

Supplementary Materials for

AI Assistant Scientist: Aiding scientific discovery with quantum-like evolutionary algorithm

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Materials and Methods

For Schrodinger's cat simulated thought experiment, the training values and forecasted values are the values in Table 3 of the main text. Two consecutive training sessions were run on the data, 6 verify forecast outcomes were produced in each session resulting in a total of 12. Since the quantum-like evolutionary algorithm was able to completely reconstruct the fitting data of the values, the fitting data and calculated data coincides, the observed values are the same as the calculated values, which are reflected in the graphs of the fitting data as the two lines completely overlap.

The possible forecast outcomes produced are purely based off of training the historical data (past states of the cats') by machine learning and incorporating a quantum-like decision theory.

After all of the forecast outcomes are produced, majority rules are then applied to deduce the final action sequence produced by the quantum-like evolutionary algorithm to "believe" that the cat is either alive or dead for the forecasted values.

For the graphs of the training fitting outcomes produced in Figs S1 and S8, the legend is as follows:

The solid blue line is the observed data (the generated values), and the solid yellow line is the calculated values by the quantum-like evolutionary algorithm.

For the graphs of the verify forecast outcomes produce in Figs S3 to S7 and S9 to S14, the legend is as follows:

The solid blue line is the observed values, and the solid yellow line is the forecasted values.

The corresponding values of the training and forecasted data are shown in Tables S1 to S14, with Tables S1 and S8 being the fitted training data and Tables S2 to S7 and S9 to S14 being the verify forecast outcomes data. For Tables S1 and S8, data in the observed column are the historical recorded values, and the values in the calculated column are the fitted values as calculated by the quantum-like evolutionary algorithm. For Tables S2 to S7 and S9 to S14, the values in the observed column are the observed values, and the values in the forecasted column are the values forecasted by the quantum-like evolutionary algorithm and make up the corresponding solid yellow line in the graphs of Figs S2 to S7 and S9 to S14.

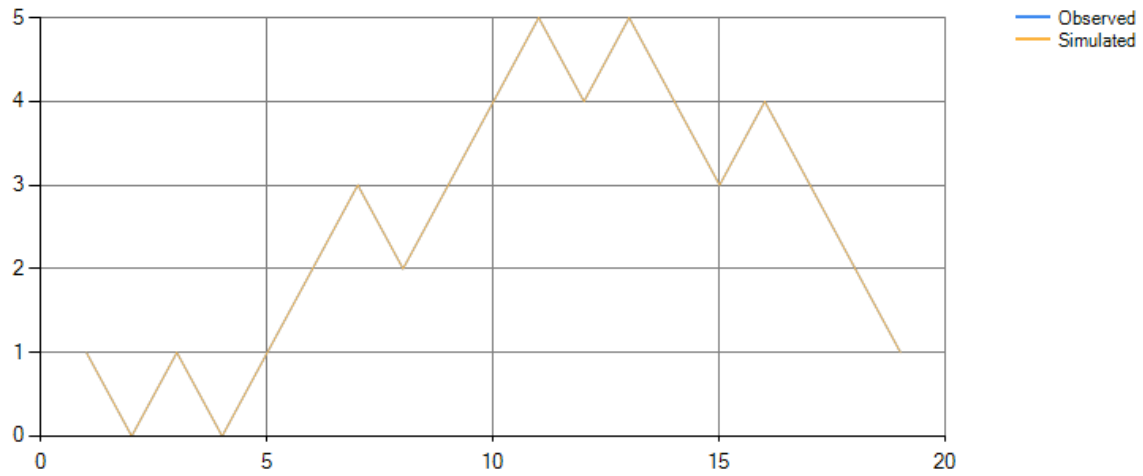


Fig. S1. Session one fitting results.

The fitting results produced in the first session are shown here. The corresponding values of the observed data are the values generated in the simulated thought experiment as shown in Table 3 of the paper's main text.

