

What is AI?

Saeed Ahmed MD

Disclosures

- This presentation reflects the views of the author and not of any organization.
- Independent consultant currently on contractual assignment with Biogen
- Other financial disclosures: none.

Artificial Intelligence

Narrow vs. General

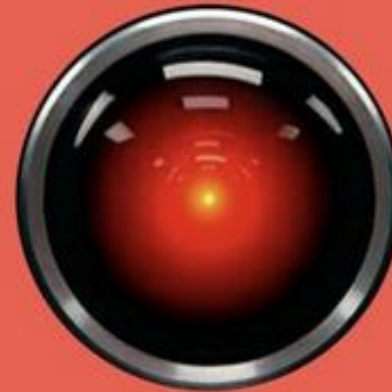
Narrow AI

PERFORMS TASKS THAT NORMALLY REQUIRE HUMAN INTELLIGENCE, BUT CAN ONLY PERFORM TASKS IN A VERY SPECIFIC AND NARROWLY DEFINED DOMAIN.



General AI

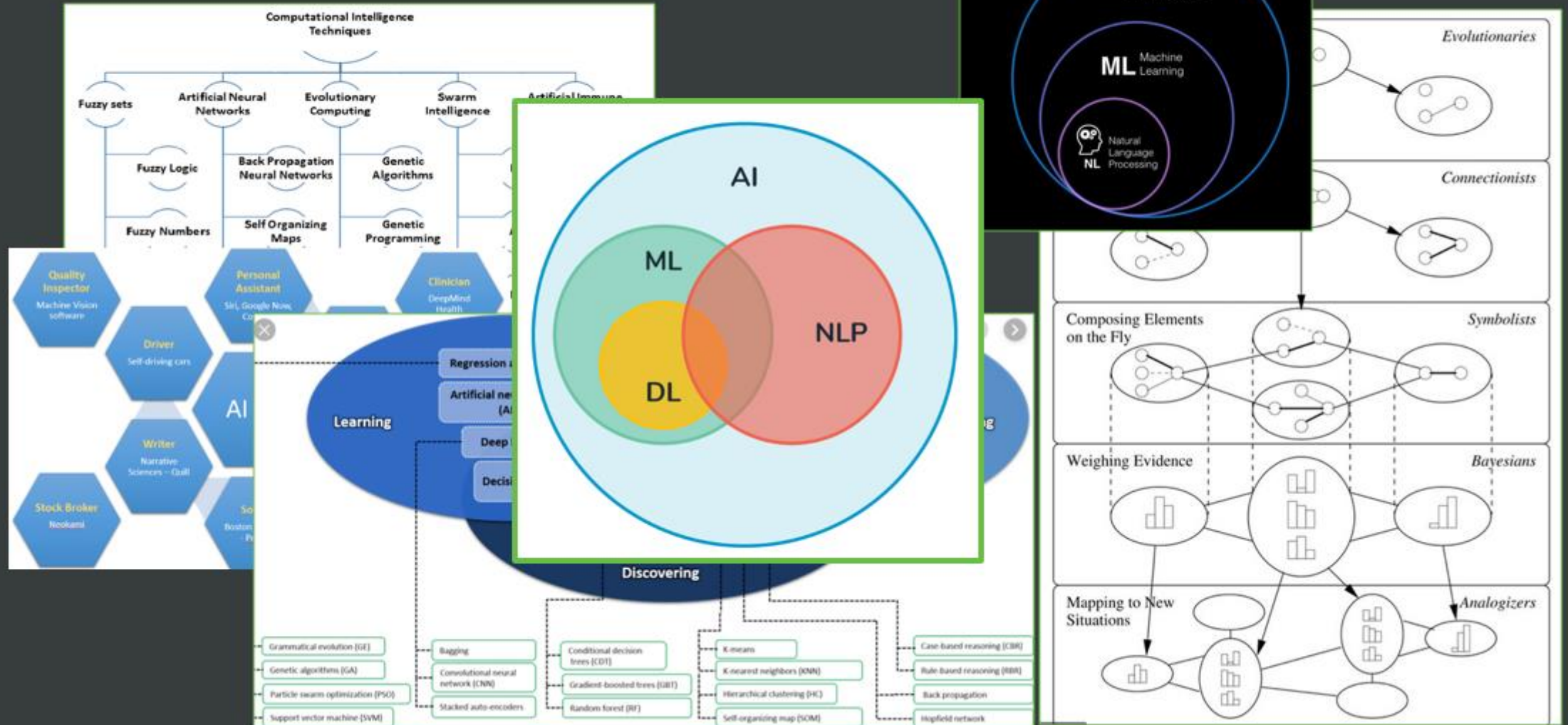
"HUMAN-LEVEL AI".
HAS A GENERAL PROBLEM SOLVING ABILITY THAT ENABLES IT TO LEARN NEW TASKS ACROSS SEVERAL DOMAINS.



