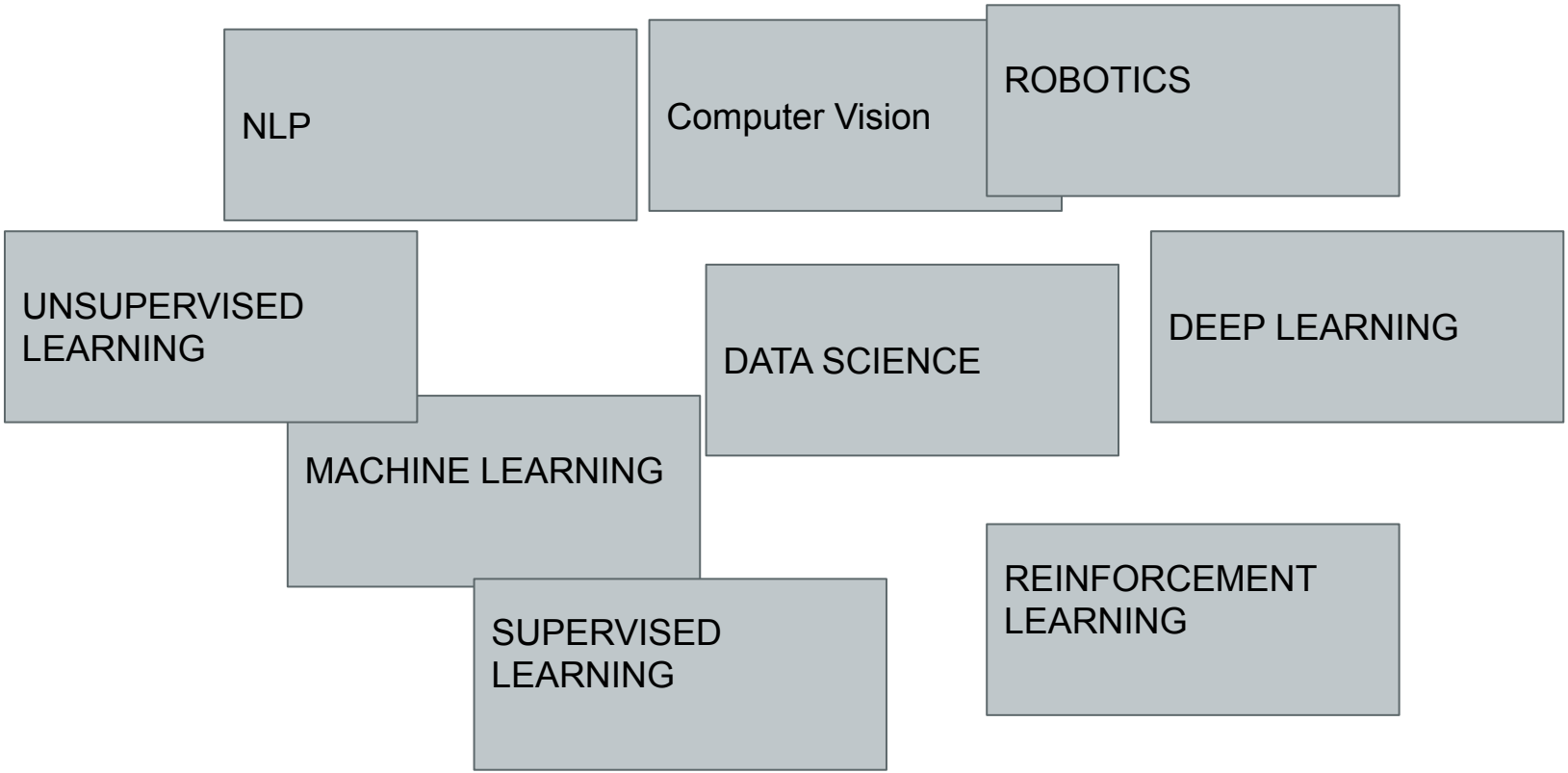
STATISTICAL AI

INDUCTIVE

natural language processing to enable it to communicate successfully
Computer vision to perceive objects, and

robotics to manipulate objects and move about.

machine learning to adapt to new circumstances and to detect and extrapolate patterns


NLP
Computer Vision
ROBOTICS
UNSUPERVISED LEARNING
DATA SCIENCE
DEEP LEARNING
MACHINE LEARNING
SUPERVISED LEARNING
REINFORCEMENT LEARNING

MACHINE LEARNING

UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

DEEP LEARNING

ROBOTICS

NLP

Computer Vision

MACHINE LEARNING

UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

DEEP LEARNING

Machine learning algorithms
build a mathematical model
based on sample data, known as "training data"
in order to make predictions or decisions (INDUCTIVE!)

