Mayden

A Brief History of How Machine Learning Works

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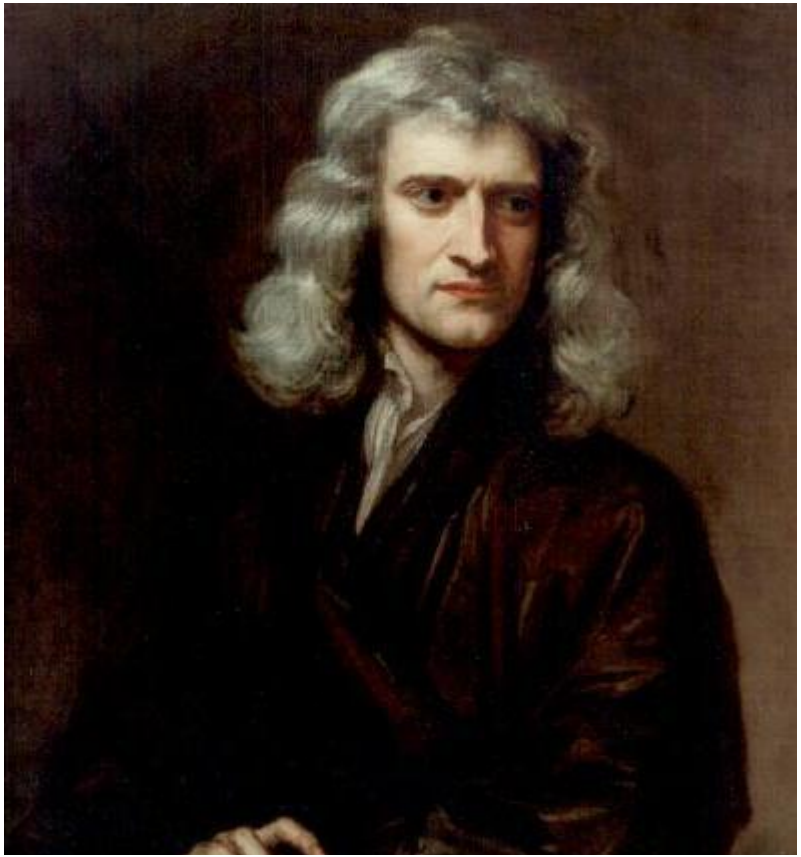
5 November 2020

“Standing on the shoulders of giants”

Sir Isaac Newton

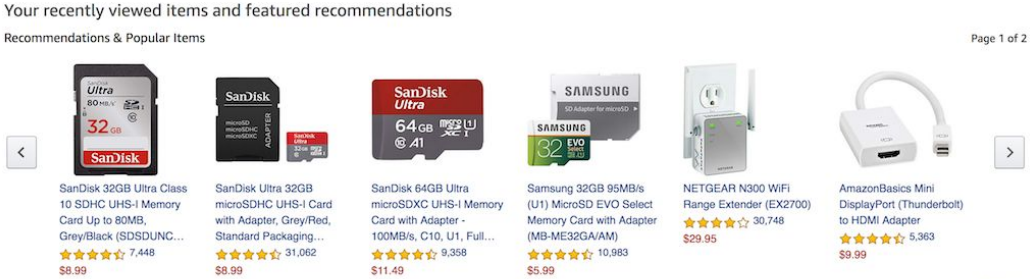

STANDING
THE SHOULDER
OF GIANTS

I do not know what I may appear to the world, but to myself I seem to have been only like a boy playing on the sea-shore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me.



