

Claims:

1. An industrial process model generation system,
comprising:
- an input unit; and
 - 5 - a processing unit;
- wherein, the input unit is configured to receive a plurality of input value trajectories comprising operational input value trajectories and simulation input value trajectories relating to an industrial process;
- 10 wherein, the processing unit is configured to implement a simulator of the industrial process;
- wherein, the processing unit is configured to generate a plurality of industrial process behavioural data, wherein industrial process behavioural data is generated for at least some of the plurality of input value trajectories, and wherein the generation of the industrial process behavioural data for the at least some of the plurality of input value trajectories comprises utilization of the simulator;
- 15 wherein, the processing unit is configured to implement a machine learning algorithm that models the industrial process;
- 20 wherein, the processing unit is configured to train the machine learning algorithm;
- wherein, the processing unit is configured to process a first behavioural data of the plurality of behavioural data with the machine learning algorithm to determine a first modelled result;
- 25 wherein, the processing unit is configured to determine to train or not to train the machine learning algorithm using the first behavioural data, the determination comprising a comparison of the first modelled result with a performance condition;
- wherein, the processing unit is configured to process a second behavioural data of the plurality of behavioural data with the machine learning algorithm to determine a second modelled result;
- 30 wherein, the processing unit is configured to determine to train or not to train the machine learning algorithm using the second behavioural data or to further train or not to further train the machine learning algorithm using the second behavioural data, the determination
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comprising a comparison of the second modelled result with the performance condition.

2. System according to claim 1, wherein the plurality of
5 input value trajectories comprises one or more of: process data; temperature data; pressure data; flow data; level data; voltage data; current data; power data; actuator data; valve data; sensor data; controller data.
3. System according to any of claims 1-2, wherein the
10 determination to train or not to train the machine learning algorithm using the first behavioural data, comprises a determination of a sensitivity of the trained machine learning algorithm to at least a portion of the plurality of behavioural data.
4. System according to any of claims 1-3, wherein the
15 determination to train or not to train the machine learning algorithm using the second behavioural data, comprises a determination of the sensitivity of the trained machine learning algorithm to at least a portion of the plurality of behavioural data.
5. System according to any of claims 1-4, wherein the
20 determination to further train or not to further train the machine learning algorithm using the second behavioural data, comprises a determination of the sensitivity of the trained machine learning algorithm to at least a portion of the plurality of behavioural data.
6. System according to any of claims 4-5, wherein the
30 determination of the sensitivity of the trained machine learning algorithm to at least a portion of the plurality of behavioural data comprises an analysis of a loss function of the trained machine learning algorithm with respect to at least the portion of the plurality of behavioural data.
7. System according to any of claims 1-6, wherein the
35 processing unit is configured to determine to stop training of the machine learning algorithm, the determination comprising a determination of a sensitivity

of the trained machine learning algorithm to at least a portion of the plurality of behavioural data.

8. System according to any of claims 1-7, wherein the processing unit is configured to select the at least some of the plurality of input value trajectories.
9. An industrial process model selection and generation system, comprising:
- an input unit; and
 - a processing unit.
- wherein, the input unit is configured to receive a plurality of input value trajectories comprising operational input value trajectories and simulation input value trajectories;
- wherein, the processing unit is configured to implement a simulator of the industrial process;
- wherein, the processing unit is configured to generate a plurality of industrial process behavioural data, wherein the industrial process behavioural data is generated for at least some of the plurality of input value trajectories, and wherein the generation of the industrial process behavioural data for the at least some of the plurality of input value trajectories comprises utilization of the simulator;
- wherein, the processing unit is configured to implement a plurality of machine learning algorithm that model the industrial process;
- wherein, the processing unit is configured to process a first behavioural data of the plurality of behavioural data with a first machine learning algorithm of the plurality of machine learning algorithms to determine a first machine learning algorithm first modelled result; and
- wherein, the processing unit is configured to determine to train the first machine learning algorithm using the first behavioural data or implement a second machine learning algorithm of the plurality of machine learning algorithms, and wherein the determination comprises a comparison of the first machine learning algorithm first modelled result with a performance condition.