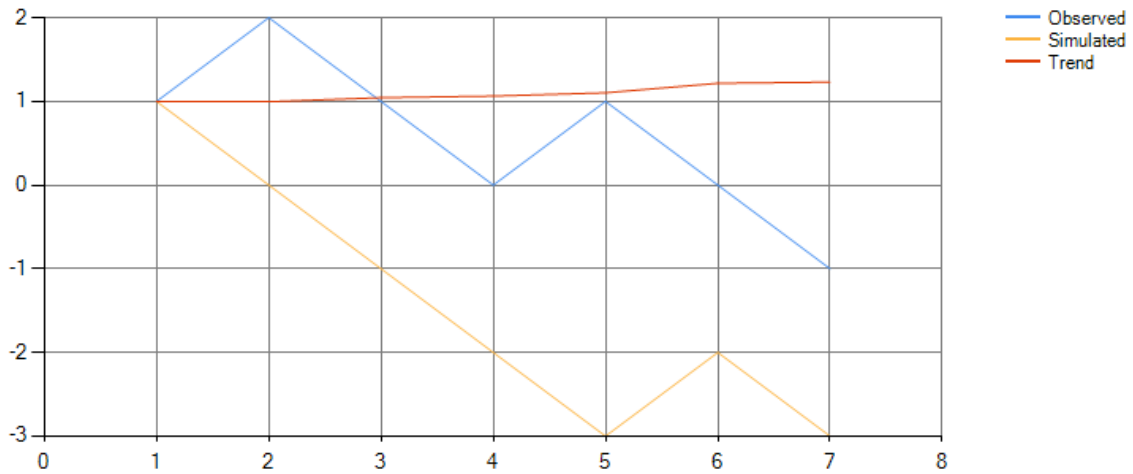


Fig. S2. First verify forecast produced in session one.

The first of six verify forecast outcomes produced in the first session are shown here. The corresponding values for this forecast are Dead (1), Dead (1), Dead (1), Dead (1), Alive (0), Dead (1). This action sequence of 1, 1, 1, 1, 0, 1 is shown in the first sub column under the Session 1 column in Table 4 of the paper's main text.

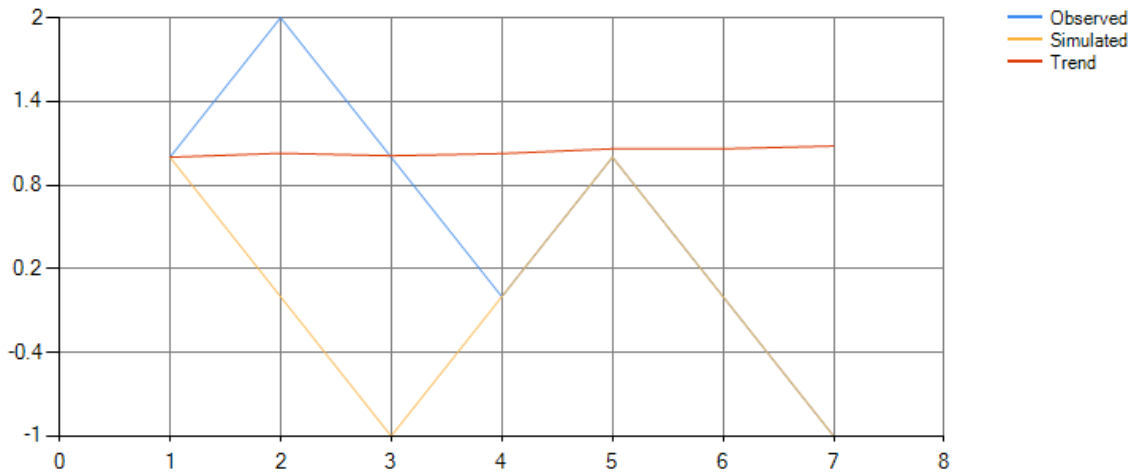


Fig. S3. Second verify forecast produced in session one.

The second of six verify forecast outcomes produced in the first session are shown here. The corresponding values for this forecast are Dead (1), Dead (1), Alive (0), Alive (0), Dead (1), Dead (1). This action sequence of 1, 1, 0, 0, 1, 1 is shown in the second sub column under the Session 1 column in Table 4 of the paper's main text.