What do these guys think about Artificial General Intelligence?



Taxonomies of (Narrow) AI vary



What is Machine Learning?

A machine is said to learn from experience **E** with respect to some class of tasks **t** and performance measure **P** if its performance at tasks in **t**, as measured by **P**, improves with experience **E**

$P(t) \longleftarrow E$

Mitchell, Tom. (1997) Machine Learning
E. Fredkin University Professor
School of Computer Science
Carnegie Mellon University



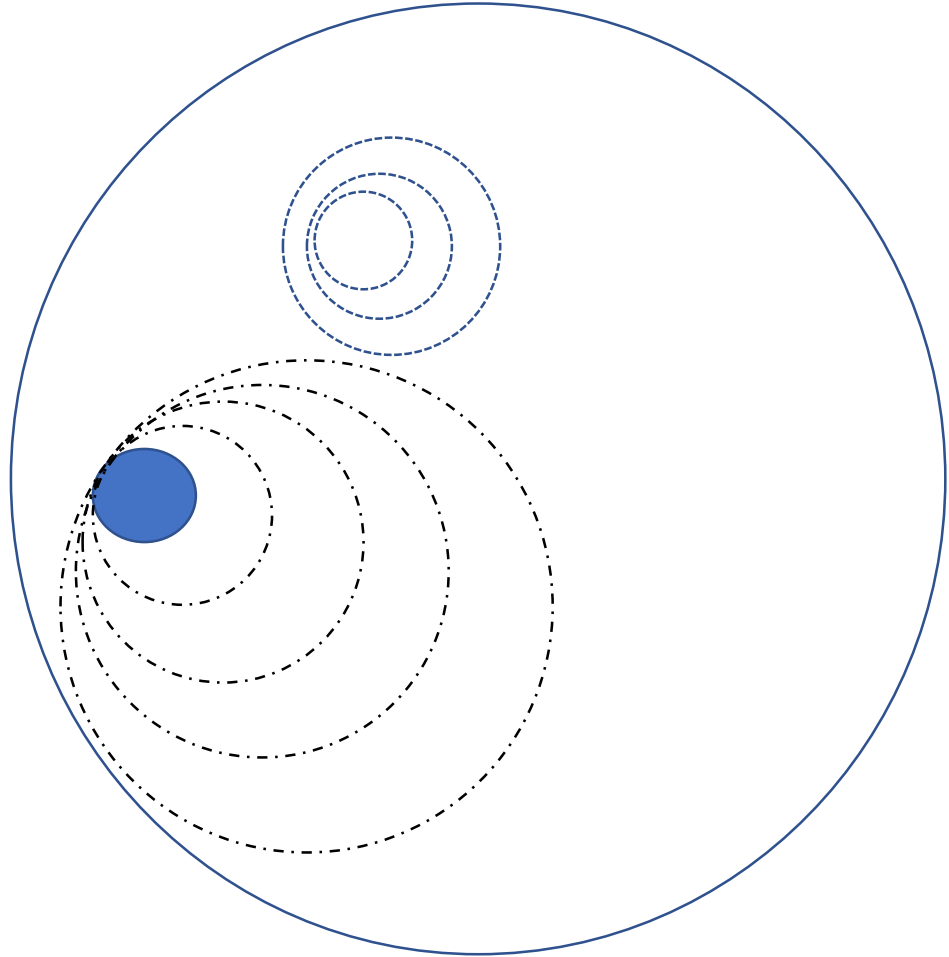
“Curve Fitting” [multivariate, large datasets, fast computation]