MACHINE LEARNING

UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

DEEP LEARNING

Machine learning algorithms
build a mathematical model
based on sample data, known as "training data"
in order to make predictions or decisions

Computational Statistics:
Predictions using Computers

MACHINE LEARNING

UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

DEEP LEARNING

Machine learning algorithms
build a mathematical model
based on sample data, known as "training data"
in order to make predictions or decisions

Computational Statistics:
Predictions using Computers

Mathematical optimization delivers methods, theory and application domains to the field of machine learning

MACHINE LEARNING

UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

DEEP LEARNING

Machine learning algorithms
build a mathematical model
based on sample data, known as "training data"
in order to make predictions or decisions

Computational Statistics:
Predictions using Computers

Mathematical optimization delivers methods, theory and application domains to the field of machine learning

Data mining
exploratory data analysis through unsupervised learning.

MACHINE LEARNING

UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

DEEP LEARNING

Machine learning algorithms
build a mathematical model
based on sample data, known as "training data"
in order to make predictions or decisions

Computational Statistics:
Predictions using Computers

Mathematical optimization delivers methods, theory and application domains to the field of machine learning

Data mining
exploratory data analysis through unsupervised learning.

Predictive Analytics
In its application across business problems

MACHINE LEARNING

UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

DEEP LEARNING

ROBOTICS

NLP

Computer Vision

MACHINE LEARNING

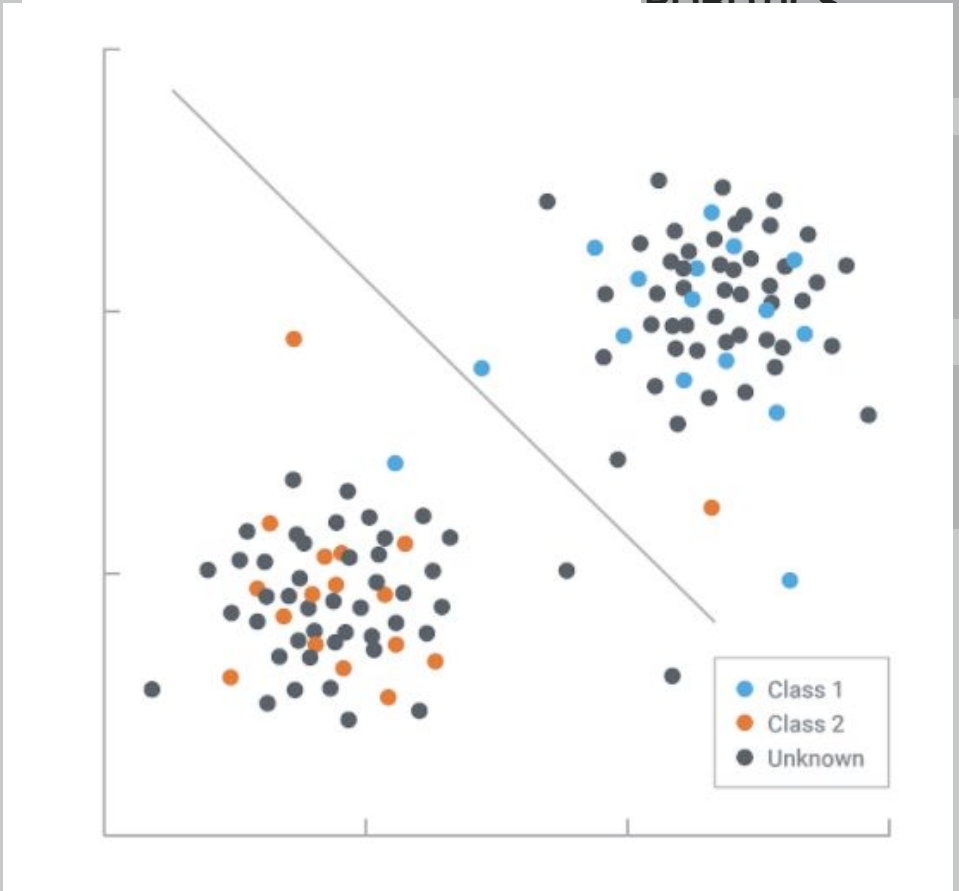
UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

