

Adaptive Control in Smart Home Environments

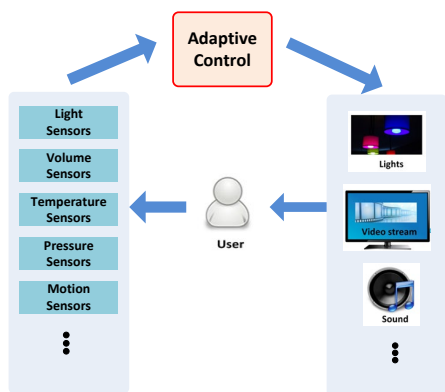
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I. Introduction

A **smart home** refers to an indoor living environment, where different kinds of devices can interconnect together and interface with each other accordingly, making the lives of inhabitants more comfortable.



System adaptive control is therefore important in **associating services and devices with users, acting as the brain of a smart home** to understand its users and provide supervised services.

II. Motivation and Objective

Research objective here is to develop **a framework of home adaptive control** where:

- **Analysing information** collected on home devices about user activities and environment condition.
- **Predicting user's needs and adjusting settings** of home environments in advance.

III. Methodologies

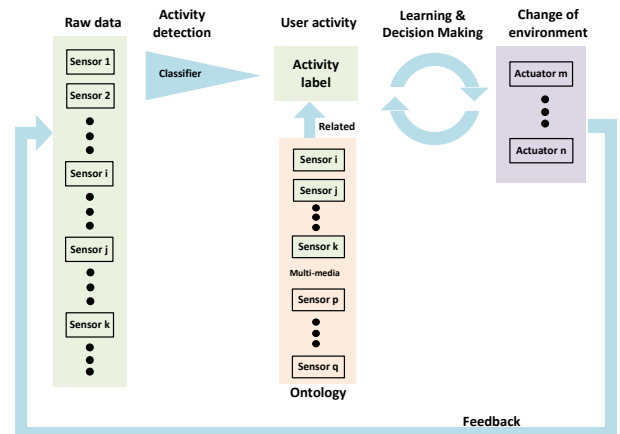
Stage 1: Activity Recognition

Stage 2: Semantic Interoperability

Stage 3: Machine Learning

IV. Progress

System Architecture



Activity Recognition Tests

- ARAS Dataset is used to **compare performance** of commonly used classification methods in stage 1.

Ontology Design

- An ontology with detailed components in smart home is proposed for establishing relations among user, services and devices in stage 2.

V. Future Works

- **Association** via terms and concepts in proposed ontology for Stage 2.
- Use of **multimedia datasets** to build up testing environments for reinforcement learning for Stage 3.

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