Judea Pearl (2019) SamHarris.org
Chancellor’s Professor Emeritus,
Computer Science, UCLA



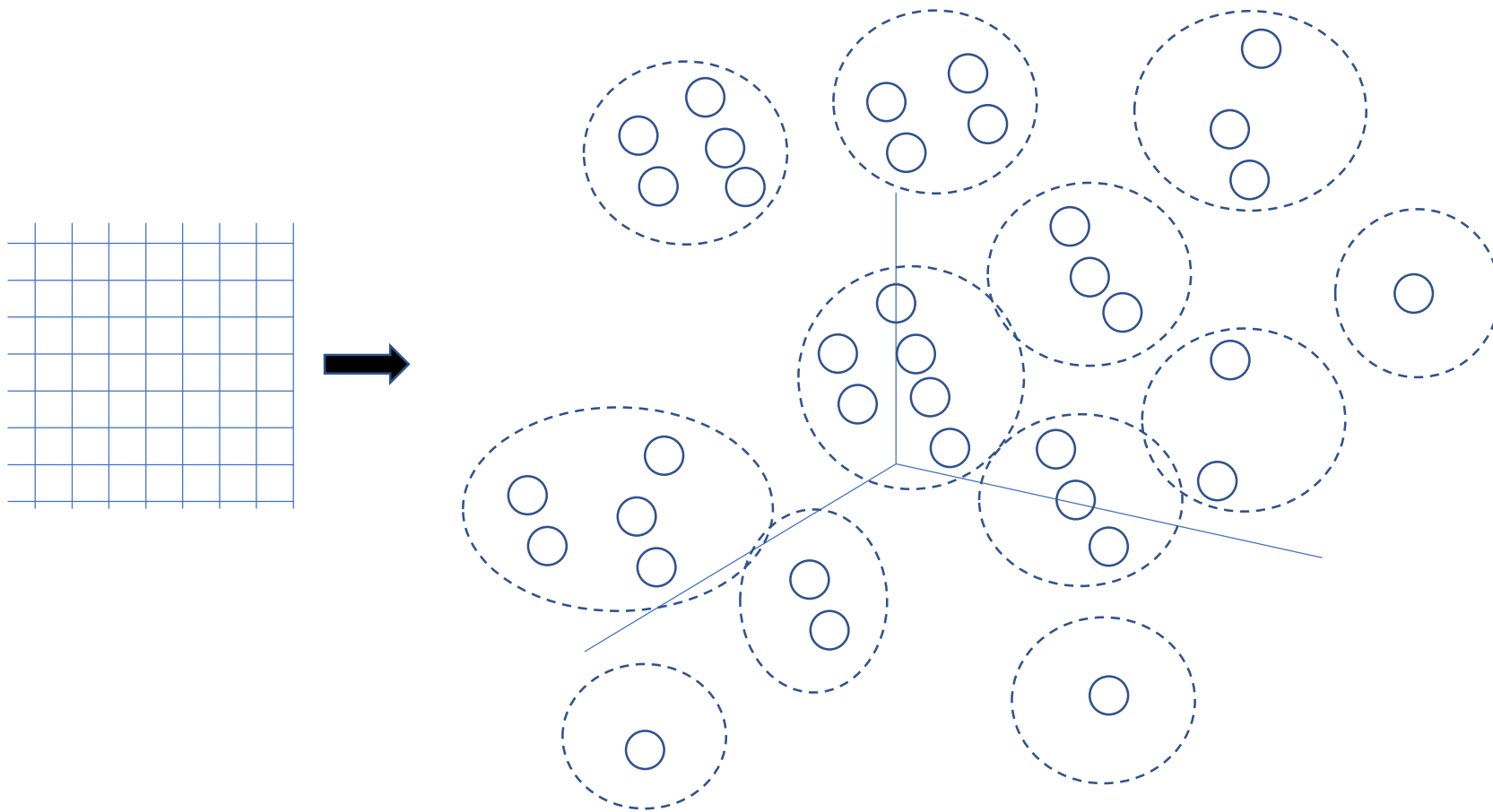
Data

Structured and Unstructured



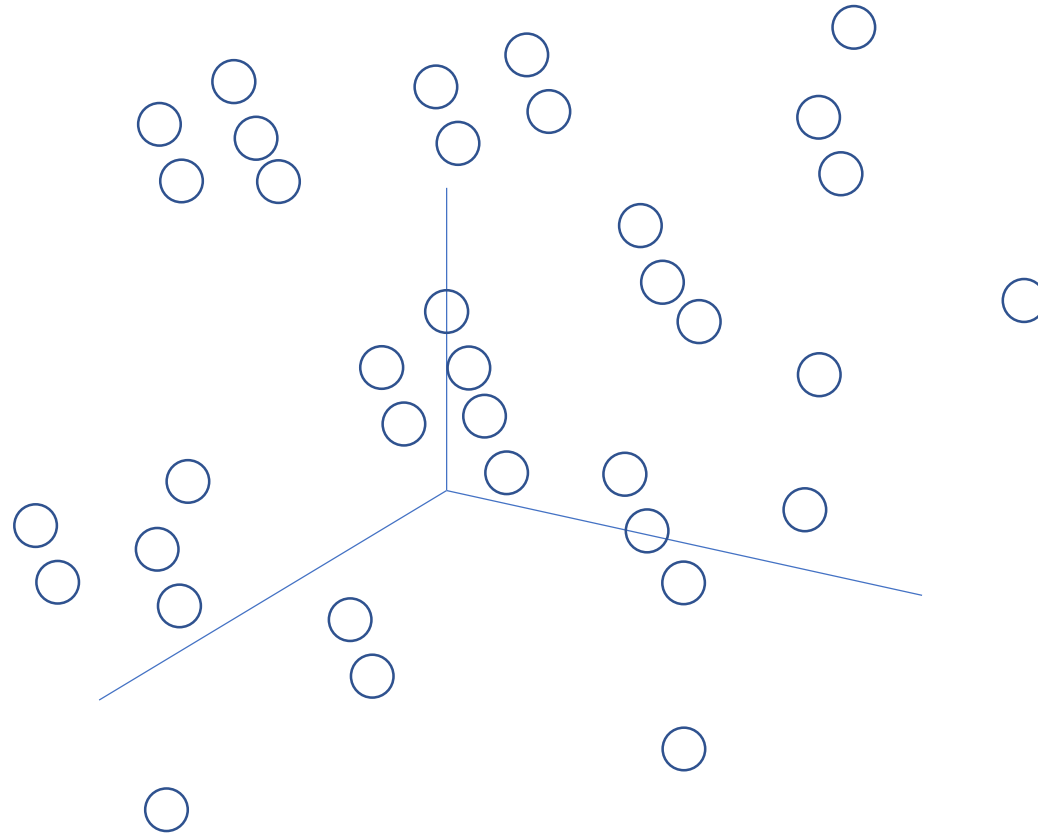
