Chapter 1. Introduction

Context

Home automation is the residential extension of building automation and involves the control and automation of lighting, heating, ventilation, air conditioning (HVAC), and security. Modern systems generally consist of switches and sensors connected to a central hub sometimes called a *gateway* from which the system is controlled with a user interface that is interacted either with a wall-mounted terminal, mobile phone software, tablet computer or a web interface, often but not always via internet cloud services.

A smart home, or smart house, is a home that incorporates advanced automation systems to provide the inhabitants with sophisticated monitoring and control over the building's functions. Smart homes use home automation technologies to provide home owners with intelligent feedback and information by monitoring many aspects of a home. For example, a smart home's refrigerator may be able to catalogue its contents, suggest menus, recommend healthy alternatives, and order replacements as food is used up. A smart home might even take care of feeding the cat and watering the plants.

Many new homes are being built with the additional wiring and controls which are required to run advanced home automation systems. Retro-fitting (adding smart home technologies to an existing property) a house to make it a smart home is obviously significantly more costly than adding the required technologies to a new home due to the complications of routing wires and placing sensors in appropriate places.

The range of different smart home technologies available is expanding rapidly along with developments in computer controls and sensors. This has inevitably led to compatibility issues and there is therefore a drive to standardise home automation technologies and protocols.

Purpose

Regardless of the technology, smart homes present some very exciting opportunities to change the way we live and work, and to reduce energy consumption at the same time. Imagine being able to check messages, open windows, operate lights and curtains and monitor how much money your house has made you from your renewable energy system

While the cost of living is going up, there is a growing focus to involve technology to lower those prices. With this in mind the Smart Home project allows the user to build and maintain a house that is smart enough to keep energy levels down while providing more automated applications. A smart home will take advantage of its environment and allow seamless control whether the user is present or away.

Scope

The implementation of multiple hardware components is necessary to provide the functionality that will be further discussed in this document. Behind the complex hardware involved in controlling the smart home project there is a fair amount of software architecture that is responsible for driving the hardware components. Each part of the project is built and designed with a different functionality in mind that will be determined by the use cases.