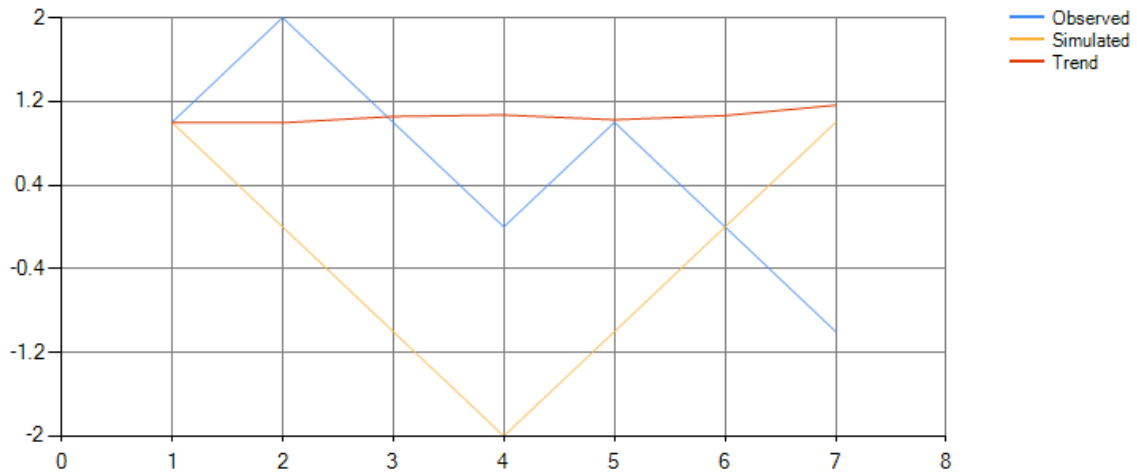


Fig. S4. Third verify forecast produced in session one.

The third of six verify forecast outcomes produced in the first session are shown here. The corresponding values for this forecast are Dead (1), Dead (1), Dead (1), Alive (0), Alive (0), Alive (0). This action sequence of 1, 1, 1, 0, 0, 0 is shown in the third sub column under the Session 1 column in Table 4 of the paper's main text.

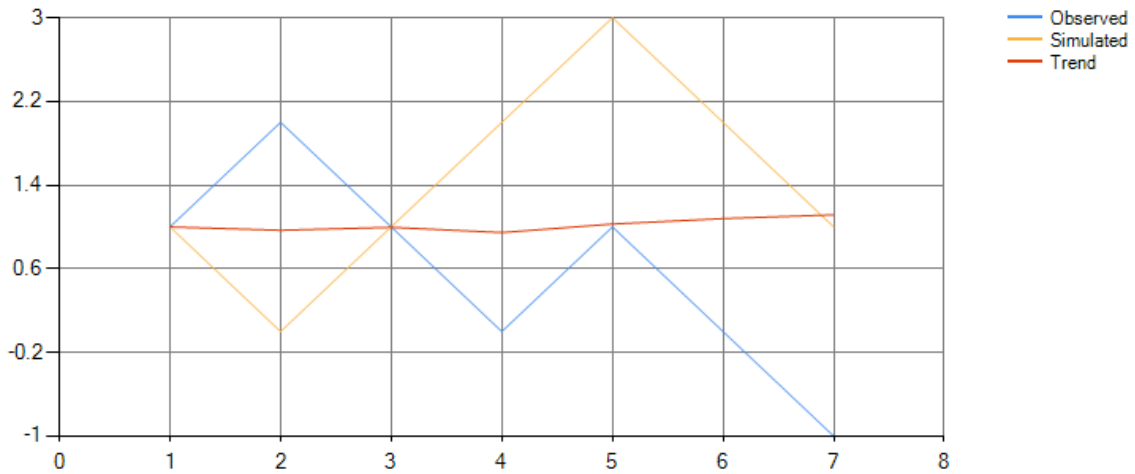


Fig. S5. Fourth verify forecast produced in session one.

The fourth of six verify forecast outcomes produced in the first session are shown here. The corresponding values for this forecast are Dead (1), Alive (0), Alive (0), Alive (0), Dead (1), Dead (1). This action sequence of 1, 0, 0, 0, 1, 1 is shown in the fourth sub column under the Session 1 column in Table 4 of the paper's main text.