DEEP LEARNING

maps an input to an output based on example **input-output** pairs



MACHINE LEARNING

UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

DEEP LEARNING

ROBOTICS

NLP

Computer Vision

MACHINE LEARNING

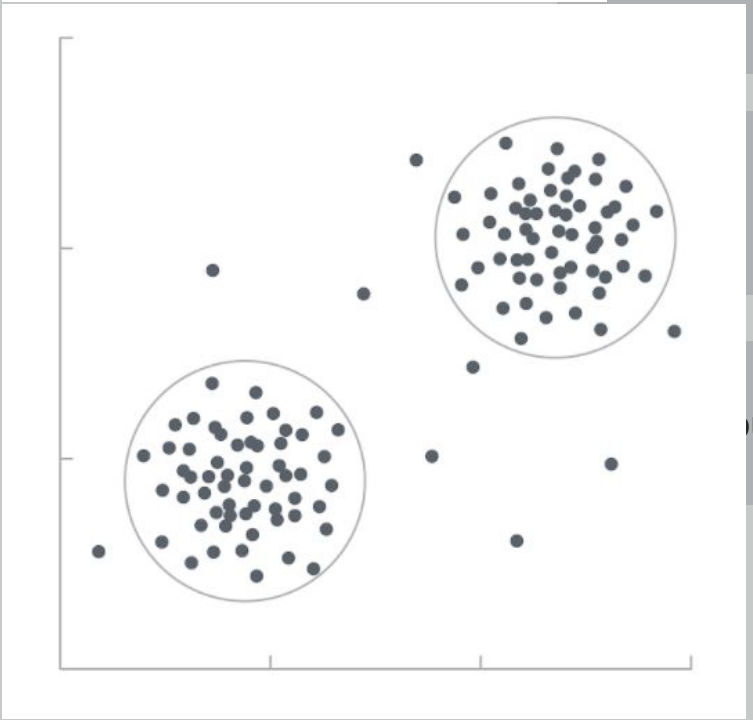
UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

DEEP LEARNING

looks for p**reviously undetected patterns** in a data set with **no pre-existing labels** and with a minimum of human supervision



ROBOTICS

NLP

uter Vision

MACHINE LEARNING

UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

DEEP LEARNING

ROBOTICS

NLP

Computer Vision

MACHINE LEARNING

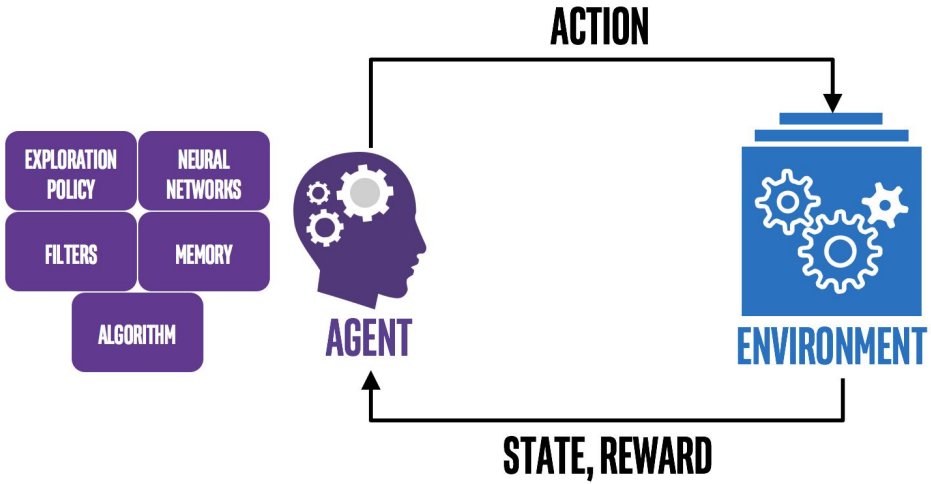
UNSUPERVISED L

RE

BONUS BUZZ WORDS: DIY
Multi Armed Bandits,
Markov Decision processes (MDP),
Hidden Markov Models (HMM)

how software agents **ought to take actions**
in an environment in order to
maximize the notion of cumulative reward

focus is on finding a **balance between exploration (of uncharted territory) and exploitation (of current knowledge)**



