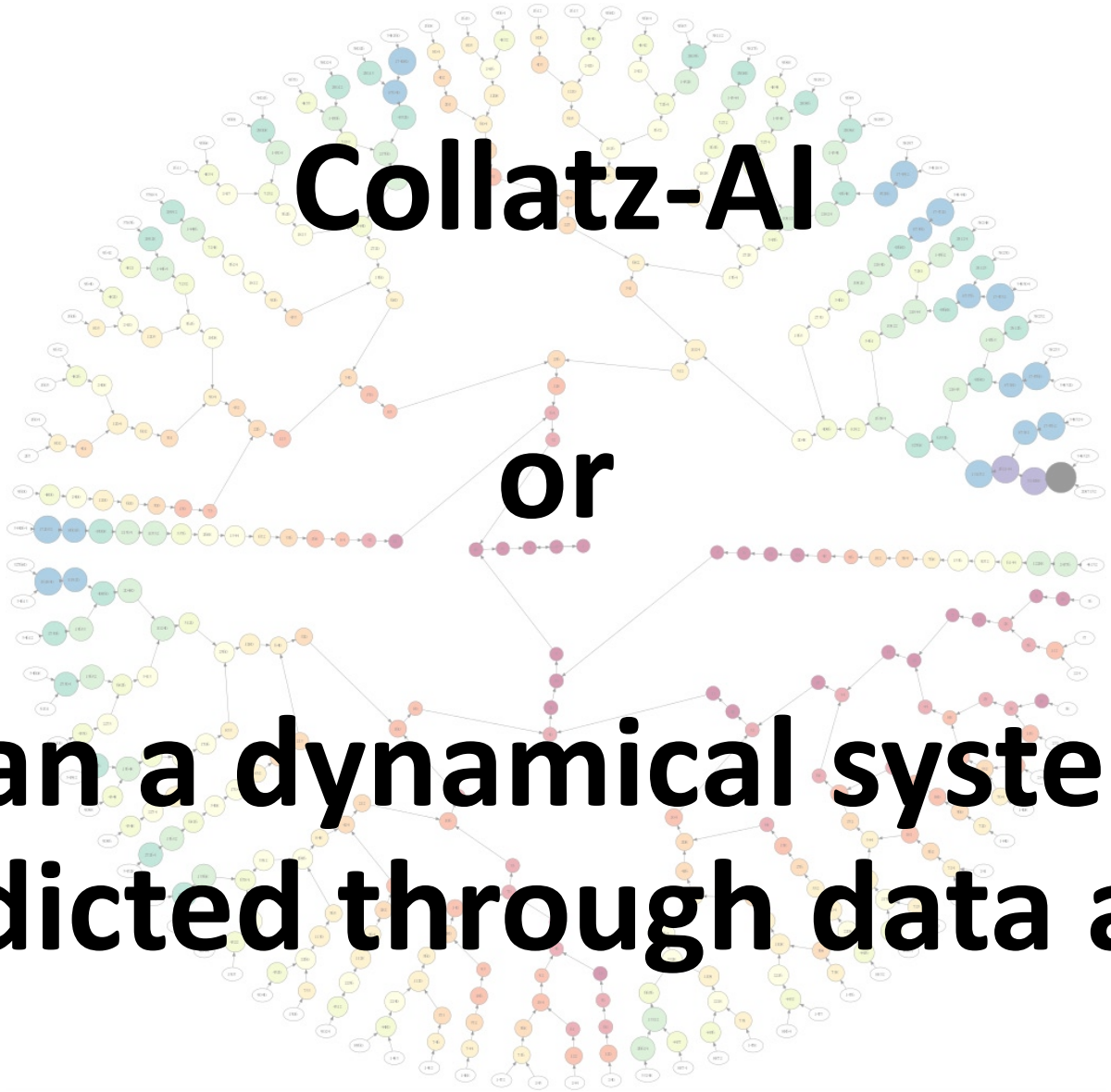
Collatz-AI



or

Can a dynamical system be predicted through data and AI?