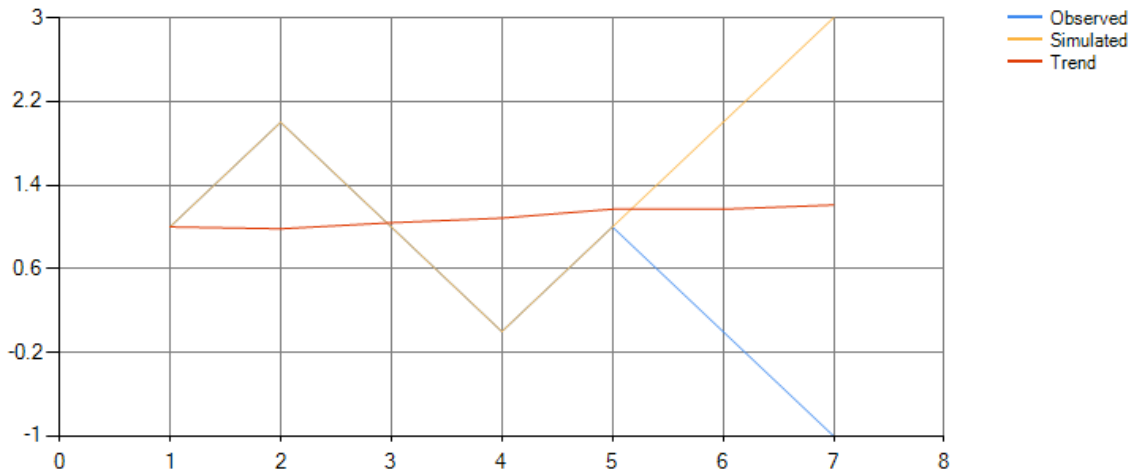


Fig. S6. Fifth verify forecast produced in session one.

The fifth of six verify forecast outcomes produced in the first session are shown here. The corresponding values for this forecast are Alive (0), Dead (1), Dead (1), Alive (0), Alive (0), Alive (0). This action sequence of 0, 1, 1, 0, 0, 0 is shown in the fifth sub column under the Session 1 column in Table 4 of the paper's main text.

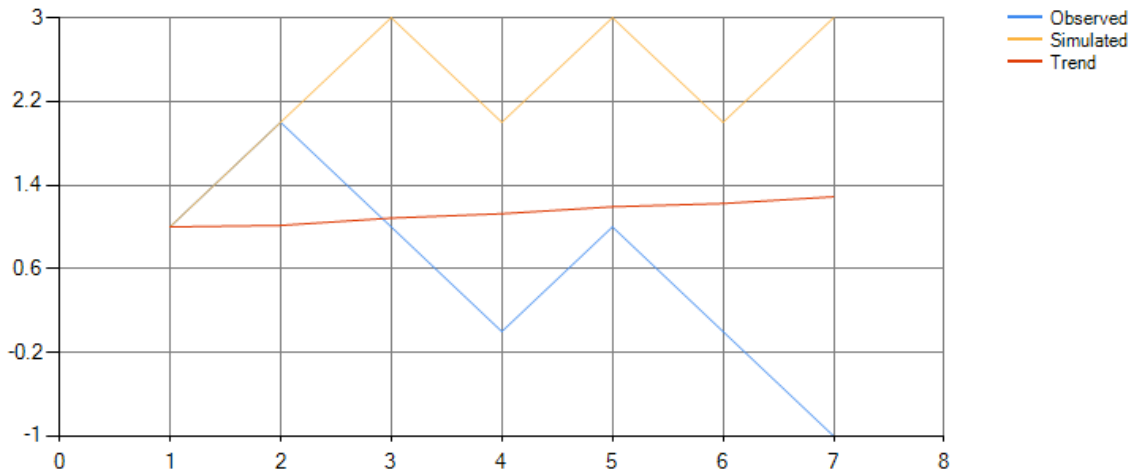


Fig. S7. Sixth verify forecast produced in session one.

The final of six verify forecast outcomes produced in the first session are shown here. The corresponding values for this forecast are Alive (0), Alive (0), Dead (1), Alive (0), Dead (1), Alive (0). This action sequence of 0, 0, 1, 0, 1, 0 is shown in the sixth sub column under the Session 1 column in Table 4 of the paper's main text.