Learning

Unsupervised and Supervised



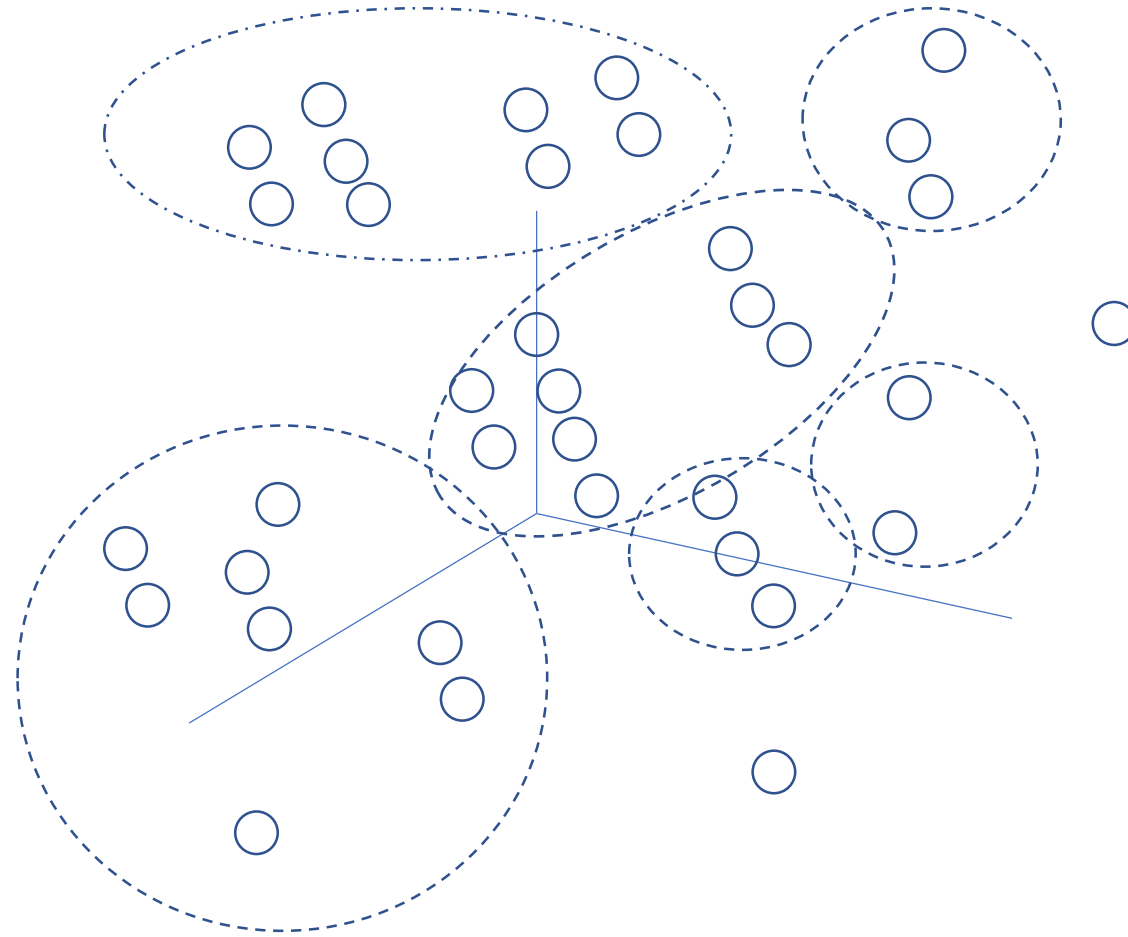
Learning

Unsupervised and Supervised



Learning

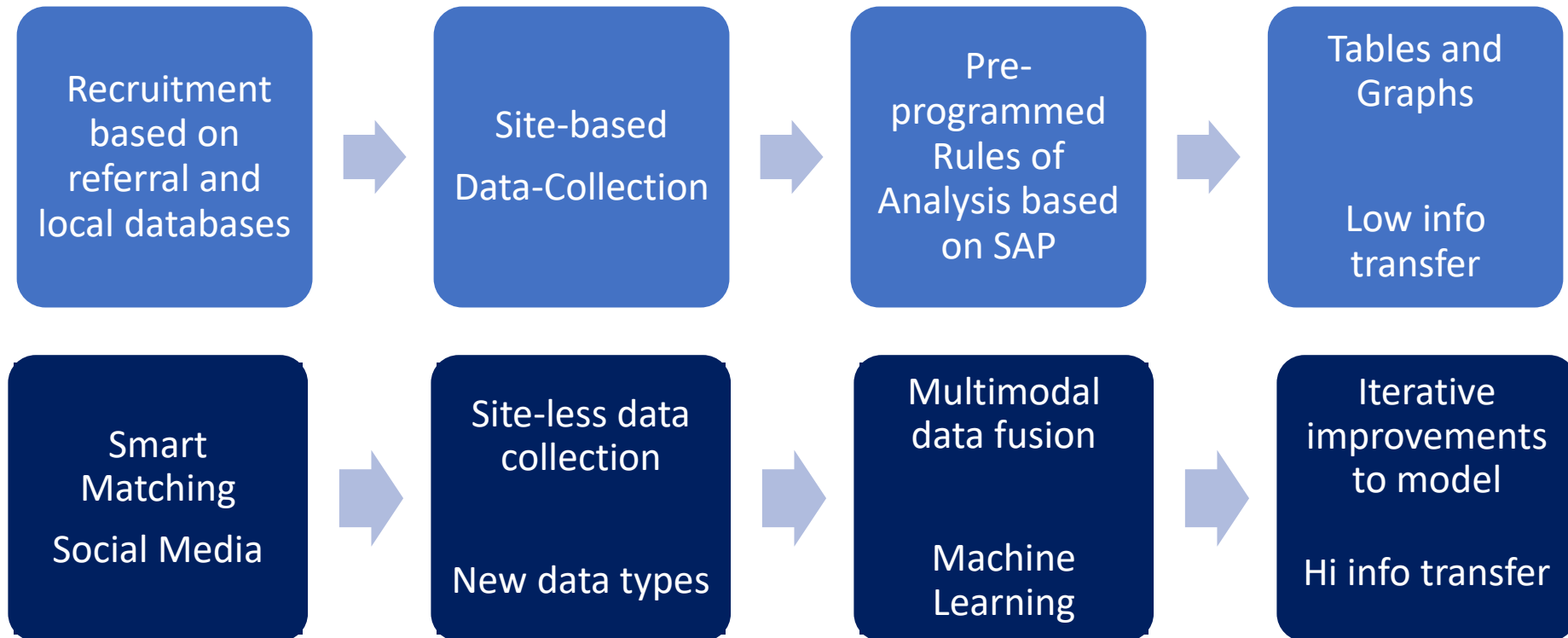
Unsupervised and Supervised



7	2	1	0	4	1	4	9	5	9
