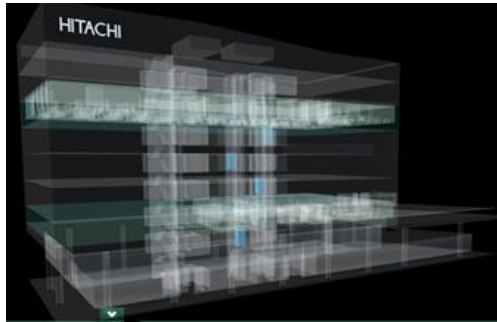


IoT-based Smart Building and Digital Twin – An Integrated and Adaptive Control Solution



Intelligent Building Management System

Buildings consume large amount of electricity and contribute to 40% of the total carbon emission, which has a strong correlation with the rising global temperature. It is critical to reduce building energy consumption, in order to combat climate change.

The occupant presence and density of a commercial building may vary dynamically within a typical business day due to various business activities. It is common to find spaces partially occupied or even unoccupied for significant time periods. Current building management system generally operates based on fixed schedules, and building sub-systems (such as air-conditioning, lighting, power plug, and elevator) work independently. Control and set points are pre-determined, and are not adaptive to the change of surrounding situations, such as weather, occupant presence & density, personal thermal comfort, etc. This results in unnecessary energy consumption. Hence, adaptive control and holistic optimization across building sub-systems is needed to reduce building energy consumption while maintain occupant's comfort.

With the support from Building and Construction Authority (BCA), Hitachi Asia Ltd. has enhanced its intelligent building management system to enable a human-centric, automated, and adaptive building management. The system provides a plug and play platform to ease the integration of building sub-systems and various IoT devices. Utilizing AI and machine learning technologies, the system can optimize the power plug based on usage pattern, optimize the lift operation based on vertical transportation demand, and control the environment settings (including lighting and air-conditioning) based on human activities and comfort requirements. The system also provides a digital twin with an intuitive and interactive interface for building owners to manage the entire building.

Project Principal Investigator: Wujuan LIN / Hitachi Asia Ltd.
Project supported by GBIC R&D

Applications:

- Intelligent building management system for commercial buildings

Capabilities:

- Plug-and-Play system integration
- Digital Twin
- Real-time monitoring
- Integrated and adaptive building control based on human activity and personal comfort

Benefits:

- Reduce building energy consumption
- Improve occupant's comfort
- Automate facility management

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