

Green Building Management System - An Open IoT Platform Approach

The objectives of the project are to:

1. Utilize low cost **IoT** devices for rapid and large-scale deployment.
2. Integrate **human tracking** to account energy usage.
3. Cloud based system to enable **big data analysis**.
4. Integration of **renewable** energy and energy storage.
5. **Open** platform - one stop integrated building management portal.

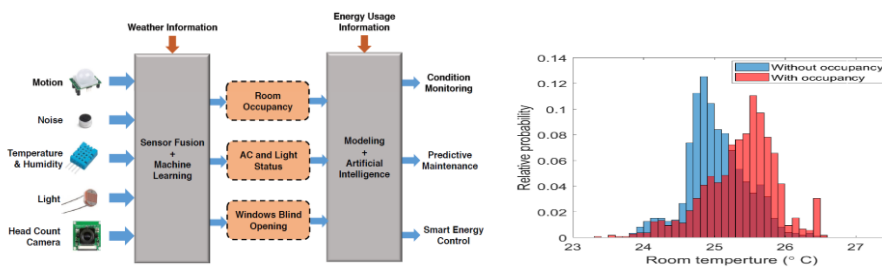
Selected project outcomes:

Solar thermal hot water system audit and optimization



We investigate the energy efficiency of the solar thermal hot water system and identify the issues of the system. Through optimized control, we demonstrate energy saving of 50% is possible. In addition, we also build an AI model for heat pump condition monitoring, which can be used for abnormal detection and predictive maintenance.

IoT sensor fusion with Artificial Intelligence



We design an AI based solution that will perform unsupervised learning and fuse information from various sensors to detect room occupancy, aircon status, and hence to deduce the room aircon energy efficiency. This is a challenging task, as rooms vary in size, layout, and aircon set point. Also sensors are installed at different locations within a room. Through big data collected, we perform benchmarking to normalize energy efficiency based on the aircon set point and room size, and then justify the energy efficacy for each individual room.

Applications:

- Energy auditing
- Energy management
- Asset management
- Aircon management
- Hot water system & renewable energy system optimization

Capabilities:

- Energy efficient benchmarking, to figure out potential energy wastage in each part of the system.
- Energy management, especially renewable energy, energy storage.
- Predictive maintenance, to detect abnormal and predict equipment failure.

Benefits:

- Low-cost IoT based building management system.
- Big data collected by IoT can provide additional information, e.g. abnormal detection, equipment remaining useful life prediction, etc.

Contact Information:

Assoc Prof Yuen Chau
 (Project Principal Investigator)
 Singapore University of
 Technology and Design
yuen@ieee.org

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