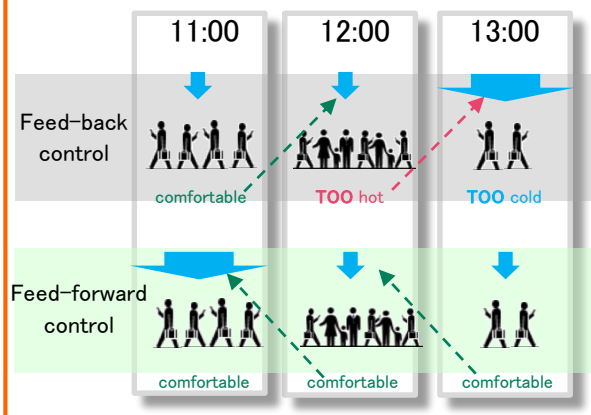
# 02 Efficient and comfortable AC control by AI

## - Environment reproduction and control optimization system -


## Abstract

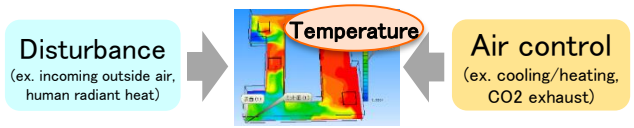
We propose an air-conditioning control system by AI to save more enegy and to be more comfortable. In a lerge-scaled facility, it takes serveral time to stabilize temperature. Traditional and typical way of control system, commonly known as feed-back control, makes sometimes uncomfortable and consumes extra enegy by the time-delay. On the other hand, feed-forward control determines suitable control with predicting environment status of the facility. For example, if congestion is predicted, the air-flow could be increased or decreased in advance, which would make the facility's temperature suitable. We developed AI consisting of environment reproduction system and control optimization system to calculate the optimal operation schedule for multiple air-conditioning flows, and demonstrated the importance of feed-forward control through field trial at "COREDO Muromachi", which is one of the largest-scale commercial facilities, with NTT-Facilities and MITSUI FUDOSAN.


## Background: feed-back or feed-forward



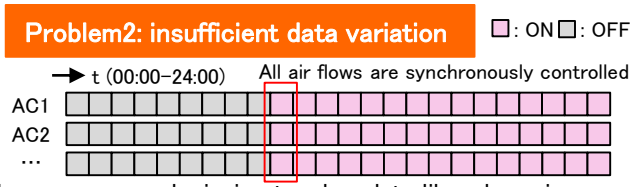

Prediction is needed to keep temperature comfortable.

## Problem1: complex environment



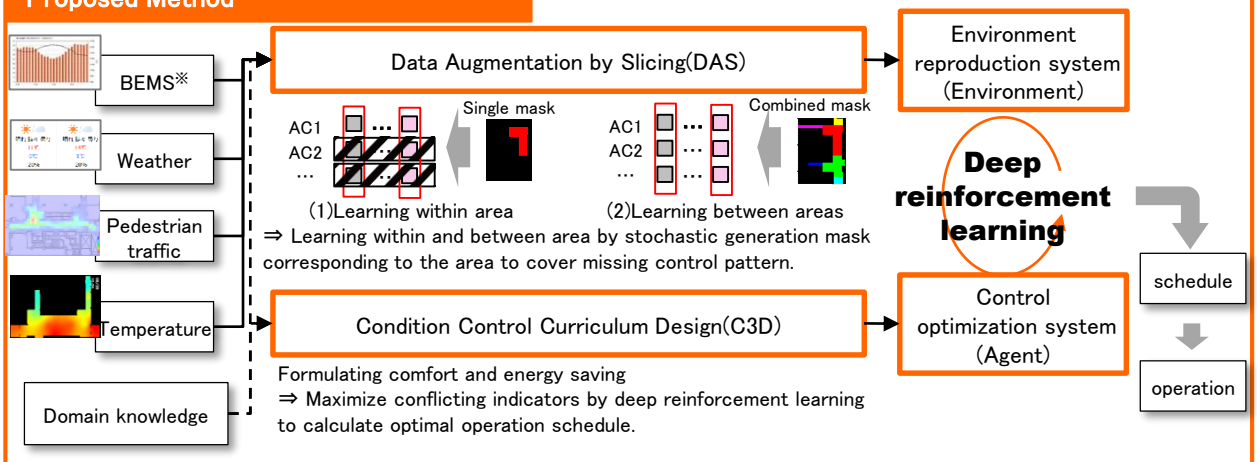

It is hard to build prediction model.

## Problem2: insufficient data variation




There are several missing teacher data like when air-conditioning flows are partially or periodically turned off, because normally all air flows are synchronously controlled.

## Proposed Method




※: BEMS: Building Energy Management System

## References


[1] I. Shake, K. Kawase, Y. Suzuki, "NSRI × NTT × MITSUI FUDOUSAN Collaboration results: Commenced joint experiments to utilize urban big data and AI in Nihonbashi Muromachi area," *NTT technical journal*, Vol. 29, No. 11, pp. 63-65, 2017.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