The Team

The Physicists

The Mathematician

AI special-ops

The Economist

What is the Collatz-Conjecture again?

The problem that even fifth graders can understand

But no one can solve…

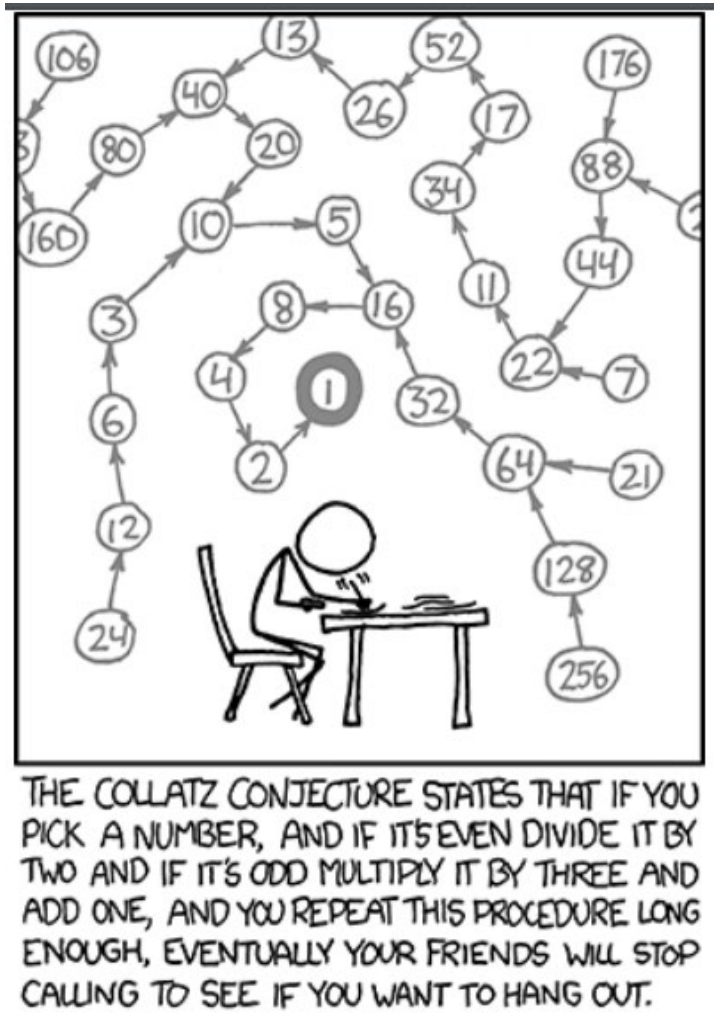
What is the Collatz-Conjecture again?