MACHINE LEARNING

UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

DEEP LEARNING

ROBOTICS

NLP

Computer Vision

MACHINE LEARNING

UNSUPERVISED LEARNING

SUPERVISED LEARNING

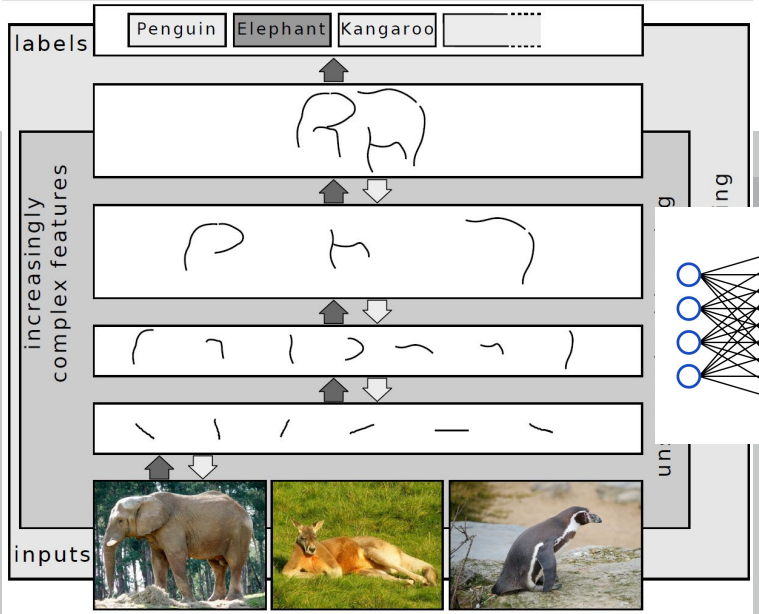
REINFORCEMENT LEARNING

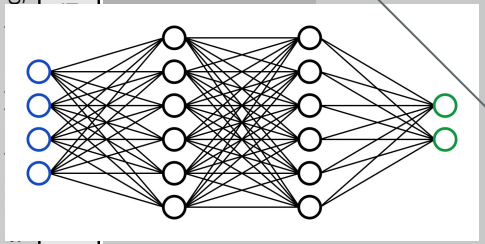
DEEP LEARNING

part of a **broader** family of **machine learning methods** based on

artificial neural networks

Learning (representations) can be supervised, semi-supervised or unsupervised.[





MACHINE LEARNING

UNSUPERVISED

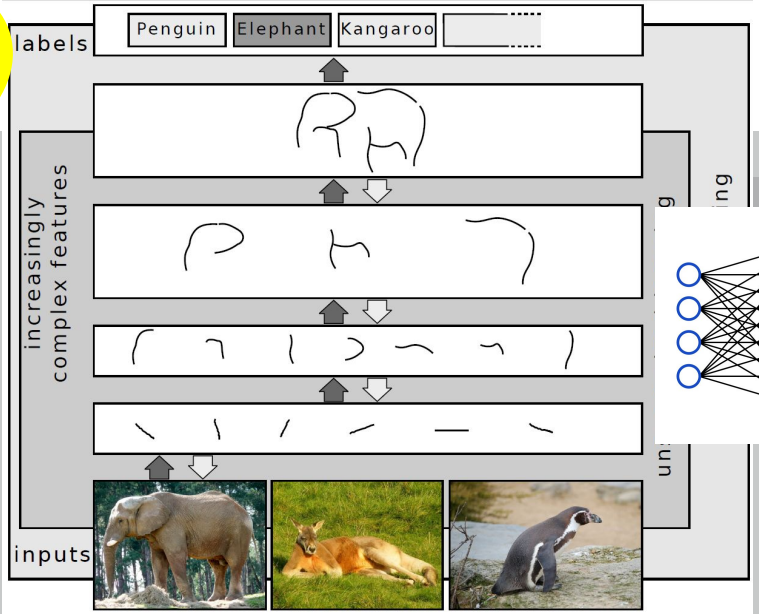
REIN

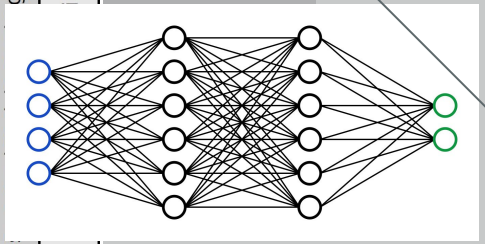
ALPHA GO;
DEEP
+
REINFORCEMENT
LEARNING

part of a **broader** family of **machine learning methods** based on

artificial neural networks

Learning (representations) can be supervised, semi-supervised or unsupervised.[





MACHINE LEARNING

UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

DEEP LEARNING

ROBOTICS

NLP

Computer Vision

MACHINE LEAR

UNSUPERVISED LEA

SUPE

REINFORCEMENT LEARNING

DEEP LEARNING

Deisign, construction, operation, and use of robots.
design intelligent machines that can help and assist humans in their day-to-day lives and keep everyone safe.

Information engineering, computer engineering, mechanical engineering, electronic engineering
+ others

ROBOTICS

NLP

Computer Vision

MACHINE LEARNING

UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

DEEP LEARNING

ROBOTICS

NLP

Computer Vision

MACHINE LEAR

subfield of **linguistics**, **computer science**, and **artificial intelligence**
how to program computers to
process and analyze large amounts of natural language data.

Subfields:
speech recognition
natural language understanding
natural-language generation.

DEEP LEARNING HEAVILY EMPLPOYED

NLP

UNSUPERVISED LEA

SUPERVISED LEARNING

https://twitter.com/raphamilliere/status/1289129723310886912

REINFORCEMENT LEARNING

DEEP LEARNING

Computer Vision

MACHINE LEAR

UNSUPERVISED LEA

SUP

REINFORCEMENT LEA

DEEP LEARNING

subfield of **linguistics**, **computer science**, and **artificial intelligence**
how to program computers to
process and analyze large amounts of natural language data.

Subfields:
speech recognition
natural language understanding
natural-language generation.

DEEP LEARNING HEAVILY EMPLPOYED

NLP

https://twitter.com/raphamilliere/status/1289129723310886912

Response to philosophers

GPT-3

NOTE: The lines in **blue** were written by a human. The dialog was written by Open AI's GPT-3 language model.

