UNB EST. 1785 UNIVERSITY OF NEW BRUNSWICK | Off-site Construction Research Centre

PROJECT PROFILE

IOT USE-CASE MAPPING FOR SMART BUILDING MANAGEMENT

NOVEL USE-CASES MAPPING FRAMEWORK FOR IOT-BASED SMART BUILDING MANAGEMENT

This research focused on mapping the use-cases of Internet-of-Things (IoT) sensors in the domain of smart building management (SBM). The research aims to develop a structured framework for mapping the potential uses of IoT sensors in the context of academic smart building management in university campuses. It is in support of the Smart Campus Integration and Testing Lab collaboration (SCITLab) at Toronto Metropolitan University, with leadership at UNB by Hung Cao, Trevor Hanson and Monica Wachowicz (RMIT, UNB Adjunct).

PROJECT BACKGROUND

The overarching goal was to create a macro mapping for all IoT devices used in a smart building and list their overall uses in the management of smart buildings. There is plenty of research others have created on the uses of IoT-based devices for smart buildings, but they solely focus on a singular use-case and there is not any standardization between these papers. Most of these papers list the classifications of these smart buildings in completely different ways, either in use/functionality or for devices accomplishing multiple uses.

RESULTS

- **Classification based on the building components.** This classification focuses on dividing IoT devices between Systems or Occupant, then their respective sub-classifications; for Systems, the subdivisions are Primary systems, Control Systems, and Outdoor systems. Each of these are further subdivided. For Occupants, the subdivisions are Human Users and Assets. Like previous subdivisions, these are also further subdivided.
- **Classirication based on the building "Smartness".** The Smartness aspects are classified under smart operations, smart maintenance, smart energy, smart data/information & communication, smart security & safety, smart mobility & accessibility, and smart health & environment.
- **Classification based on building management objectives.** The Management Objectives are classified under service cost optimization, condition optimization, energy management, productivity, comfort, and asset/inventory management.
- **Classification based on the device overall class type.** This is another vector to classify the IoT sesnors and their class type. In this study, four sensor types were identified. These types are Motion, Position, Environment, and Mass measurement IoT sensors.

FINDINGDS

Based on initial observation of the design, the 4D mapping framework developed in this research is capable in serving the following functions:

- Documenting and mapping the available sensors and their use-cases,
- Identifying the potential use-cases of new or existing sensors
- Highlighting gaps in the targeted building components and the corresponfing use-cases.
- Serving as a communication tool for collaboration on IoT-related projects with different parties,
- Setting a framework for strategic visioning in SBM research and development programs
- Support planning, visioning, and building roadmaps for strategic SBM research and development programs