Source: https://en.wikipedia.org/wiki/Isaac_Newton

Do you know how Machine Learning really works?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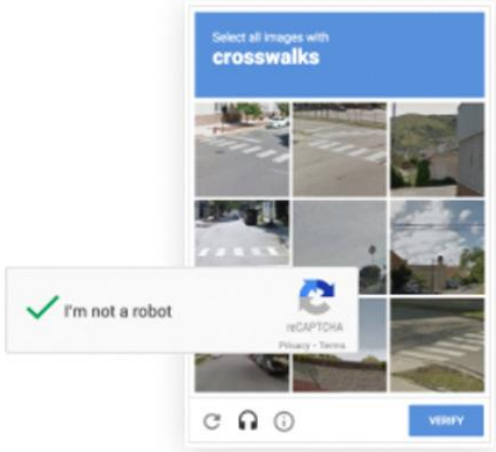
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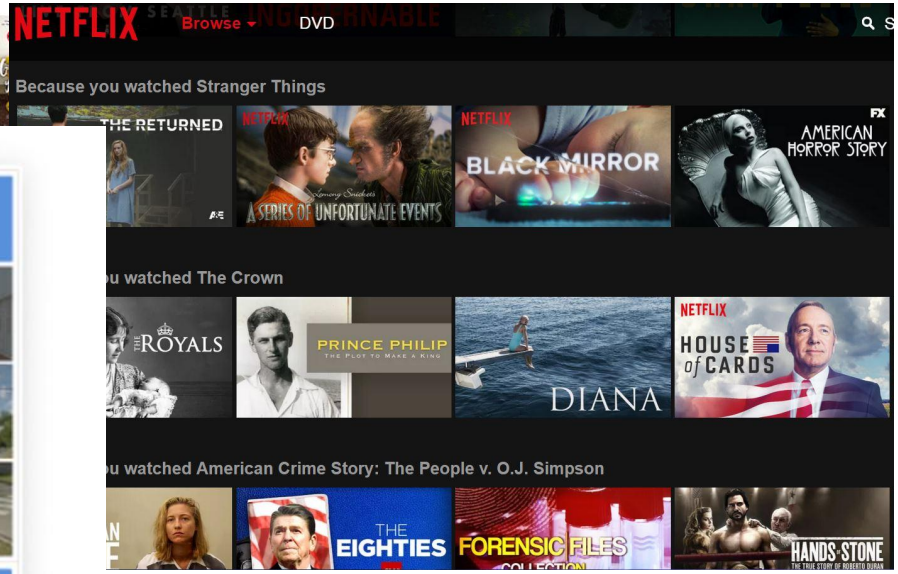
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ROYALS
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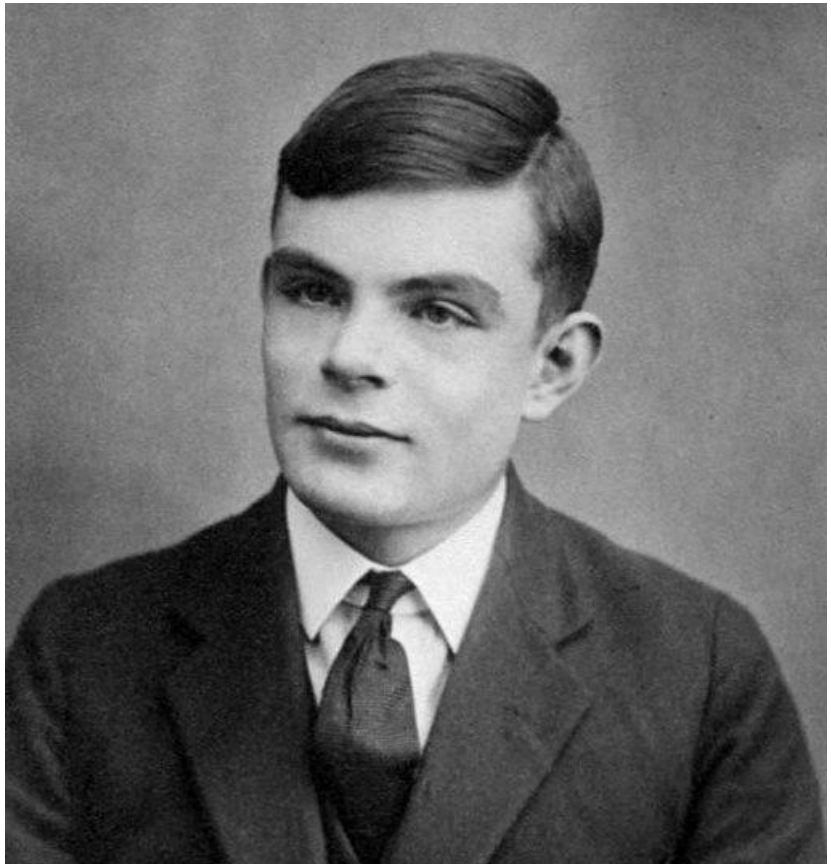
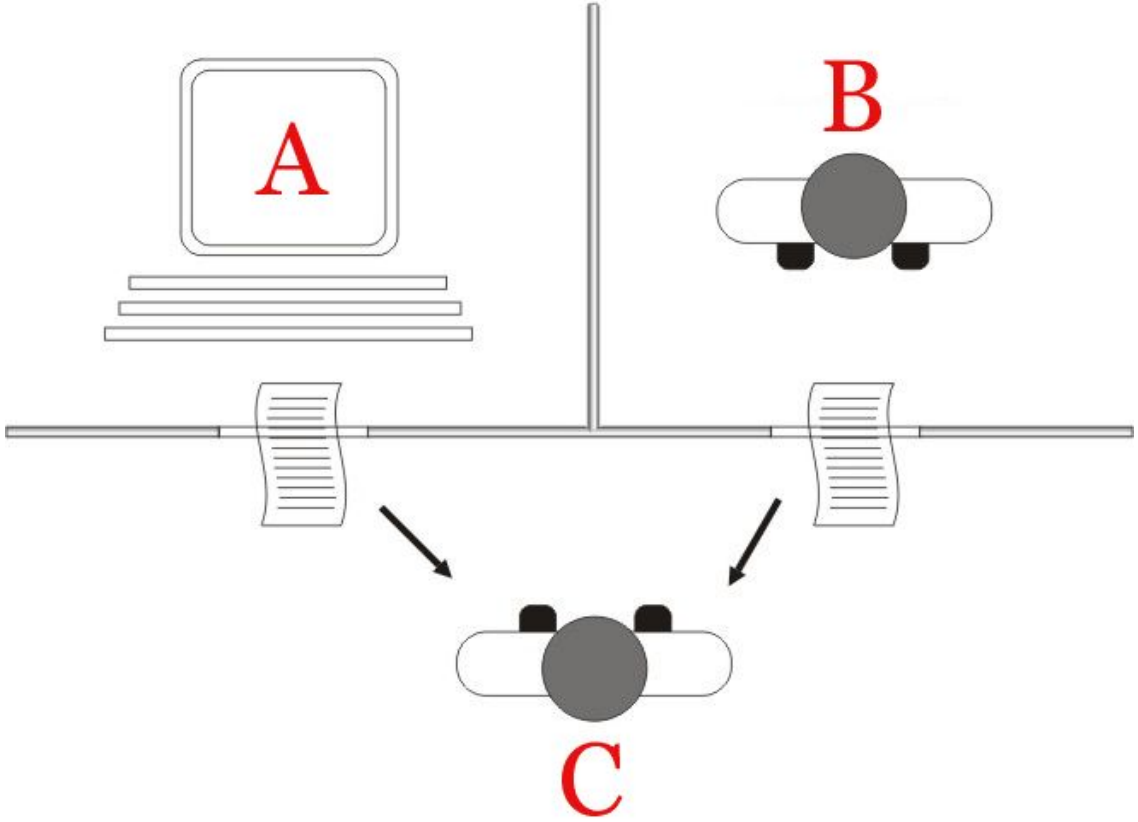
DIANA
HOUSE of CARDS
u watched American Crime Story: The People v. O.J. Simpson
THE EIGHTIES
FORENSIC FILES
HANDS OF STONE



