

To Achieve Replacing Human Operators for the AI

SC C2

PS1-3 Question 1.8

Given the capacity of advanced intelligent systems to process large amounts of data and quickly compute an answer, can AI replace human operators in system operations?

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Two requirements to achieve replacing human operators for the AI

Requirement 1: Ensuring interpretability

- The reasons behind AI outputs (causal relationship between inputs and outputs) must be clear.
- The operation of AI must be easily understandable by human operators in order to explain the reasons to third parties.

Requirement 2: Adaptability for new situations

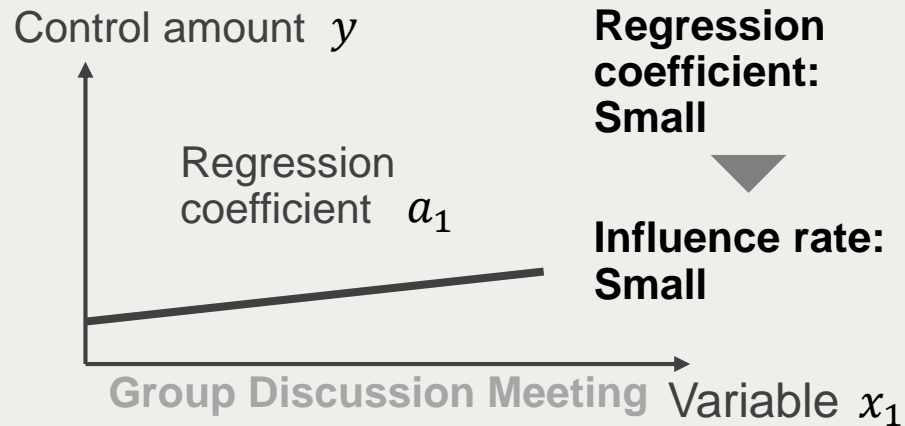
- The performance must be maintained even under conditions where the system state during online operation differ significantly from that during offline learning (the risk condition of the drop of AI output precision and control performance).

Our new system takes the measures for each requirement.

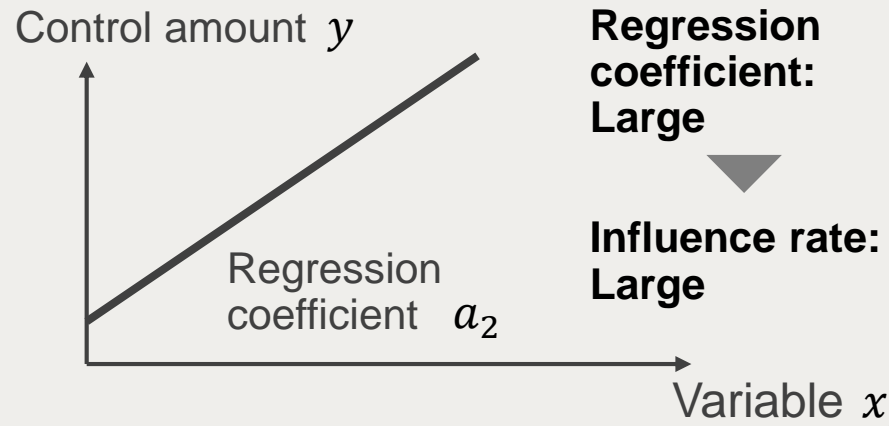
Measures to ensure interpretability in the new system: The adoption of multiple regression model

- Adopt a multiple regression model that can maintain the necessary precision and has excellent input and output-related interpretation.
- Evaluate the influence rate of each variable input for the control amount from the magnitude relationship of the regression coefficient.