Pick any positive integer ***n*** *and*

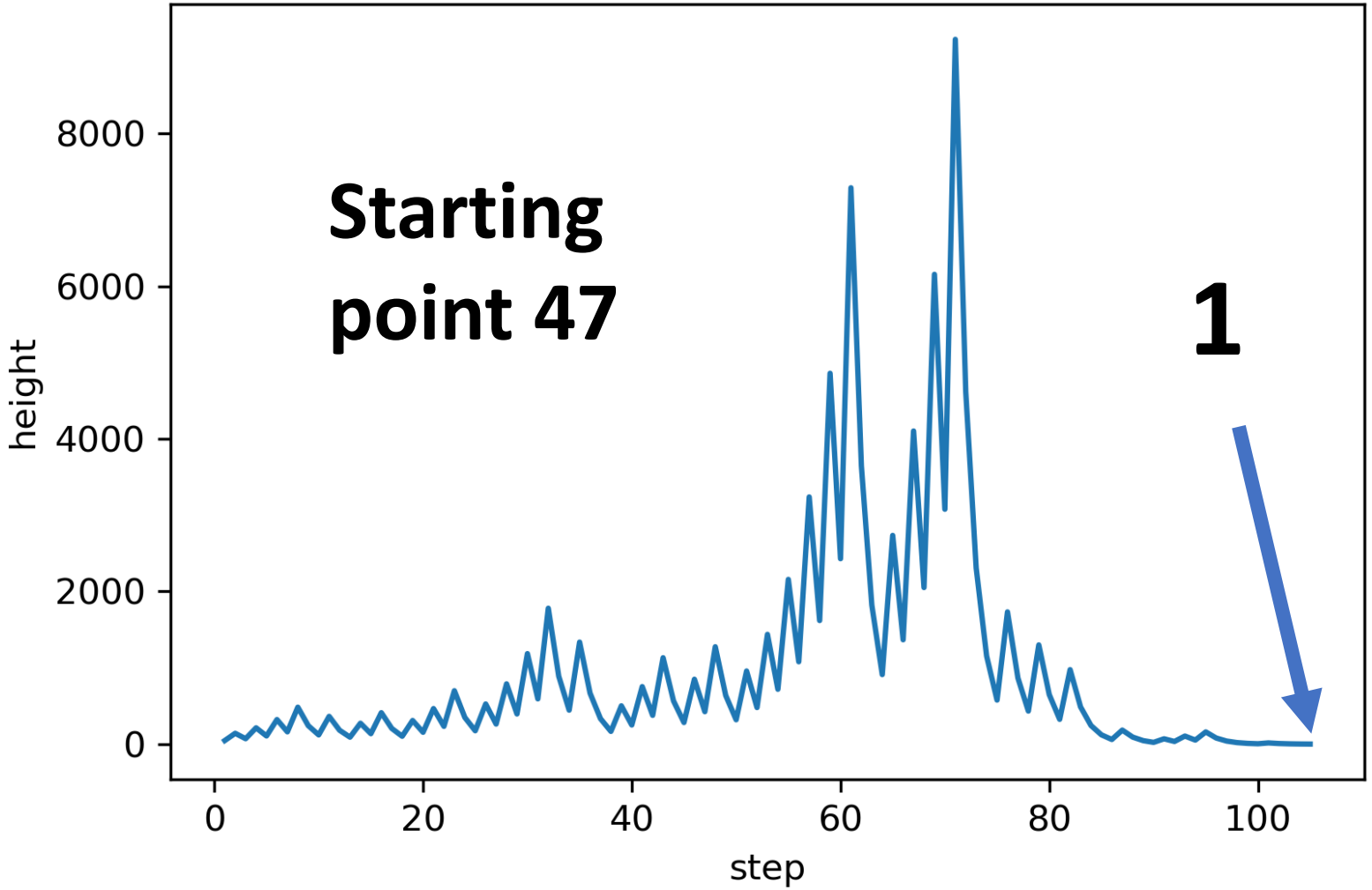
$$f(n) = \begin{cases} n/2 & if\ n\ is\ even \\ 3n+1 & if\ n\ is\ odd \end{cases}$$

What is the Collatz-Conjecture again?

Your friends will stop calling you..



Collatz - An example



What is it about 47 that it goes round like this?

Why work on this stuff?

Article

Advancing mathematics by guiding human intuition with AI

https://doi.org/10.1038/s41586-021-04086-x
Received: 10 July 2021
Accepted: 30 September 2021
Published online: 1 December 2021
Open access
Check for updates