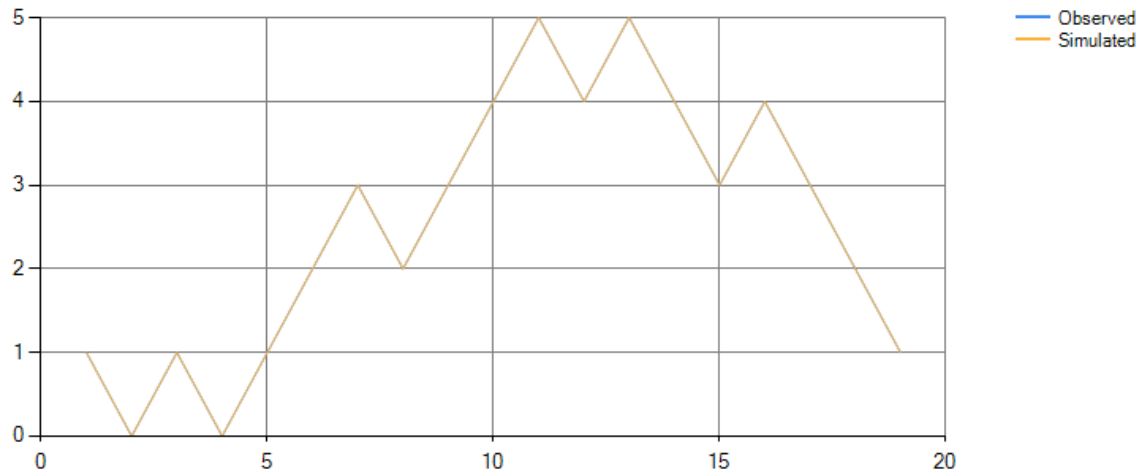


Fig. S8. Second session fitting results.

The fitting results produced in the second session are shown here. The corresponding values of the observed data are the values generated in the simulated thought experiment as shown in Table 3 of the paper's main text.

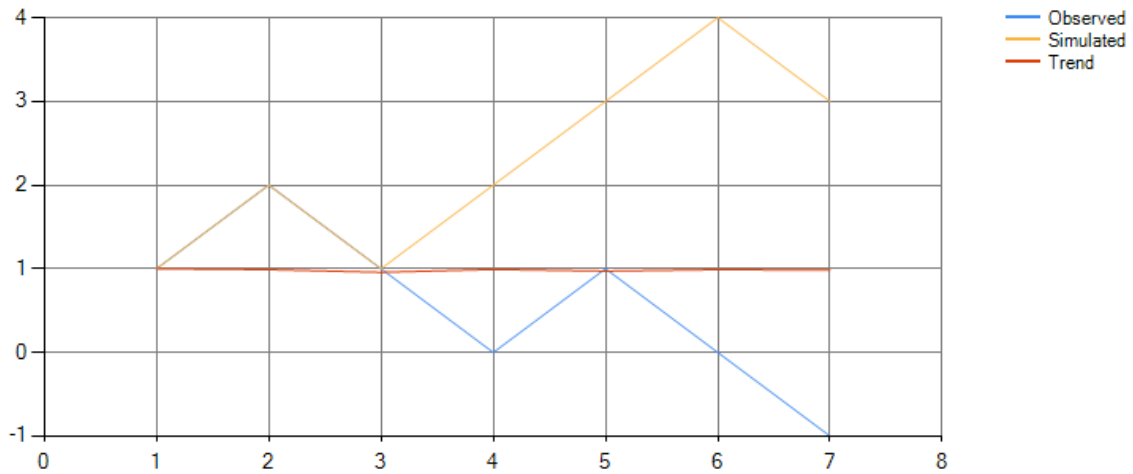


Fig. S9. First verify forecast produced in session two.

The first of six verify forecast outcomes produced in the second session are shown here. The corresponding values for this forecast are Alive (0), Dead (1), Alive (0), Alive (0), Alive (0), Dead (1). This action sequence of 0, 1, 0, 0, 0, 1 is shown in the first sub column under the Session 2 column in Table 4 of the paper's main text.

