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Project Plan

Aim:

The overall aim of the project is to create a web based simulator and visualizer of a smart environment that can be configured and simulated by a user. The configuration will include location placement of any items (furniture and utilities) and sensors (pressure, temperature, motion detection sensors) within the area presented and then having the ability to define rules between these items and sensors. The simulation will include the ability to let a user controlled avatar to roam the environment and interact with the items and sensors, changing values and properties of items by sensor detections and interactions. Once an interaction run is complete, the information from the simulation instance will be available to the user and some of its information will be visually graphed. There will also be an option available to the user to keep or send to a repository any sets of data for further study of potential human – computer interactions and other analysis.

Motivation:

Smart environments are becoming increasingly desired especially in the application of creating smart homes to aid the automated care of elderly or disabled people. The older population is the most common to suffer from chronic diseases and general disability and with the elderly population predicted to increase dramatically in the near future and with life expectancy also increasing it seems logical that medical sensor technology and nursing assisting software are eager to be developed and implemented. The implementation of this technology into a home or similar environment is still in its very stages.

The main motivation for this type of application is that smart environments are very difficult and expensive in term of both money and time, to setup, implement, test, maintain and make usable, configurable. These difficulties can be over-come by making a virtual environment for engineers and researchers interested in smart environments to create virtual trial runs and gather extra data that will hopefully help make real physical implementations of smart environments less error prone and therefore less expensive. Many of the difficulties that have been presented similar attempts at this work before include the largely undefined formats and heterogeneous nature of the data both required and extracted from the simulations of a smart environment.

The goal of the project is not simply to create a smart home simulator for commercial and general use but to inexpensively help answer the question; what obstacles are in place in the configurations of smart homes and how can smart homes be integrated inexpensively into common basic environments.

If I have spare time towards the end of the project I will try designing common sensor-object rules in the form of a template for other users to work upon, test and extend into more complicated and precise configurations. An example of this would be a TV and sofa configuration where the rule is already set up that once a sofa in interacted with (sat upon) the TV will be turned on.

As a computer science web system engineering student, my personal motivation for this project stems from my interests in human computer interaction and simulation software. I believe this project will be well suited to me and also give me an opportunity to hone my software development and problem solving skills and gain experience with more software development tools.

Required resources for the project:

The only hardware necessary includes a suitably equipped PC with administration privileges to research and experiment possibly useful software tools related to the areas of study.

The software required varies greatly. It includes;

* Access to research papers related to studies in smart environments.
* High quality internet usage and access.
* The use of Java and any other programming languages involved in creation of web applications.
* A group of programming frameworks and libraries available for use.
* A capable and preferably highly commercially used IDE and plugins to aid the development of the web based project with a server available to use.
* Multi-media image processing software such as Gimp and Google Sketch-up.
* A repository to help version control on completed work and to help show progress task by task.
* A suitable IDE with various plugins to aid web based development.
* Online resources and tutorials for more information on client side programming techniques and tools.

Refined details:

Smart environments configurations can become very complicated quickly once rules are created and implemented. Because this project has a fixed deadline I have decided that it will focus on the principle that there will only be a single occupant in the environment.

An original ideal that I contemplated was to have the entire floor-plan of a smart home to configure and navigate through but after researching possible implementations with a user drawn navigable dynamic canvas using SVG files or other formats the project became overly focused on a dynamic (paint style) simulator rather than a configured smart home simulator. I decided that to help make a more usable product I will keep the implementation of the configurable smart environment to an undivided room suggested with a looking down view static image of a basic environment for the purpose of helping the user.

The web application should allow users to input data into forms to

I have chosen Java script library/ engine because. Line Js , paperjs for canvas drawing, MelonJs. jQuey for all other client side needs.

I have chosen IDE eclipse because.. I tried aptana studio 3 but because of it not recognising jsp I decided against it.

I have decided web apllicaiton to be created in jsp because some sever side scripting is required but not enough to use need a framework such as JSF.

I intend to do coding in a test driven style to ensure a working finished product.

List of tasks and subtasks:

* Research smart environment developments in recent years.
* Install and investigate any current similar Smart environment software.
* Brainstorm and research possible implementations.
* Research available libraries and tutorials and preferably narrow down a few chosen and for what reasons.
* Obtain and study any previous datasets (if possible).
* Set up repository for project version control.
* Create some basic project documentation UML diagrams to help clarify system components and give an overview of project implementation.
* Begin coding early-mid November;
  + Create facilities for input of valid HomeML and HomeRuleML data.
  + Creation of sensor objects from HomeML data.
  + Canvas “Room” backgrounds created and objects movable in room.
  + Room sensor objects with working variable states.
  + Basic rules implemented with HomeRuleML device value causes effect to reference operation.
  + Facilitate for recording of data for a set amount of time (simulation run)
  + Functions to record sensor change events and store information in xml files.
  + Moveable sprite though canvas.
  + Sprite able to interact with sensor objects.
  + Facilitate using JSCharts or an xml parser to visualise information on simulation run.
* Finish coding of vital features before end of January.
* If I have time to spare I will also facilitate;
  + Graphics to represent room objects and animations to indicate sensor object interactions.
  + Users to be able to load in previously generated XML datasets rather than recreating previous datasheets again.

Risk assesment