0	6	9	0	1	5	9	7	8	4
9	6	6	5	4	0	7	4	0	1
3	1	3	4	7	2	7	1	2	1
1	7	4	2	3	5	1	2	4	4

Clinical Research Models

Old and New



Handle with
Care!

How one bad algorithm cost traders \$440m

A look at the worst software testing day ever

By [Dan Olds](#), [OrionX](#) 3 Aug 2012 at 09:32

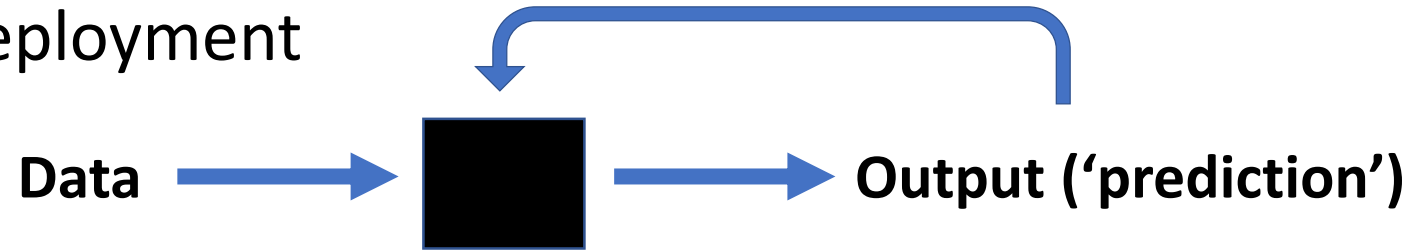
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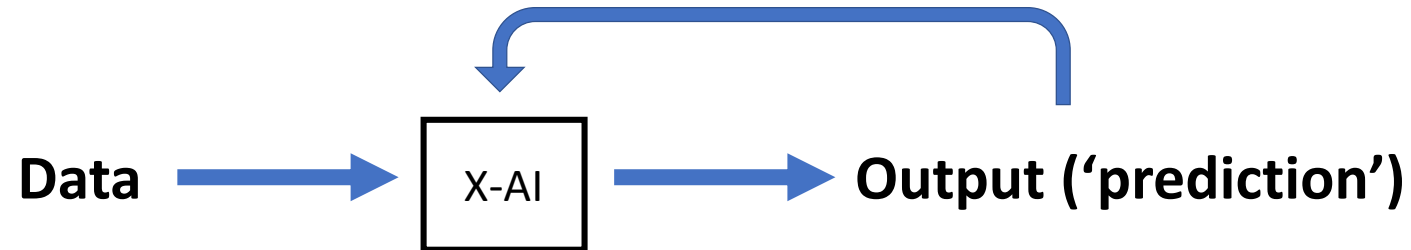