Multiple regression model $y = a_1x_1 + a_2x_2 + \dots + a_nx_n + b$



(active power of transmission line1)



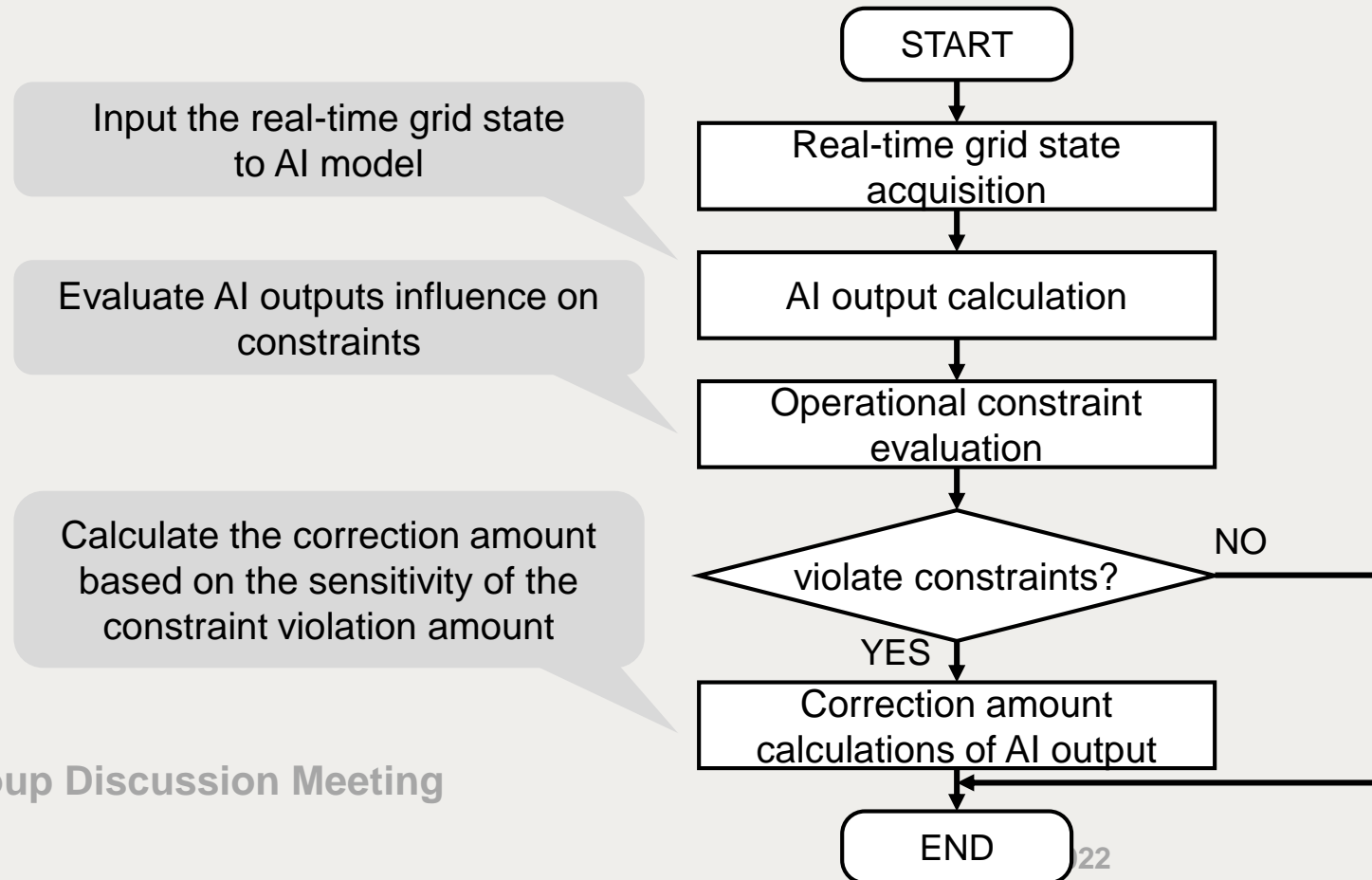
(active power of bank 1)

The reason why the control amount increased at time X is that the active power of bank 1 increased.



Measures to adapt for new situations in the new system: The introduction of correction processing

- Evaluate AI outputs for the constraints based on the real-time grid state.
- Correct AI output If the AI output causes a constraint violation.



Group Discussion Meeting