Adaptive Simulation with Reinforcement Learning Data Flow

Simulation time period is for 12 months. The simulation stops after each month and waits for the “new data input”. If there is no new data input, simulation keeps continuing to the next month and stops. It again waits for the new data input. At any stop point, the algorithm will get divided into two parts.

In the first part, the user can see the worst 5 performing operations/processes from the whole manufacturing processes with a ranked option list to improve the performance. Once the user chooses an option, a new estimated data input will be generated and used for simulation all the way to the month 12. The improved results will be shown, and the differences will be recorded.

On the second part, the simulation will keep continuing to simulate from the stop point as per the algorithm without considering any process improvement. It will keep asking for new data input and simulate accordingly.

Comparison:

Once a first part of the simulation happens, the results will be stored without impacting further simulation. When the second part of simulation takes a new data input after the stop point, the new data input and estimated data input will get compared. Based on the user selection and comparison, the options from the option bank will be ranked. Next cycle of simulation, the rank will get updated. That is how the provided options will always get evolved and more accurate.

Simulation Starts (X0)

Month: 0 – 1

Data input: 0

Simulation Stops

New data input: Yes/No

User asks for review: Yes/No

New data input: No

User asks to review: No

New data input: Yes

User asks to review: No

New data input: No

User asks to review: Yes

New data input: Yes

User asks to review: Yes

Simulation Starts

(X1)

Month: 1 – 2

Data input: 0

Simulation Stops

New data input: Yes/No

User asks for review: Yes/No

Simulation Starts

(X2)

Month: 1 – 2

Data input: 1

Simulation Stops

New data input: Yes/No

User asks for review: Yes/No

Simulation Starts (X3)

Month: 1 – 2

Data input: 0

Simulation Stops

Show worst 5 operations

User chooses 2-3 options

Generate estimated data input A

New data input: Yes/No

User asks for review: Yes/No

Simulation Starts (X4)

Month: 1 – 2

Data input: 1

Simulation Stops

Show worst 5 operations

User chooses 2-3 options

Generate estimated data input A

Simulation Starts (X30)

Month: 2 - 12

Data input: Generated A

Simulation Stops

Simulation Starts (X40)

Month: 2 - 12

Data input: Generated A

Simulation Stops

Algorithm Continues

Algorithm Continues

Algorithm Continues

Continues to next page

Algorithm Continues

Comparison data input 1 vs A <30%: Yes

Rank the option bank

Rank the option bank

Comparison data input 1 vs A <30%: No

Comparison data input 1 vs A <30%: Yes

Rank the option bank

Rank the option bank

Comparison data input 1 vs A <30%: No

Simulation Starts (X340)

Month: 3 - 12

Data input: Generated

Simulation Stops

Show worst 5 operations

User chooses 2-3 options

Generate estimated data input

New data input: Yes/No

User asks for review: Yes/No

Simulation Starts (X33)

Month: 2 – 3

Data input: 0

Simulation Stops

Show worst 5 operations

User chooses 2-3 options

Generate estimated data input B

Simulation Starts (X32)

Month: 2 – 3

Data input: 1

Simulation Stops

Compared result <30%: Yes/No

Algorithm Continues

Algorithm Continues

Simulation Starts (X330)

Month: 3 - 12

Data input: Generated

Simulation Stops

Algorithm Continues

Simulation Starts

(X31)

Month: 2 – 3

Data input: 0

Simulation Stops

Simulation Starts (X3)

Month: 1 - 2

Data input: 0

Simulation Stops

New data input: Yes/No

User asks for review: Yes/No

New data input: No

User asks to review: No

New data input: Yes

User asks to review: No

New data input: No

User asks to review: Yes

New data input: Yes

User asks to review: Yes

Simulation Starts (X34)

Month: 2 – 3

Data input: 1

Simulation Stops

Show worst 5 operations

User chooses 2-3 options

Generate estimated data input