Practical Considerations

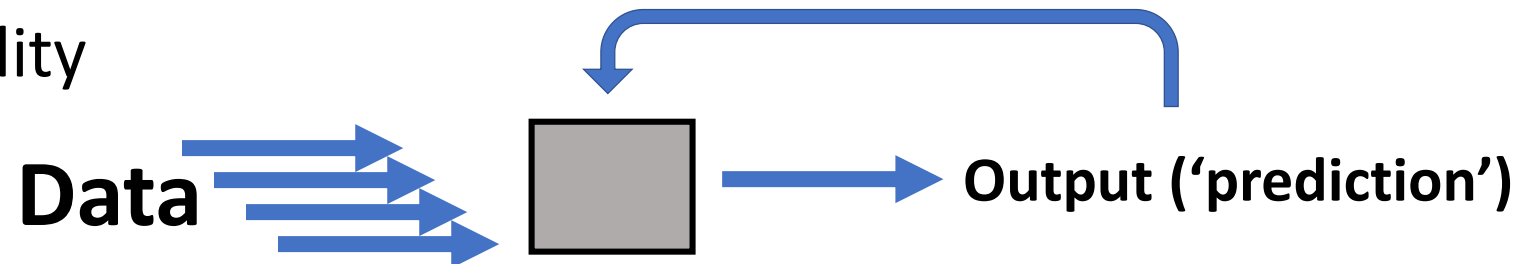
Training/Deployment



Black Box

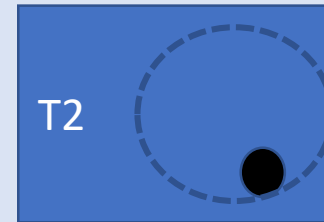
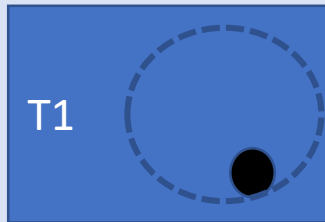


Scalability



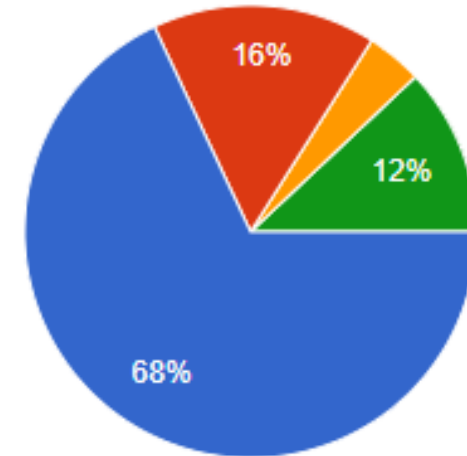
Careful Sampling is Still Very Important

Set consisting of all possible data from all patients with schizophrenia



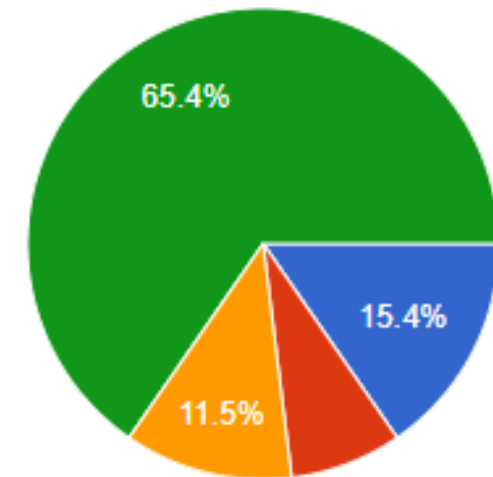
For an organization, what is the biggest challenge to incorporating AI into its business practices?

- Ethical, legal, social implications
- Staff to develop and implement AI
- Setting up data management systems
- Gathering data



How should an organization approach its AI strategy?

- Use vendors and consultants as needed
- Through the IT or Biostats departments
- Each department should have its own strategy
- The whole organization should have a coordinated strategy



- Thank you!