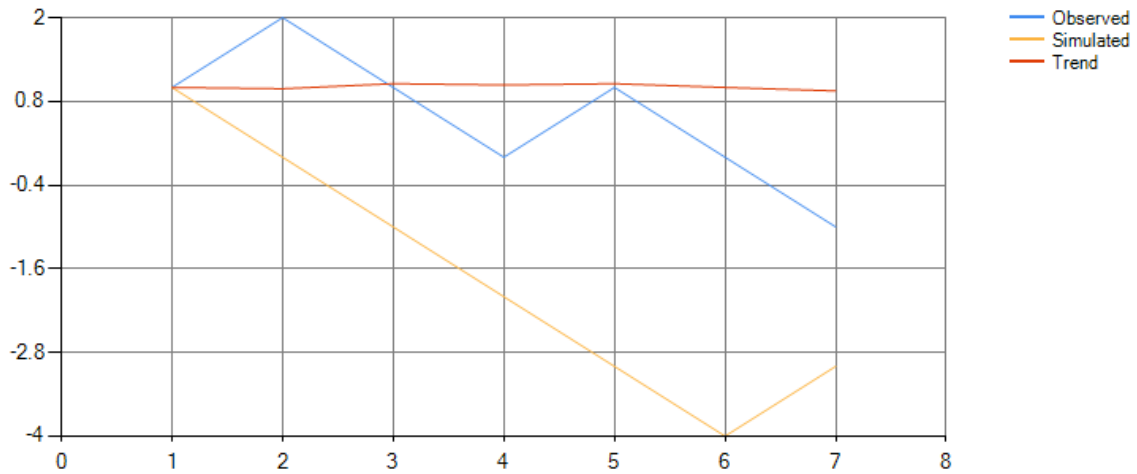


Fig. S10. Second verify forecast produced in session two.

The second of six verify forecast outcomes produced in the second session are shown here. The corresponding values for this forecast are Dead (1), Dead (1), Dead (1), Dead (1), Dead (1), Alive (0). This action sequence of 1, 1, 1, 1, 1, 0 is shown in the second sub column under the Session 2 column in Table 4 of the paper's main text.

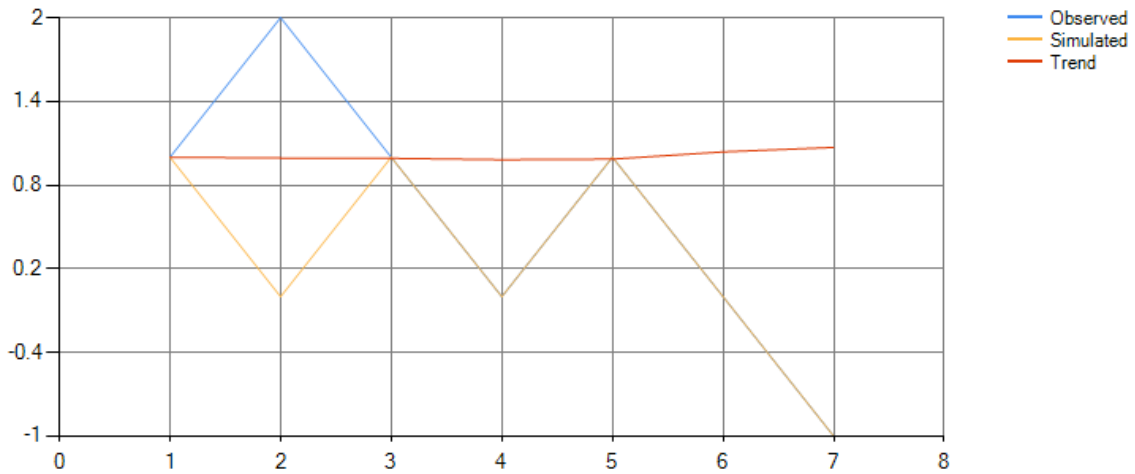


Fig. S11. Third verify forecast produced in session two.

The third of six verify forecast outcomes produced in the second session are shown here. The corresponding values for this forecast are Dead (1), Alive (0), Dead (1), Alive (0), Dead (1), Dead (1). This action sequence of 1, 0, 1, 0, 1, 1 is shown in the third sub column under the Session 2 column in Table 4 of the paper's main text.