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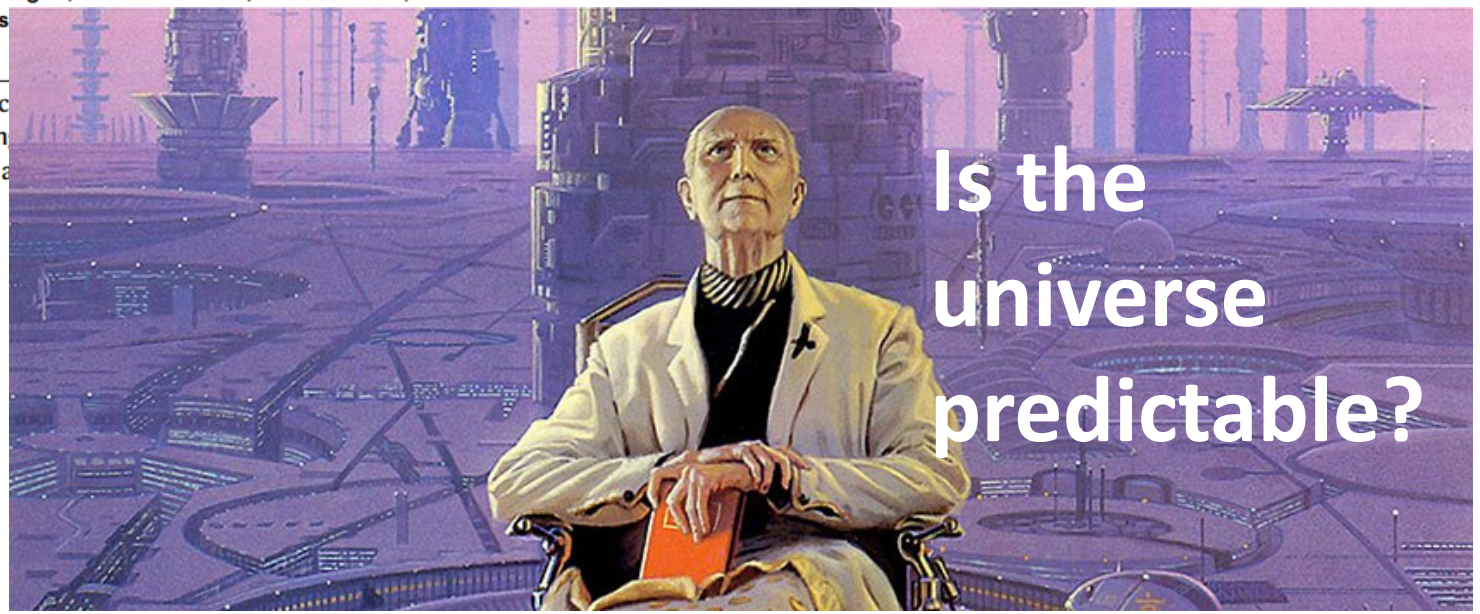
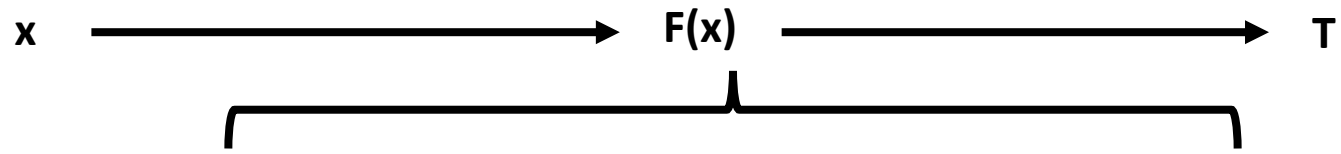
The practice of mathematics involves disc
formulate and prove conjectures, resultin
mathematicians have used computers to a



Initial discussions (1)

If we sufficiently characterize the numbers, AI can predict the trajectory length!

Characterizing initial conditions = gathering data



Starting point	Even?	Odd?	Divisble by 3?	Prime?	Total stopping time (T)
1	0	1	0	0	
2	1	0	0	1	
3	0	1	1	1	
4	1	0	0	0	
5	0	1	0	1	
6	1	0	1	0	

That doesn’t make any sense!

Initial discussions (2)

I want to try!