10. System according to claim 9, wherein the processing unit is configured to process a second behavioural data of the plurality of behavioural data with the first machine learning algorithm to determine a first machine learning algorithm second modelled result; and wherein the processing unit is configured to determine to train the first machine learning algorithm using the second behavioural data or implement the second machine learning algorithm, wherein the determination comprising a comparison of the first machine learning algorithm second modelled result with the performance condition.
11. System according to claim 9, wherein the processing unit is configured to process the first behavioural data with the second machine learning algorithm to determine a second machine learning algorithm first modelled result; and wherein the processing unit is configured to determine to train the second machine learning algorithm using the first behavioural data or implement a third machine learning algorithm of the plurality of machine learning algorithms, wherein the determination comprises a comparison of the second machine learning algorithm first modelled result with the performance condition.
12. System according to any of claims 9-11, wherein the determination to train the existing machine learning algorithm using behavioural data or implement a new machine learning algorithm comprises a determination of a sensitivity of the existing machine learning algorithm to at least a portion of the plurality of behavioural data.
13. System according to any of claims 9-12, wherein the processing unit is configured to determine to stop training of the existing machine learning algorithm, wherein the determination comprises a determination of a sensitivity of the trained machine learning algorithm to at least a portion of the plurality of behavioural data.
14. System according to any of claims 12-13, wherein the determination of the sensitivity of the trained machine learning algorithm to at

least the portion of the plurality of behavioural data comprises an analysis of a loss function of the trained machine learning algorithm with respect to at least the portion of the plurality of behavioural data.

- 5 15. System according to any of claims 9-14, wherein the processing unit is configured to select the at least some of the plurality of input value trajectories.
- 10 16. An industrial process model generation method, comprising:
- receiving a plurality of input value trajectories comprising operational input value trajectories and simulation input value trajectories relating to an industrial process;
- 15 implementing by a processing unit a simulator of the industrial process;
- generating by the processing unit a plurality of industrial process behavioural data, wherein the industrial process behavioural data is generated for at least some of the plurality of input value trajectories,
- 20 and wherein the generation of the industrial process behavioural data for the at least some of the plurality of input value trajectories comprises utilization of the simulator;
- implementing by the processing unit a machine learning algorithm that models the industrial process, wherein the processing
- 25 unit is configured to train the machine learning algorithm;
- processing by the processing unit a first behavioural data of the plurality of behavioural data with the machine learning algorithm to determine a first modelled result;
- determining by the processing unit to train or not to
- 30 train the machine learning algorithm using the first behavioural data, the determination comprising a comparison of the first modelled result with a performance condition;
- processing by the processing unit a second behavioural data of the plurality of behavioural data with the machine learning
- 35 algorithm to determine a second modelled result;

determining by the processing unit to train or not to train the machine learning algorithm using the second behavioural data or to further train or not to further train the machine learning algorithm using the second behavioural data, the determination comprising a comparison of the second modelled result with the performance condition.

17. An industrial process model selection and generation method, comprising:

receiving a plurality of input value trajectories

comprising operational input value trajectories and simulation input value trajectories relating to an industrial process;

implementing by a processing unit a simulator of the industrial process;

generating by the processing unit a plurality of industrial process behavioural data, wherein the industrial process behavioural data is generated for at least some of the plurality of input value trajectories, and wherein the generation of the industrial process behavioural data for the at least some of the plurality of input value trajectories comprises utilization of the simulator;

implementing by the processing unit a first machine learning algorithm of a plurality of machine learning algorithms that model the industrial process;

processing by the processing unit a first behavioural data of the plurality of behavioural data with the first machine learning algorithm of the plurality of machine learning algorithms to determine a first machine learning algorithm first modelled result; and

determining by the processing unit to train the first machine learning algorithm using the first behavioural data or implement a second machine learning algorithm of the plurality of machine learning algorithms, the determination comprising a comparison of the first machine learning algorithm first modelled result with a performance condition.