Vision Documentation

Title of Project: Interactive House Project

Subgroup: SG2 Units
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Revision History

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2026-02-10	1.4	Extended Product Overview and Vision text	Ali Daoud
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Product Overview

Project Background

The Interactive House Project is part of the course DA330B at Kristianstad University and is designed as a large-scale collaborative student project. The overall goal is to investigate how connected home systems can be engineered to support people in their everyday lives through improved usability, accessibility, and system integration. A particular emphasis is placed on users with functional disabilities, where intuitive interaction methods and reliable automation can significantly increase independence and quality of life. Many existing smart home solutions are fragmented across multiple proprietary platforms, applications, and hardware ecosystems. This fragmentation often leads to complex configuration processes, inconsistent user experiences, and steep learning curves for end users. Through this project, students explore how a centralized software architecture combined with clearly defined interfaces can reduce complexity while enabling experimentation with novel interaction paradigms.

Problem Statement

Current commercial smart home systems frequently prioritize feature richness over accessibility and coherence. Users may be required to switch between several applications to control lighting, climate systems, alarms, or appliances, creating confusion and increasing the risk of user error. For individuals with accessibility needs, these difficulties may form substantial barriers to independent living. There is therefore a clear need for a unified and extensible platform that allows devices to be managed through a single control point, while also serving as a testbed for evaluating alternative interaction mechanisms such as speech control, gesture recognition, and adaptive interfaces. The system must additionally support rapid prototyping so that design ideas can be validated early in the development process.

Vision Statement

Our vision is to design and prototype an interactive home environment that empowers users—particularly people with disabilities—to control household devices through simple, transparent, and adaptable interfaces. The system shall support multiple modes of interaction, including traditional graphical interfaces as well as emerging modalities such as voice commands and gesture-based input. In doing so, the project aims to demonstrate how thoughtful software engineering practices, combined with human-centered design principles, can produce connected systems that are both technically robust and socially beneficial.

Project Goals

The project aims to develop a central server platform that coordinates communication between users and simulated household devices. This platform shall expose web-based and mobile-oriented user interfaces for monitoring and control, while also providing clearly specified APIs for device integration. Additional goals include constructing a realistic virtual home environment, enabling experimentation with innovative interaction techniques, and following an iterative and incremental development process inspired by industrial practice. Accessibility, security, reliability, and maintainability shall be treated as core quality attributes throughout the project lifecycle.

Stakeholders

Primary stakeholders include end users with accessibility needs, who serve as the focal point for design decisions, as well as course instructors and examiners responsible for evaluating the project outcomes. The student development teams are also central stakeholders, gaining experience in large-scale collaboration, system integration, and formal software engineering processes. Secondary stakeholders may include academic researchers in smart home technologies, future student cohorts who reuse or extend the platform, and industrial partners interested in exploratory prototypes or educational demonstrators.

Scope of the Vision

The Interactive House will initially be realized as a virtual and simulated environment rather than a fully deployed physical installation. It will comprise a central server, software-based device simulators, and user interfaces running in standard web browsers or mobile-like applications. The system is developed strictly as a course project and experimental prototype. As such, it is not intended to function as a commercial-grade product, nor to satisfy regulatory certification requirements. However, the architectural decisions and documentation produced shall be sufficiently rigorous to support later extensions or research-oriented use cases.

Future Outlook

In the longer term, the platform could be extended with real physical devices, sensor networks, and embedded controllers such as microcomputers and IoT modules. More advanced automation logic, machine learning-based adaptation, and personalized accessibility features could also be explored. The project infrastructure may furthermore serve as a foundation for follow-up courses, bachelor theses, or research experiments, enabling longitudinal studies of usability, system evolution, and collaborative development processes.

Summary

The Interactive House Project seeks to illustrate how a connected home ecosystem can be engineered with human needs at its center. By focusing on accessibility, usability, modular architecture, and disciplined software engineering methods, the project provides both a functional prototype and an educational environment in which students can practice requirements engineering, design, implementation, and validation in a realistic setting.