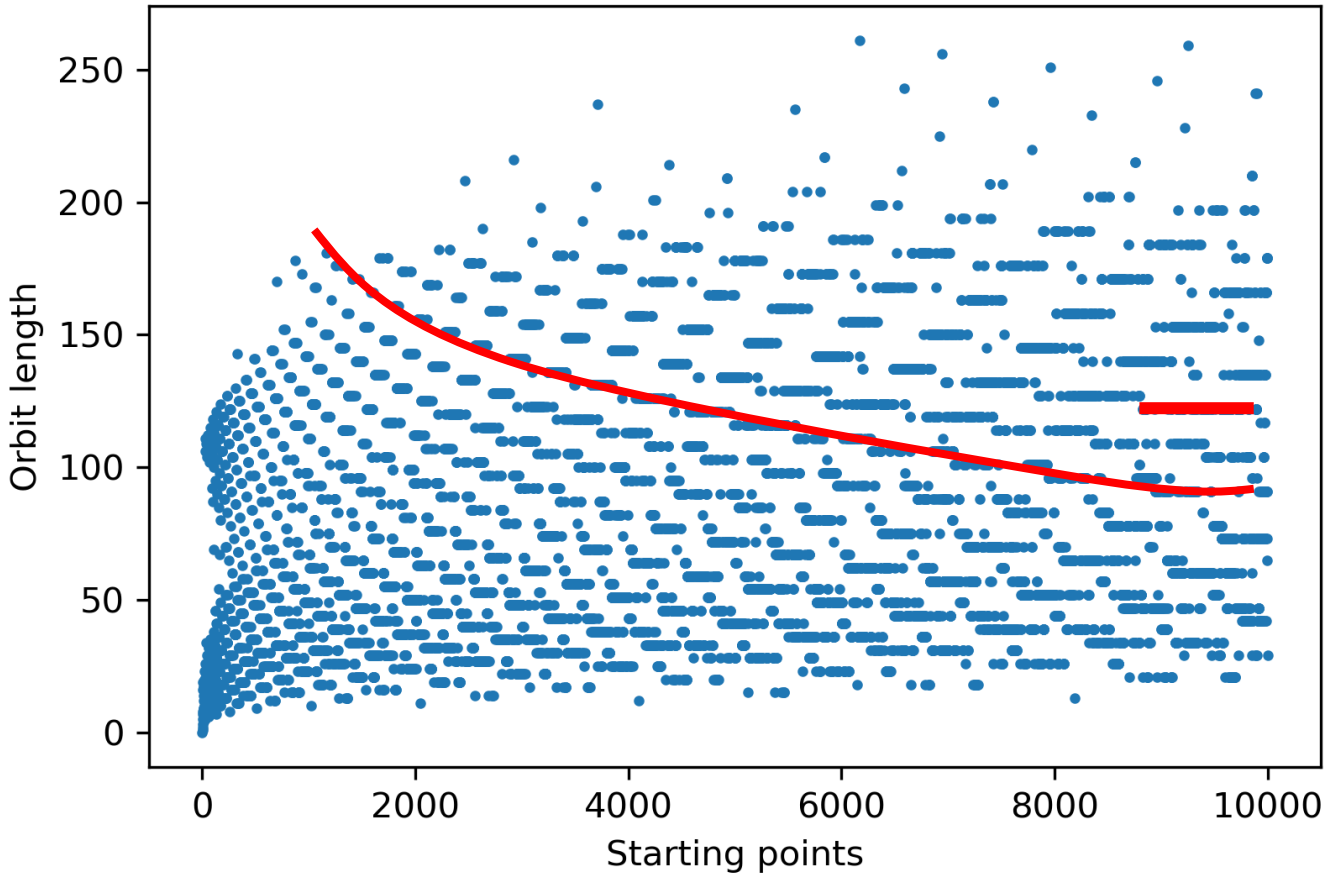
There must be some information!

Walk the trajectory to predict it!