Source: https://en.wikipedia.org/wiki/Alan_Turing

- Can computers think?
- Can computers be conscious?
- Can computers fall in love?
- Can computers create art, music or poetry?



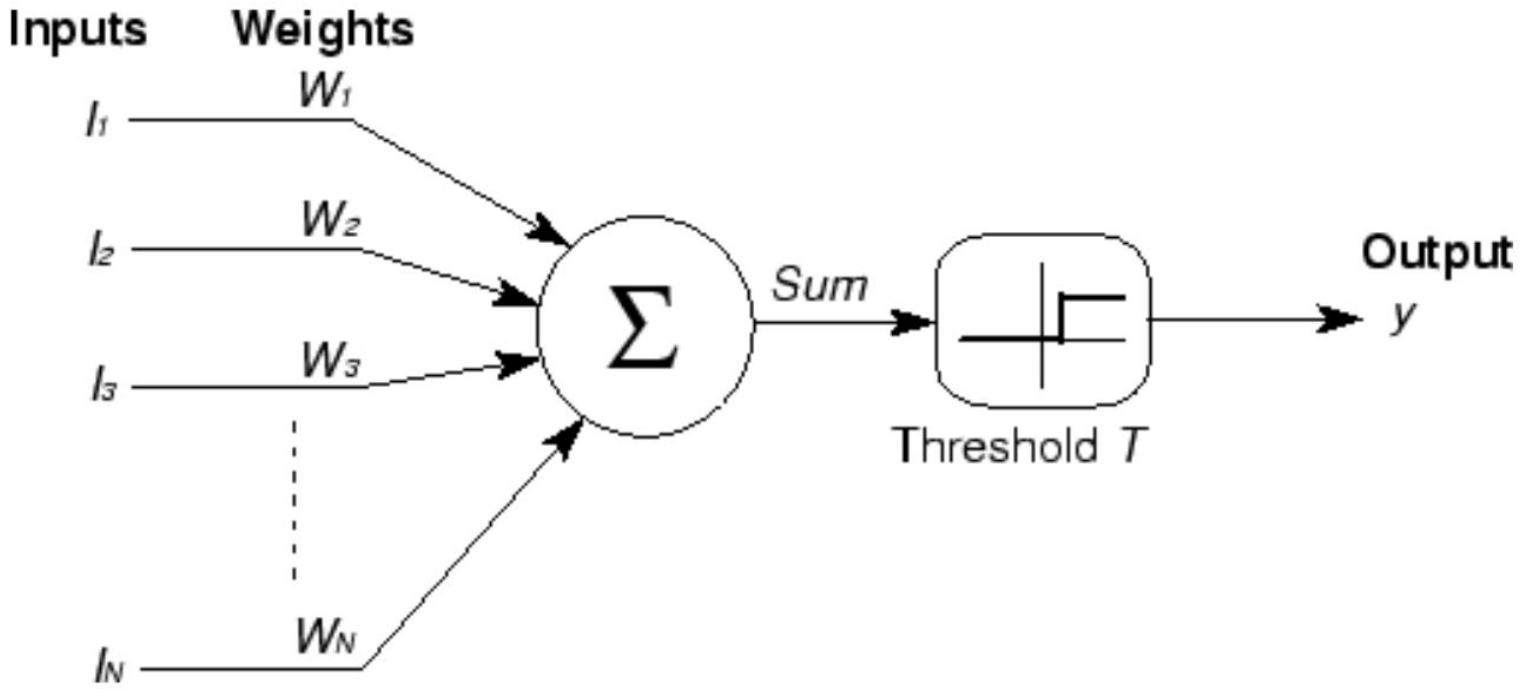
Source: https://en.wikipedia.org/wiki/Turing_test