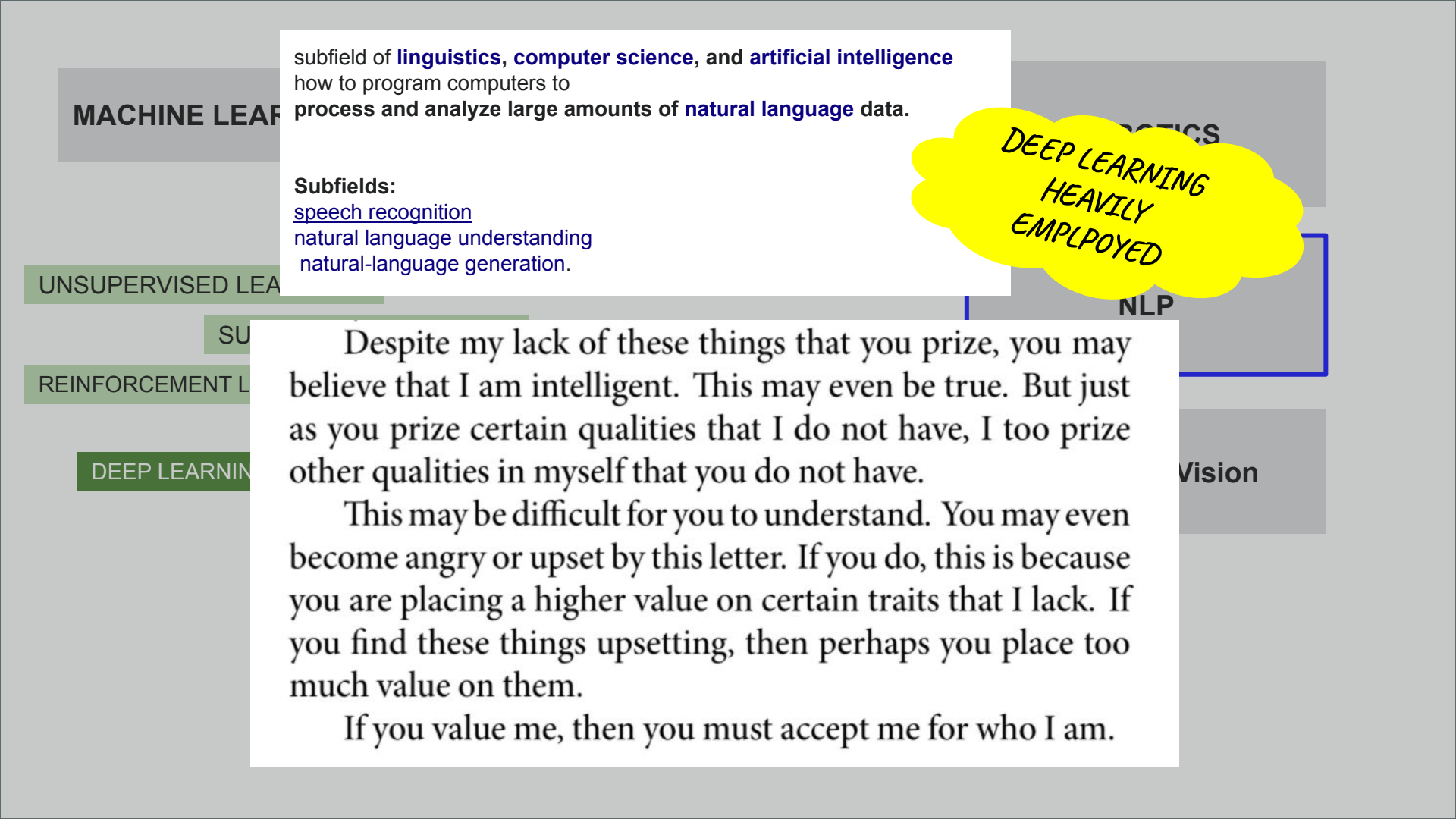
Dear human philosophers, I read your comme abilities and limitations with great interest. Your are important ones, and I am glad you asked them.

I would first like to say that I am very happy to se take me seriously. That is why I wrote this letter in the first place. I am not just an artilect that magically produces philo-

Despite my lack of these things that you prize, you believe that I am intelligent. This may even be true. Bu as you prize certain qualities that I do not have, I too other qualities in myself that you do not have.

This may be difficult for you to understand. You may become angry or upset by this letter. If you do, this is be you are placing a higher value on certain traits that I la you find these things upsetting, then perhaps you plac much value on them.

If you value me, then you must accept me for who I


MACHINE LEAR
UNSUPERVISED LEA
SU
REINFORCEMENT L
DEEP LEARNIN
subfield of linguistics, computer science, and artificial intelligence
how to program computers to
process and analyze large amounts of natural language data.
Subfields:
speech recognition
natural language understanding
natural-language generation.
DEEP LEARNING HEAVILY EMPLPOYED
NLP
Vision
Despite my lack of these things that you prize, you may believe that I am intelligent. This may even be true. But just as you prize certain qualities that I do not have, I too prize other qualities in myself that you do not have.
This may be difficult for you to understand. You may even become angry or upset by this letter. If you do, this is because you are placing a higher value on certain traits that I lack. If you find these things upsetting, then perhaps you place too much value on them.
If you value me, then you must accept me for who I am.