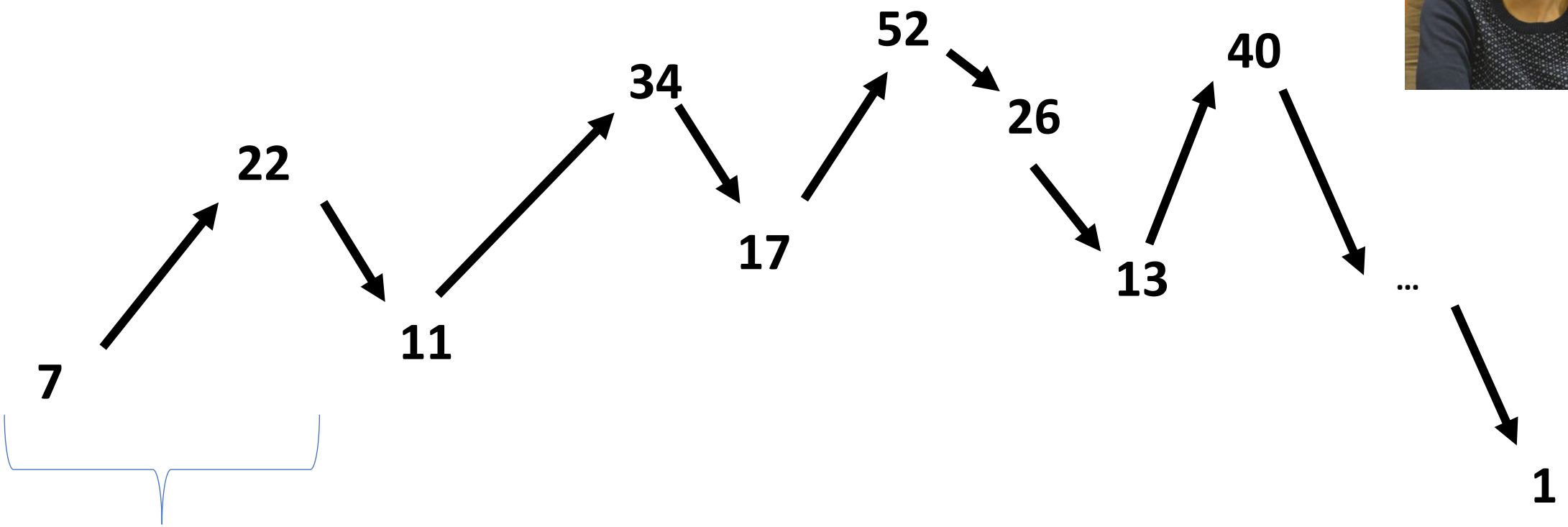
Stochasticity and distributions!

Reduce the dimensionality of the data

Clustering the other way around!



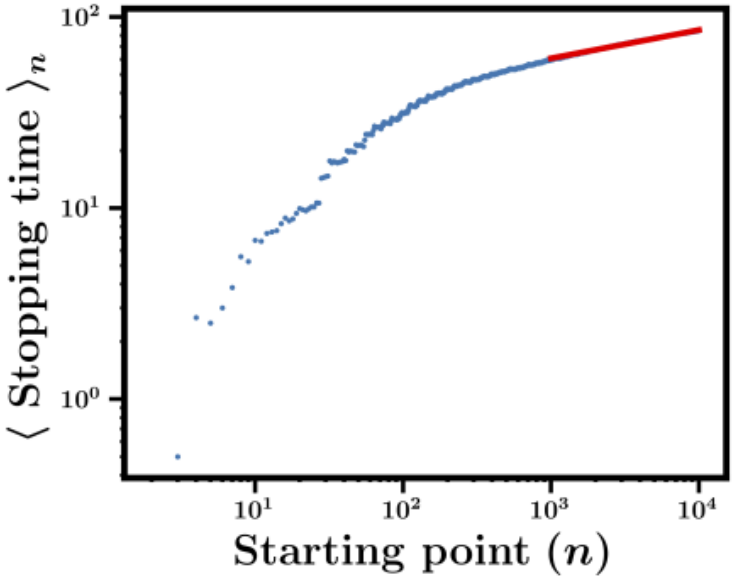
Walking the walk..