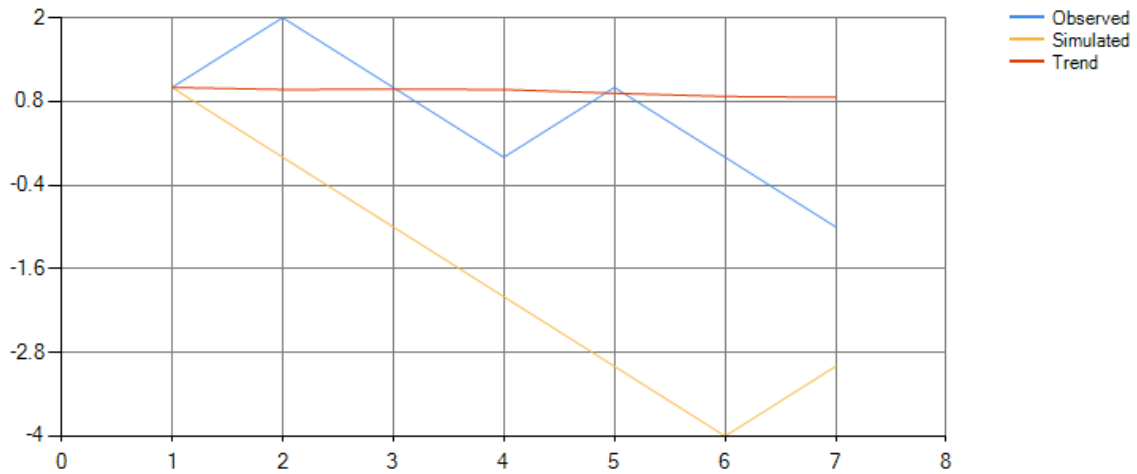


Fig. S12. Fourth verify forecast produced in session two.

The fourth of six verify forecast outcomes produced in the second session are shown here. The corresponding values for this forecast are Dead (1), Dead (1), Dead (1), Dead (1), Dead (1), Alive (0). This action sequence of 1, 1, 1, 1, 1, 0 is shown in the fourth sub column under the Session 2 column in Table 4 of the paper's main text.

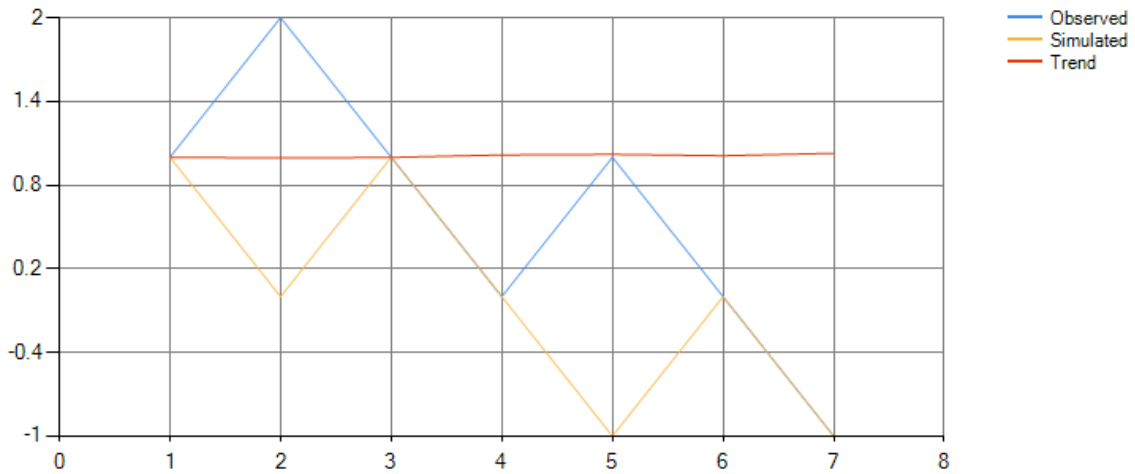


Fig. S13. Fifth verify forecast produced in session two.

The fifth of six verify forecast outcomes produced in the second session are shown here. The corresponding values for this forecast are Dead (1), Alive (0), Dead (1), Dead (1), Alive (0), Dead (1). This action sequence of 1, 0, 1, 1, 0, 1 is shown in the fifth sub column under the Session 2 column in Table 4 of the paper's main text.

