A Proposal of Developing an AADL Model of The Smart Heating and Ventilation System

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ABSTRACT

In this document, we introduced the overview of the heating and ventilation system which we are going to develop using AADL. In addition, we also talked about the expected outcomes and milestones of this project.

keywords: AADL; Software architecture; Heating and Ventilation;

1. SYSTEM DESCRIPTION

1.1 System Overview

For this project, we are going to develop an AADL model of the smart heating and ventilation (SHV) system. SHV is a related device which used to heating and ventilation of a house or a car. The purpose of SHV is to establish an indoor artificial environment which is beneficial to human health. It can raise the temperature or improve the quality of the air for indoor environment. Figure 1 presents an example of a popular heating and ventilation which normally used in a house. Compared with normal heating and ventilation, we add the smart elements into the system of the SHV, which include automatic warming, automatically adjust the air quality, and remote control.

Figure 1. an Example of Household Heating and Ventilation.

1.2 System Components

The SHV system consists of four major components:

- Heating Generator (HG)
- Ventilation Generator (VG)
- Control Model (CM)
- Remote Controller (RC)

The Heating Generator (HG) monitors the temperature and enhances the temperature. It has three components which include Heating Unit, Sensing Unit, and the Control Unit. The Ventilation Generator (VG) has the similar three functional models, and the VG has the function to monitor the air quality and improve the air condition. The control Model used to control the whole system with choosing mode, handling data, command delivery, etc. The component Remote Controller is provided to user to control this system and send commands to Control Model.

Figure 2 is an overview of the architecture of the SHV.

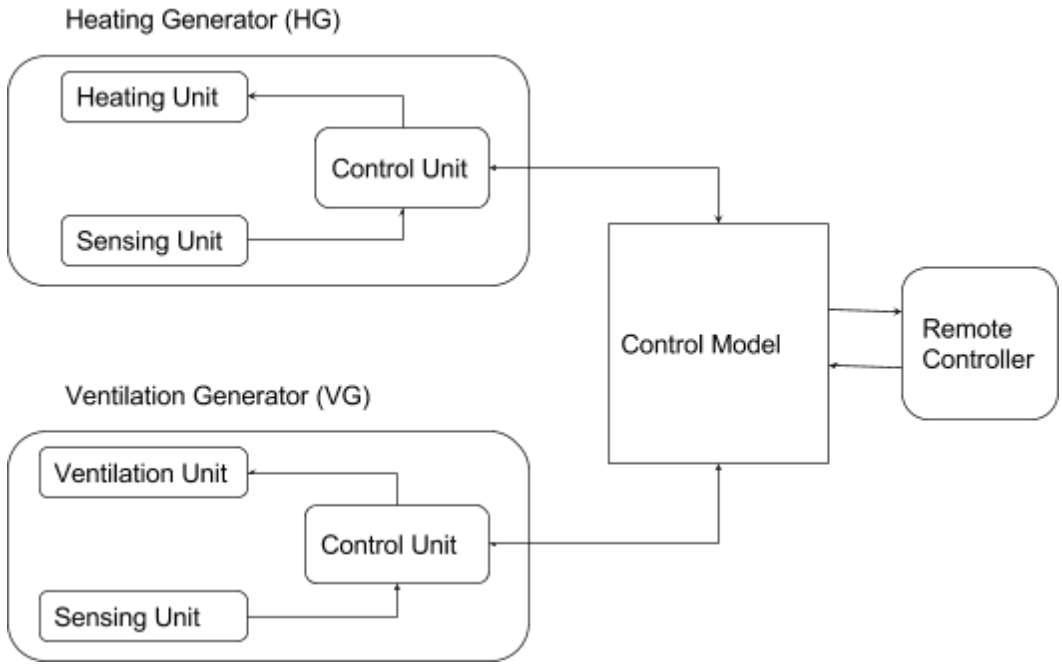

Figure 2. Cartoon of the Architecture of the SHV

EXPECTED OUTCOMES

We are trying to develop an AADL model of the smart heating ventilation system, which means we will use AADL to present the architecture of the SHV system. We will give the definition and implementation of the entire architecture, the detail definition and implementation of each models,

the error modeling and related flows in the system. As a final expected outcome, we hope we can design an efficiency, maintainability, reliability, and usability smart heating ventilation system.

MILESTONE

Delivery Date	Milestones
Mar 13, 2017	Project proposal
Mar 20, 2017	Accomplishing the subcomponents and connections of implementation of the SHV system
Apr 03, 2017	Accomplishing the definition and implementation of the Heating Generator (HG) model
Apr 10, 2017	Accomplishing the definition and implementation of the Ventilation Generator (VG) model
Apr 17, 2017	Accomplishing the definition and implementation of the Control model and Remote Controller model
Apr 24, 2017	Identifying and Adding related modes and flows, which include nominal and error flows
May 01, 2017	Adding error and nominal behavior for error model