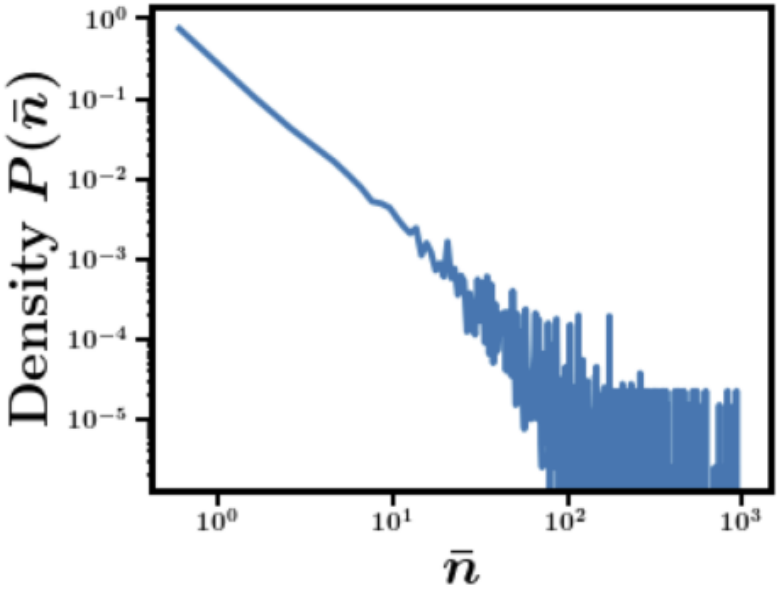
Can we say sth. from the first 2 steps?

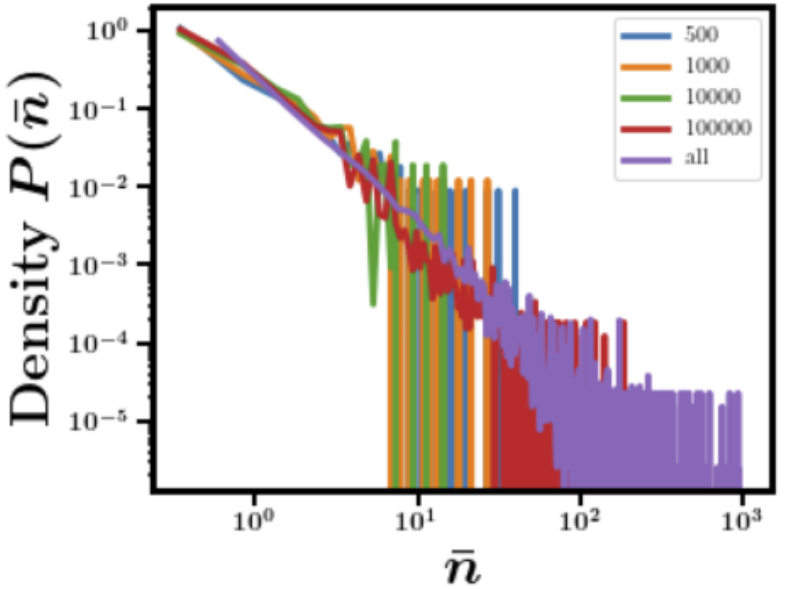
Statistical patterns

Asymptotic trends



Scaling laws





Cris Moore's feedback

Start doing some actual mathematics!

Transform conjecture to p-adic numbers!

Calculate in Nimber number systems and consider it a cellular automaton!

What's next?

- Understand results (neural networks used)
- Consensus is to gather the material on Github
- Maybe study another problem