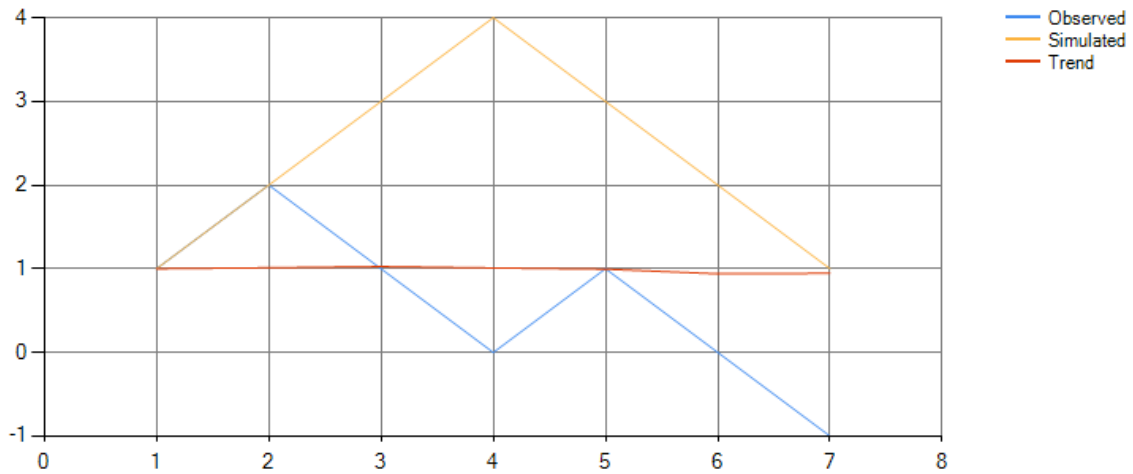


Fig. S14. Sixth verify forecast produced in session two.

The final of six verify forecast outcomes produced in the second session are shown here. The corresponding values for this forecast are Alive (0), Alive (0), Alive (0), Dead (1), Dead (1), Dead (1). This action sequence of 0, 0, 0, 1, 1, 1 is shown in the sixth sub column under the Session 2 column in Table 4 of the paper's main text.

Table S1. Fitting data from first training session.

Id	Observed	Calculated
1	1	1
2	0	0
3	1	1
4	0	0
5	1	1
6	2	2
7	3	3
8	2	2
9	3	3
10	4	4
11	5	5
12	4	4
13	5	5
14	4	4
15	3	3
16	4	4
17	3	3
18	2	2
19	1	1

Table S2. Data of first verify forecast outcome produced in first training session.

Id	Observed	Calculated
19	1	1
20	2	0
21	1	-1
22	0	-2
23	1	-3
24	0	-2
25	-1	-3

Table S3. Data of second verify forecast outcome produced in first training session.

Id	Observed	Calculated
19	1	1
20	2	0
21	1	-1
22	0	0
23	1	1
24	0	0
25	-1	-1

Table S4. Data of third verify forecast outcome produced in first training session.

Id	Observed	Calculated
191	1	1
202	0	0
211	-1	-1
220	-2	-2
231	-1	-1
240	0	0
25-1	1	1

Table S5. Data of fourth verify forecast outcome produced in first training session.

Id	Observed	Calculated
191	1	1
202	0	0
211	1	1
220	2	2
231	3	3
240	2	2
25-1	1	1

Table S6. Data of fifth verify forecast outcome produced in first training session.

Id	Observed	Calculated
191	1	1
202	2	2
211	1	1
220	0	0
231	1	1
240	2	2
25-1	3	3

Table S7. Data of sixth verify forecast outcome produced in first training session.

Id	Observed	Calculated
191	1	1
202	2	2
211	1	1
220	0	0
231	1	1
240	2	2
25-1	3	3

Table S8. Fitting data from second training session.

Id	Observed	Calculated
1	1	1
2	0	0
3	1	1
4	0	0
5	1	1
6	2	2
7	3	3
8	2	2
9	3	3
10	4	4
11	5	5
12	4	4
13	5	5
14	4	4
15	3	3
16	4	4
17	3	3
18	2	2
19	1	1

Table S9. Data of first verify forecast outcome produced in second training session.

Id	Observed	Calculated
191	1	1
202	2	2
211	1	1
220	2	2
231	3	3
240	4	4
25-1	3	3

Table S10. Data of second verify forecast outcome produced in second training session.

Id	Observed	Calculated
19	1	1
20	2	0
21	1	-1
22	0	-2
23	1	-3
24	0	-4
25	-1	-3

Table S11. Data of third verify forecast outcome produced in second training session.

Id	Observed	Calculated
191	1	1
202	0	0
211	1	1
220	0	0
231	1	1
240	0	0
25-1	-1	-1

Table S12. Data of fourth verify forecast outcome produced in second training session.

Id	Observed	Calculated
19	1	1
20	2	0
21	1	-1
22	0	-2
23	1	-3
24	0	-4
25	-1	-3

Table S13. Data of fifth verify forecast outcome produced in second training session.

Id	Observed	Calculated
19	1	1
20	2	0
21	1	1
22	0	0
23	1	-1
24	0	0
25	-1	-1

Table S14. Data of sixth verify forecast outcome produced in second training session.

Id	Observed	Calculated
191	1	1
202	2	2
211	3	3
220	4	4
231	3	3
240	2	2
25-1	1	1