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(54) Title: OPTIMIZING CONTROL ACTIONS OF A CONTROL SYSTEM VIA AUTOMATIC DIMENSIONALITY REDUC-
TION OF A MATHEMATICAL REPRESENTATION OF THE CONTROL SYSTEM

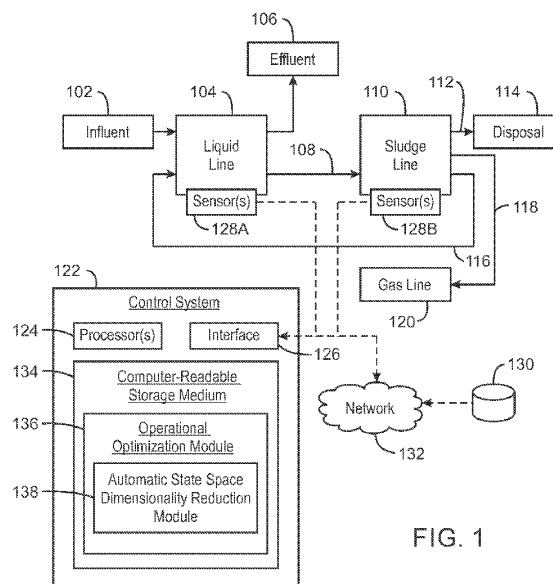


FIG. 1

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(57) Abstract: A method for automatically reducing the dimensionality of a mathematical representation of a controlled application system is provided. The method includes receiving, at a control system, data corresponding to control action and system state variables relating to the controlled application system, fitting a constrained reinforcement learning (CRL) model to the controlled application system based on the data, and automatically identifying a subset of the system state variables by selecting control action variables of interest and identifying system state variables that drive the CRL model to recommend each control action variable of interest. The method also includes automatically performing state space dimensionality reduction of the CRL model using the subset of system state variables, estimating a transition probability matrix for a constrained Markov decision process (CMDP) model of the controlled

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