Alan Turing's Predictions

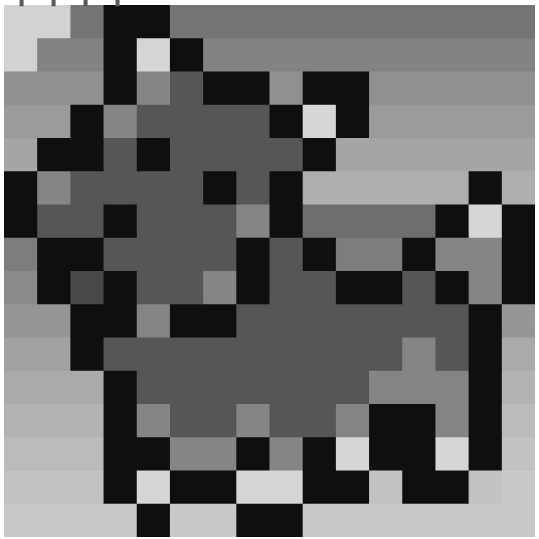
That by 2000, 50 years after this paper was published:

- Machines with 100MB of storage will be able to fool 30% of humans in a 5min test
- People will no longer consider the term "thinking machine" contradictory
- Machine learning is important

Modelling The Brain



Source: https://towardsdatascience.com/a-concise-history-of-neural-networks-2070655d3fec