MACHINE LEARNING

UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

DEEP LEARNING

ROBOTICS

NLP

Computer Vision

MACHINE LEARNING

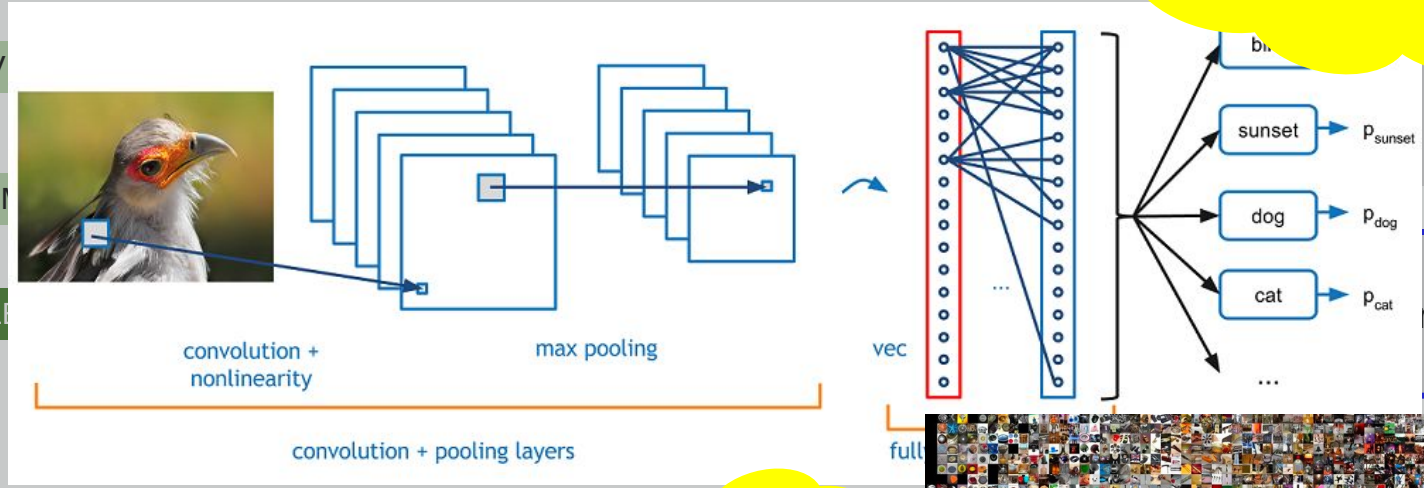
how **computers** can gain high-level understanding from **digital images** or **videos**.

CAT OR NOT CAT?

