

# Introduction

In the recent years we have seen an increase in climate awareness. The subject is gaining more and more media coverage. A survey conducted from 2007 to 2008 by the international research organization Galllup<sup>1</sup>, shows that 82% of americans and 88% of europeans are very aware of the current climate issues we are facing such as global warming. In the same survey Gallup also concludes that 67% of americans and 59% europeans view global warming as a serious threat to them selves and their families (gallup-2009, gallup-2009). With the rise of concern with the general public, the demand for sustainable solutions increases. We are already seeing a vast amount of companies spending a considerable amount of money to be classified as “green”. Companies such as Amazon are spending millions of dollars on sustainable buildings, in order to maintain an image as an environmentally conscious company.

In the residential sector the environmental awareness equally present, but the “green wave” has not had nearly the same impact. This is however not due to lack of potential. According to the United States Energy Information Administration<sup>2</sup>, the residential constituted 22% of the total energy consumption in the US (1, eia-2011). The main problem in this sector is financial. Improving your residence to be more environmentally friendly is costly, and though most improvement generally pay for them selves over time, the return of investment will often take several years. This problem is not nearly as big in the business sector where the gain in public image can be very valuable, and may even be worth the investment in it self.

There is a lot of focus on saving energy by changing habits such as remembering to turn off the light on the bathroom, or switching off appliances on standby. All these initiatives certainly help, but if we want to make a significant reduction in our energy consumption we need smart environments, that are capable of micro managing our energy use.

The purpose of this thesis is to explore the possibilities of developing a low cost

intelligent home control system, capable of reducing the power consumption in normal households. The thesis will serve as a research paper on the possibilities of using machine learning algorithms to develop an advanced artificial intelligence, capable of controlling a house hold, and reducing power consumption. We have created a prototype of a smart environment, that serves as a proof of concept, and can be used as the basis for further development. The final product shows the power of ubiquity computing[ubiquity computing], as a means of reducing energy consumption in the normal household.

The thesis is structured as follows:

In the chapter “Analysis” we will identify and analyze the problems, and issues related to developing an intelligent home control system. This involves analyzing existing solutions, technologies related to the paradigm of smart environments.

In the chapter “Design” we will discuss our solutions to the problems identified in the analysis. We will also briefly present the development process, and how this have affected the final product. This chapter will also hold a theory section, where we will discuss the most important technologies we have used, along with the mathematical theory that forms the basis for our solution.

The “Implementation” chapter examines the transition from a software blueprint to working code. In the chapter, we will describe in detail the problems we had to solve when coding the system.

Finally we will evaluate the results of our research in the chapter “Evaluation”. The chapter will both evaluate our product and contain a description of the software tests we have performed.

## **Project scope**

1. International research organization famous for making polls.  
<http://www.gallup.com>
2. <http://www.eia.gov/> [^smart-environments]: ref needed [#gallup-2009]:  
<http://www.gallup.com/poll/124652/awareness-climate-change-threat-vary-region.aspx>

## Bibliography

[1] <http://205.254.135.24/totalenergy/data/annual/showtext.cfm?t=ptb0201a>