I	W		
210	* 0.2	=	42
210	* 0.1	=	21
117	* 0.5	=	58.5
15	* 0.9	=	13.5

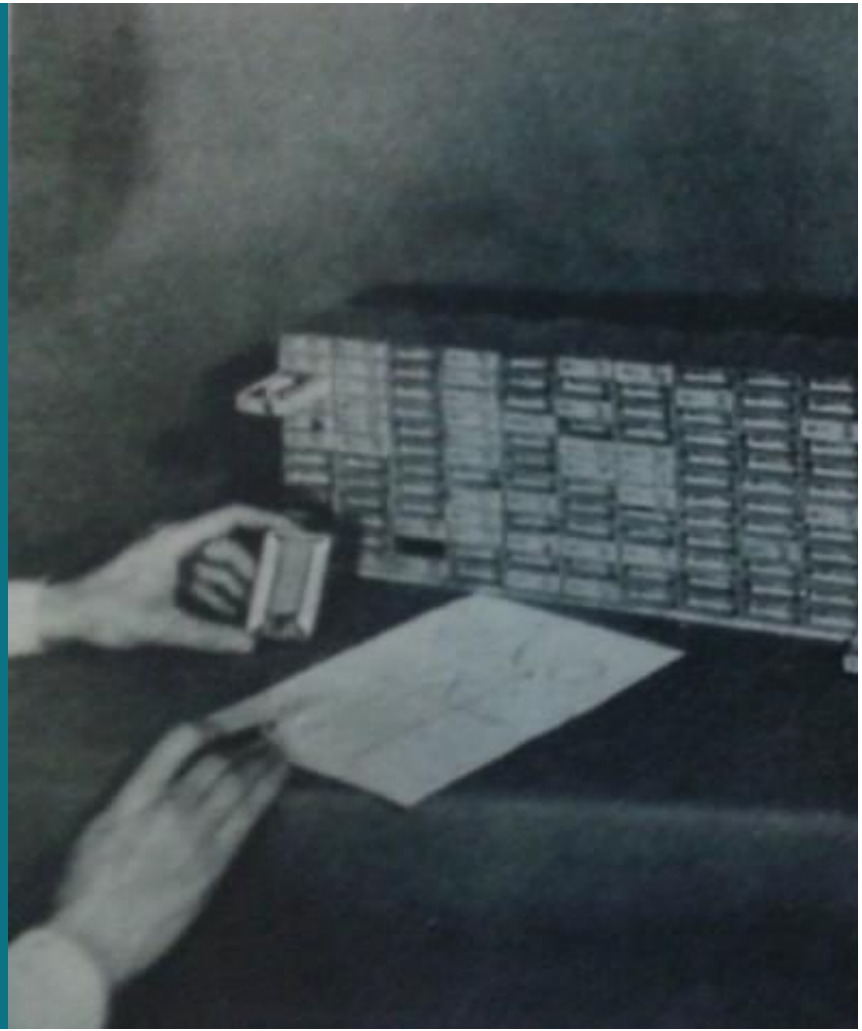
\+ = 105

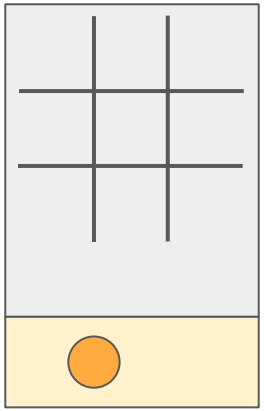
T **y**

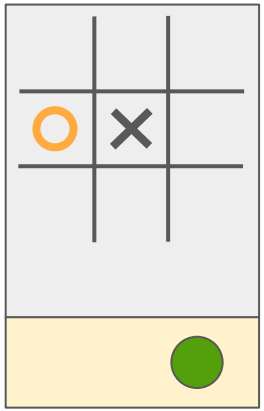
If 105 > 100 **Dog** else **Not Dog**

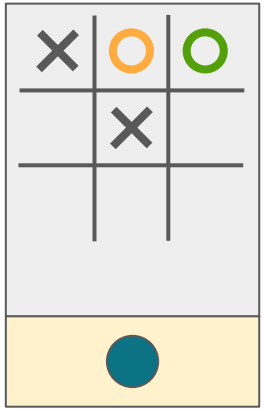
MENACE

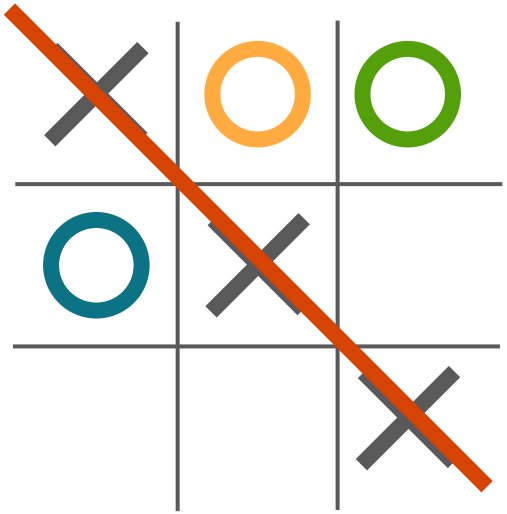
- Machine
- Educable
- Naughts
- And
- Crosses
- Engine