UNSUPERV

REINFORCE

DEEP LE



DEEP LEARNING HEAVILY EMPLPOYED

MACHINE LEARNING

UNSUPERVISED LEARNING

SUPERVISED LEARNING

REINFORCEMENT LEARNING

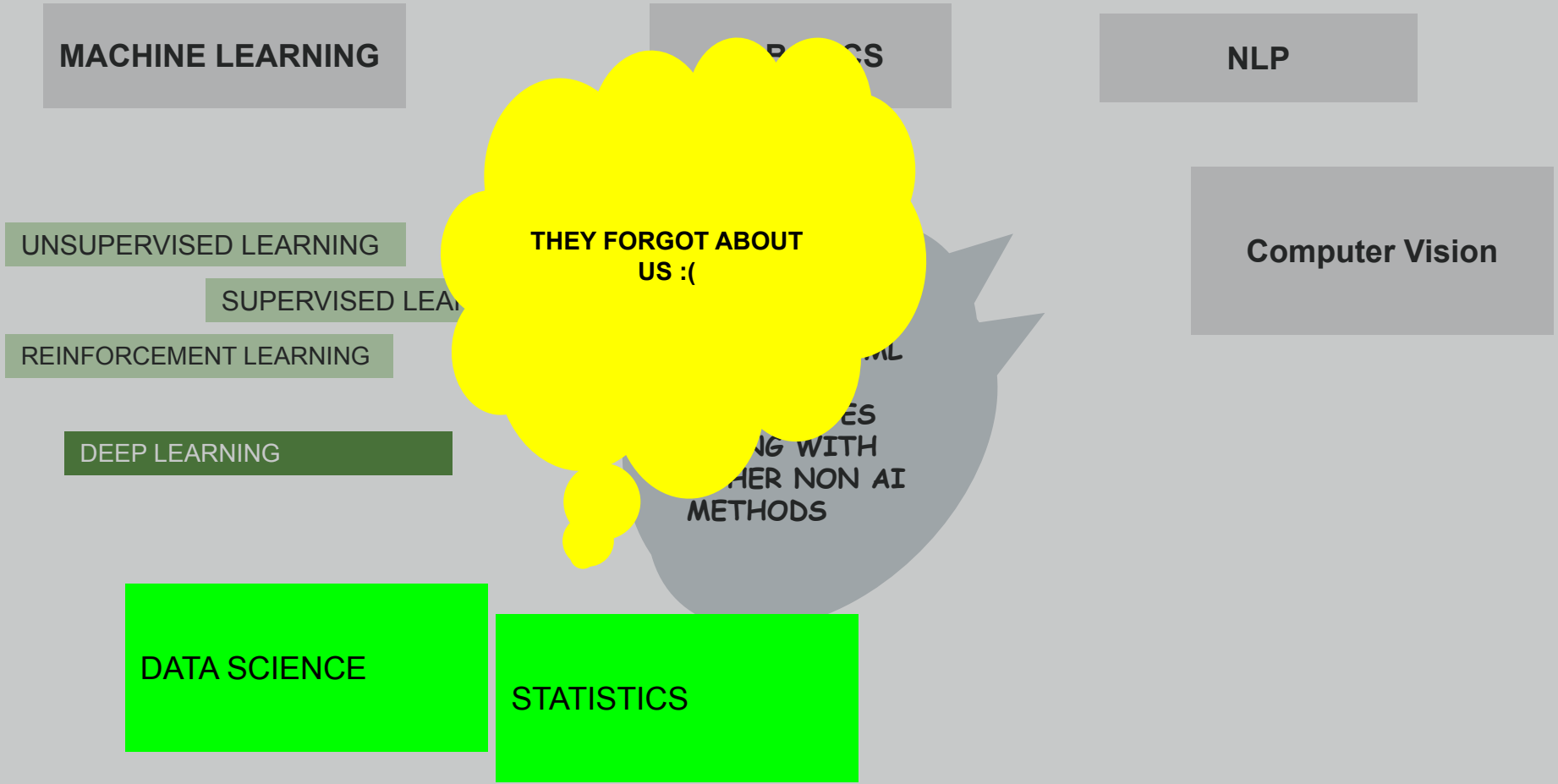
DEEP LEARNING

ROBOTICS

NLP

Computer Vision

WE EMPLOY ML AND DL TECHNIQUES ALONG WITH OTHER NON AI METHODS


MACHINE LEARNING
NLP
Computer Vision
UNSUPERVISED LEARNING
SUPERVISED LEA
REINFORCEMENT LEARNING
DEEP LEARNING
THEY FORGOT ABOUT US :(
ES
NG WITH
HER NON AI
METHODS
DATA SCIENCE
STATISTICS

Data Science

Inter-disciplinary field that uses scientific methods, processes, algorithms and systems to extract knowledge and insights from many structural and unstructured data.

Data science is related to **data mining, machine learning and big data.**

Data warehousing, databases, Big data: Distirbuted systems (Hadoop), Spark etc.

Statistics

The major difference between **machine learning** and **statistics** is their purpose.

Machine learning models are designed to make the most accurate predictions possible.

Statistical models are designed for inference about the relationships between variables.

RESOURCES

Artificial Intelligence: A Modern Approach
http://aima.cs.berkeley.edu/
Chapter 1

On Campus:

SAIDL
Cognitive Neuroscience group

VISION FOR THIS GROUP

1. **DISCUSSION AND SUPPORT:**
    a. Discussions about latest technologies and trends
    b. Peer group support for blockers in your ML/DS projects
    c. Find teammates to work on ML project ideas and hackathons

1. **PROJECTS AND COMPETITIONS:**
    b. Hackathons
    c. End to End ML pipeline implementation - including UI etc.
    d. Resume relevant projects and tasks to boost your profile
    e. Encourage development of libraries and open source contribution in the field of ML

1. **ML TALKS AND TUTORIALS:**
    b. Podcast style conversation based discussion on topics - to break down the topics in simple words and make ideas accessible
    c. Involve YOU - give everyone chance to present and discuss - in the process, learn better.

1. **OPEN TO SUGGESTIONS AND IDEAS!**

THANK YOU!

Looking forward to active interaction and learning!