AS327884

EQ House: The Future of Our Architecture with AI and IOT

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Learning Objectives

- Get information of one of the vision of the future architecture with AI and IOT through the example of the actual realized architecture.
- Get information of computational design and digital fabrication method that realized this architecture including the inspection using Revit and BIM360.
- Get information of optimization management system with machine learning.

Description

The class will be the lecture of the EQ house, the actually built architecture that AI and IoT were deployed. It was completed in 2019 March. Installed with advanced IOT technology and artificial intelligence, EQ House is expected to be attached by the owner as if it were life-like architecture. It is installed with varied sensors to perceive environmental status and accumulates data about the owner's preference by means of "like" buttons from the smartwatch. The experimental design, inspection and fabrication process that was also needed to actually realize the futuristic architecture EQ House will be introduced in this class.

Speaker

Ikuya Hanaoka is the architect working for Takenaka corporation, one of the largest design and construction companies in Japan. In 2016, Ikuya Hanaoka had built the concept of the 'Advanced Design Group' in this company to challenge in the advanced field of both design and construction, and has been leading the group as the group leader. The aim of the group is to maximize the possibility of the architectural projects that is to be actually realized with challenging design, computation, simulation and digital fabrication. This group is not only composed with architects, but also with environmental designer and programmer to highly integrate design and engineering throughout the projects. The works by Ikuya Hanaoka have won many architectural prizes including the first prize of the Japan Federation of Architects & Building Engineers Association Award, the first prize in the Tokyo Architectural Award and were also shortlisted for the World Architectural Festival.

Summery

"The Architecture as Living Being "

Installed with advanced IOT technology and artificial intelligence, EQ House is expected to be attached by the owner as if it were a living being. The house is installed with AI and varied sensors to perceive environmental status and accumulates data about the owner's preference by the record of environmental control or by means of "like" buttons from the smartwatch.

EQ House was designed to be more like a part of a nature than architecture. The façade is made of perforated aluminum panels so that sunlight and air can be taken inside through the panels. The pattern is designed to create mottled shade as if leaves made organic shade. 1,200 Aluminum panels that compose the house have more than 800 different patterns of the openings to achieve the optimized light condition that cuts off the heat load while creating beautiful light patterns on the floor. The changes of the light patterns bring the natural rhythm to the living space. Lighting and auto-ventilator is installed in the layer between two surfaces of aluminum panels to control the environment of the house. The natural ventilation is also efficient to decrease energy consumption in an Asian country like Japan.

EQ House is covered with switchable films to adjust the balance of both the visual and thermal comfort. The transparency of the film is controlled and machine learned by program to meet the preference of the owner. The film also changes its transparency in a certain amount in a rhythm of deep breath as if the architecture is living being.

EQ House also expresses the future relationship between living space and the mobility. The house includes tube-like spaces for shared cars that are to come to the house by autopilot. A glass interface is installed in front of the car to show the information and status of the car. The glass interface can also show the condition of the house such as temperature, humidity, illuminance, wind speed and comfort value as well as other information like music title played in the house. These information and status can be controlled by hand or by voice.

By designing real apace and digital effect at the same time, the architecture with AI communicates and grows with the owner and will be felt as if it is alive. The relationship between man and architecture will be recreated to be closer to each other.

The movie and the summery of the project can also be seen below.
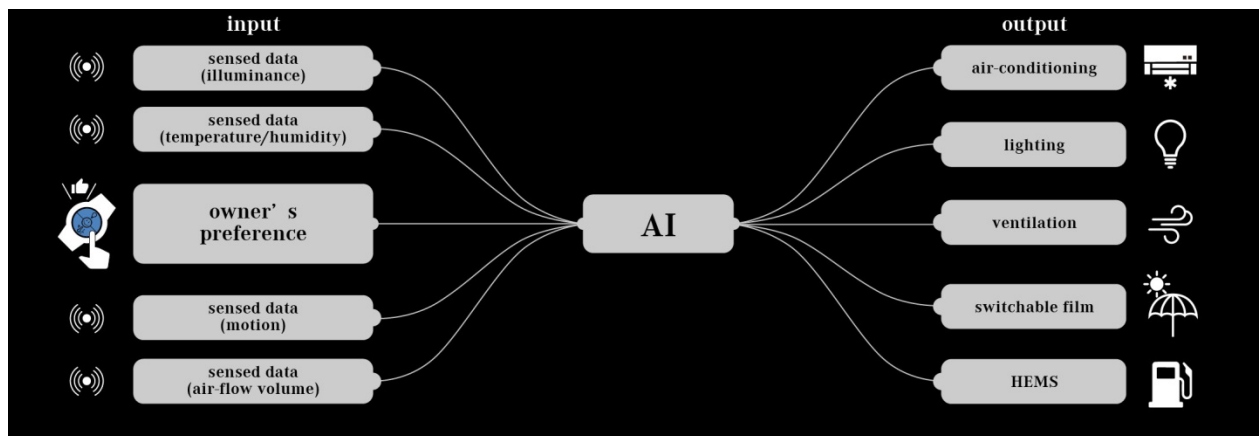https://www.takenaka.co.jp/takenaka_e/eq_house/

EQ House

Diagram of the system