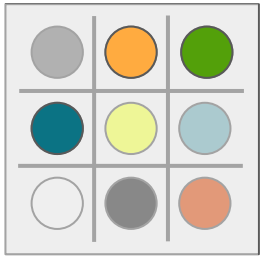






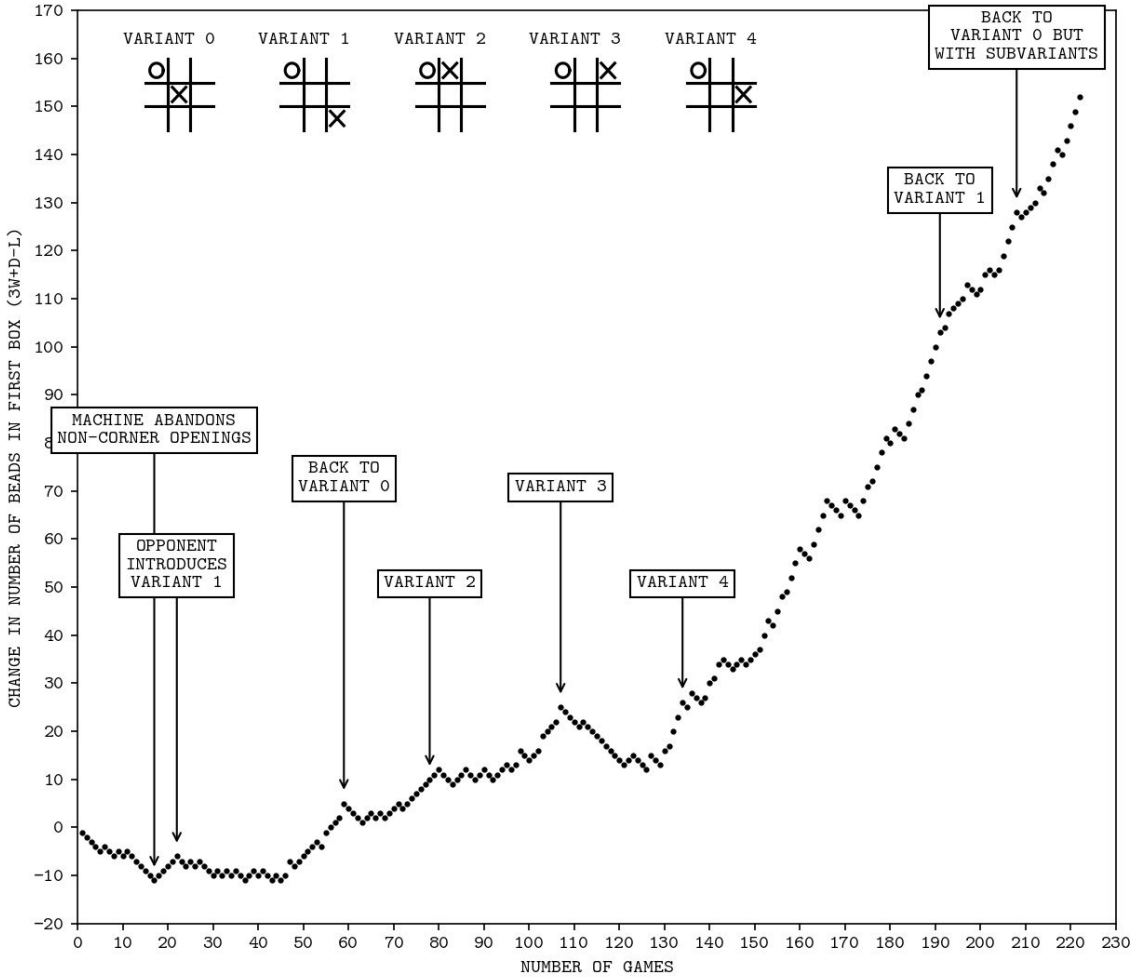


KEY

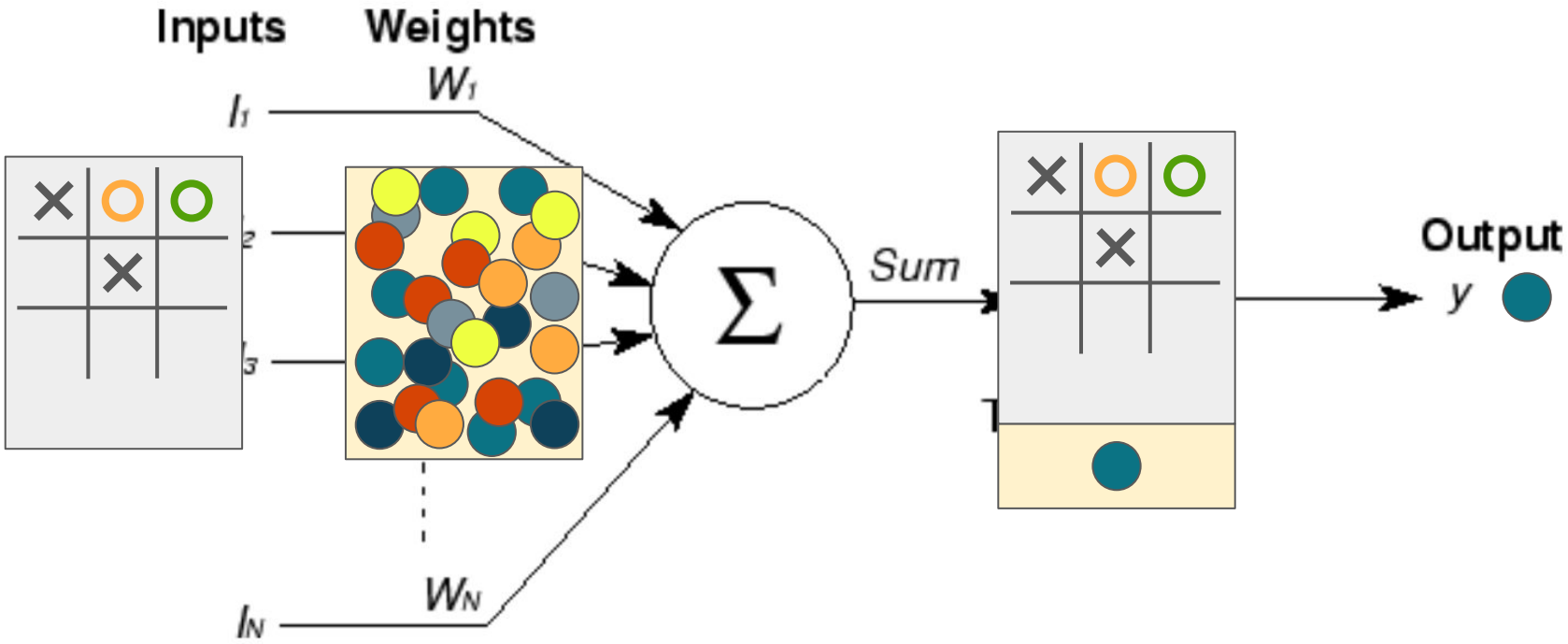


Three Rules of MENACE

- Lose → remove 1 bead from each box
- Win → add 3 beads to each box
- Draw → add 1 bead to each box

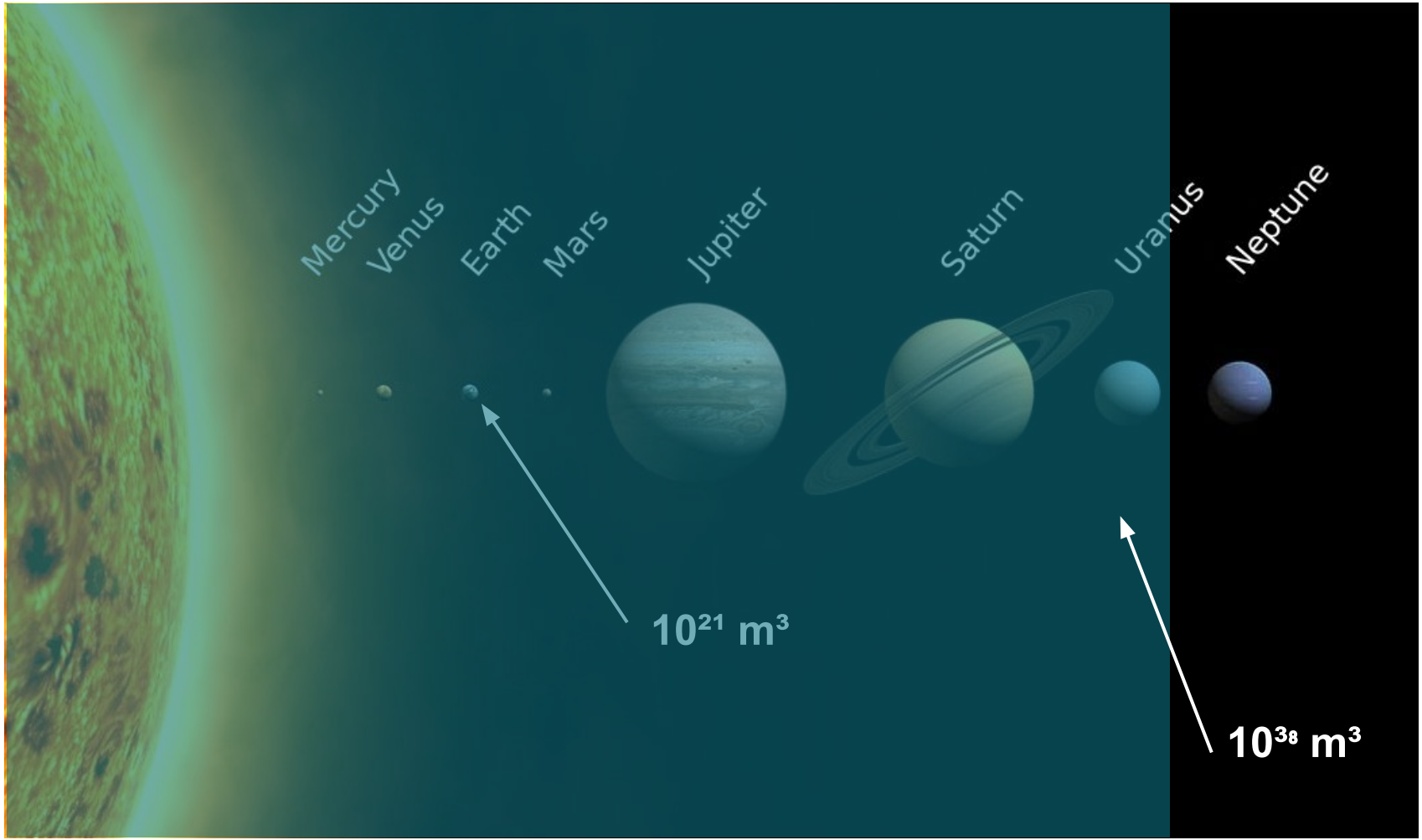


Source: https://www.mscroggs.co.uk/blog/19



Source: https://towardsdatascience.com/a-concise-history-of-neural-networks-2070655d3fec

Matchboxes To Rule The World


Mercury
Venus
Earth
Mars
Jupiter
Saturn
Uranus
Neptune
10^{21} m^3
10^{38} m^3

What Are We Doing In Our Research Projects?

Mayden Analytics Data driven patient insights

Service Name

A wealth of historical data has been collected by the IAPT programme over the last 10 years. With the SAPIO project, we aim to use this anonymised data to assist therapists by providing information about treatment pathways that have been effective for groups of patients with shared characteristics.

As a valued collaborator, we welcome your **ideas**, **input** and **feedback** on these first prototypes where we explore the use of predictive modelling and machine learning to establish patterns of patient engagement and activity from triage to treatment.

Patient engagement

Patients for supervision

'Lost' patients

Forecasting outcomes
(coming soon)

Digital triage
(coming soon)

?

Your ideas

Mayden Analytics

Patient insights: Engagement predictions
Service name

Help guide | Information

First attendance prediction

This patient is

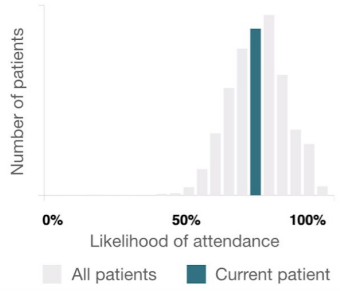
75%

likely to attend their first appointment

How do we arrive at this prediction

Please share your thoughts below or return to iaptus

How does this patient compare with all historic predictions for your service?



Help us to co-create our insights

How would you rate this prediction?

Surprising ★ ★ ★ ★ ★ Expected

Please tell us more...

What would you like to know about your patients?

If you could have any insights at all, what would you most like to know about your patients?

Click to **Submit**

iaptus adults

Find Patients | New Patient | Outcomes | Diary | Diary Search | Batch Letters

Messages | Reports | Groups | Supervision | My Account

Show/Hide Navigation Bar

My Patient Episodes (3)

Type in last name

ID	Patient	Stage	Days
100019	Ketchum, A	REF	-
100019	Ketchum, A	S3PT	-
100003	Smith, J	S3 DISP	-

Incoming Online Contacts (0)

My Searches (1)

My Therapists (0)

Personal Contact Time

Find Patients From

Super Users

Find Patients | Patient : No patient selected

< Back to Supervision Overview

Create New Supervision Session

Date of Supervision: | **Supervisor:** -----

Start time: 08 : 00 | **Location:** -----

Duration: ----- | **Supervision Type:** (•) Case Load Management ( ) Clinical Supervision

Supervisee Notes:

Supervisor Notes:

Select Patients for Supervision

Show Column Selection

Select	First Name	Last Name	DOB	DateOfDeath	Stage	Flagged	New	First PHQ	Last PHQ	PHQ Movement	First GAD
☐	Ash	Ketchum	25/10/1959		REF	No	Yes				
☐	Ash	Ketchum	25/10/1959		S3PT	No	Yes				
☐	Joseph	Smith	12/11/1975		S3 DISP	No		18	14	DOWN	17

Create Supervision Session

Mayden Analytics

Patient insights: Supervision sorter
Service name

Help guide | Information

Current caseload

	Patient ID	Referral date	Metric 1	Metric 2	Metric 3	Metric 4	Metric 5	Metric 6	
=									●
=									●
=									●
=									●
=									●
=									●
=									●
=									●
=									●
=									●

Selected patients

drag a patient into your planned supervision session

iaptus Supervision overview

send to iaptus (coming soon)

Last run date: 01-Jan-2019 9:55pm

References

- https://www.youtube.com/watch?v=MGW_Qcqr9eQ
- https://www.youtube.com/watch?v=R9c-_neaxeU
- https://www.youtube.com/watch?v=hK25eXRaBdc
- https://en.wikipedia.org/wiki/Turing_test
- https://isturingtestpassed.github.io/
- https://towardsdatascience.com/a-concise-history-of-neural-networks-2070655d3fec
- http://www.aiai.ed.ac.uk/~dm/dmcv.html
- https://www.mscroggs.co.uk/blog/19

Thank you for listening

Any questions?

Breakout session 2

1. With engagement predictions available in iaptus, how might you use that information?
2. What are your first impressions of the supervision tool?
3. Where in iaptus would you like to see predictive insights added?
4. What new information do you wish you knew about your patients?