A Generic Simulation Tool for Pervasive Devices Application

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Abstract

Quick advancement of the pervasive computing era with its underlying sources of contextual data, services and applications persistently attempts to support a variety of independent devices, with different environment, requirements and capabilities. Pervasive computing equipped with many independent collaborating electronic devices like sensors, actuators and complex device capable of sensing, actuating, computing and communicates. The main goal of this project is to develop a visual basic 6.0 tool for designing and simulation a different applications.The simulation tool provides a boundaries for the application,set of devices can be selected based on the user need and programming the triggering action based on the users entries and their action.A set of pre-recorded scenarios are designed in a way that they used for the testing purpose of user action.The goal of the simulation tool is to release as an open source component for generic applications.In this project a smart home is considered as an sample environment made of independent devices to perform user's tasks and goal.

1. Introduction

Pervasive computing is an emerging trend that makes computers physically available but having stricking effect of invisible to users [1]. Other names given to this trend are Ubiquitous computing and Ambient Intelligence. The concept was introduced by Weiser in 1991. When primarily concerning the objects involved, it is also called physical computing, the Internet of Things, or haptic computing [2][3][4][5]. .

1.1. What is a Device?

Pervasive Computing Systems (PCS) devices are likely to assume many diverse forms and sizes, from handheld units (similar to mobile phones) to near-invisible devices set into 'everyday' objects (like furniture and clothing). All the objects can able to communicate with one another and act 'intelligently' according to the environment[6].

A device is characterized as an objects or entity consisting of a set of properties, some internal mechanism, and an interface. The properties provide information about a device such as its purpose, its capabilities, vendor and operating requirements. These are critical information for both system integrators and service programmers. The internal mechanisms are responsible for the operation of the device and unknown to the external world. The gap between the internal mechanism and the external world is bridged by the interface of the device.
It specifies device IO and provides guidance to applications and other services to interact with the

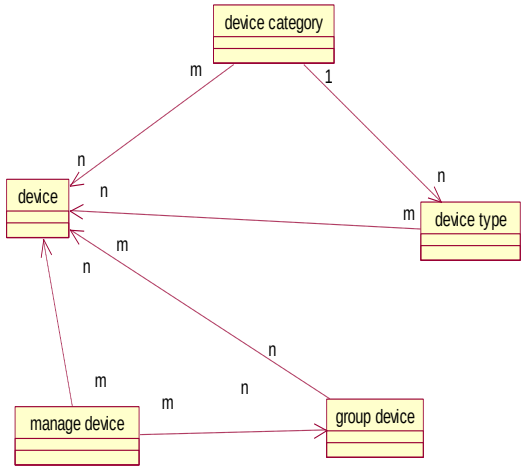


Figure1. Generic Device Framework

device. For example, the digital blood pressure monitor interface is responsible for parsing the byte streams to meaningful data and it is passed to the serial port of the monitor. From a service-oriented perspective, the properties of a device which are existent to its utilization by an external user are its properties and interface.

The properties gives information about a device such as its purpose, its capabilities, vendor and operating requirements. The interface defines how a device interacts with its external users and provides ways to access the device either to get information from it and/or to control it[7].

1.2. Categories of Device:

Devices can be classified into three categories namely:

- Sensors: input devices that discover some changes in the environmnet, user actions, human commands etc;
- Actuators: output devices that response to process the information by changing the environment via electronic or mechanical means. For example, air temperature control is often done with actuators. However the term refers to devices which deliver information, rather than changing the environment physically.
- Complex Device: A complex device which can both accept output from the external user and provide input to the external user.

There are many goal for the future development of PCS devices. Many research groups are endeavouring to produce networks of devices that could be small as a grain of sand. The idea is that each one would function independently, with its own power supply, and could also communicate wirelessly with the others. These could be distributed throughout the environment to form dense, but almost invisible, pervasive computing networks, thus eliminating the need for overt devices.
At the other outermost point, augmented reality would involve overlaying the real world with digital information. This approach emphasizes the use of mobile technologies, geographical positioning systems and internet-linked databases to distribute information via personal digital companions. Such devices could come in many forms: children might have them integrated into school bags, whereas adults might use devices more closely resembling personal digital assistants (PDAs).

Ultimately a spectrum of devices may become available. These will range from miniaturized (potentially embedded in surrounding objects) to a variety of mobile (including handheld and wearable) devices. While these could exist as standalone systems, it is likely that many will be interlinked to form more comprehensive systems.

2. Proposed Simulation Tool

The aim of our proposed simulator is to provide

interactive action in a smart home envirionment.

2.1 Smart Home Project:

2.1.1 Designing User's Home:

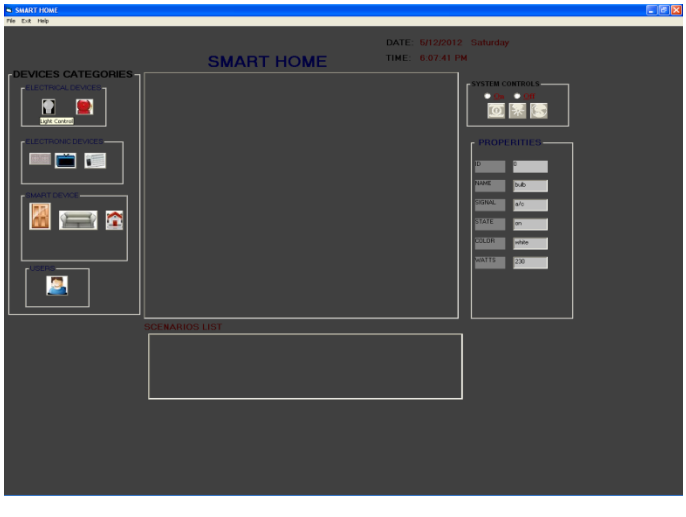


Figure 2. Home Page

2.1.2 Inputing Number of Devices Accordingly

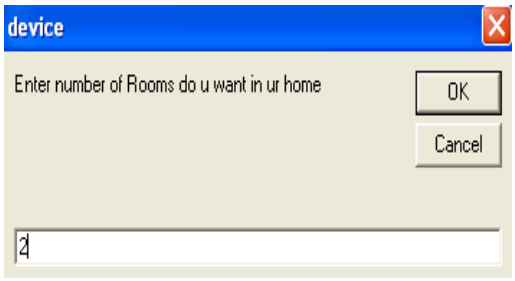
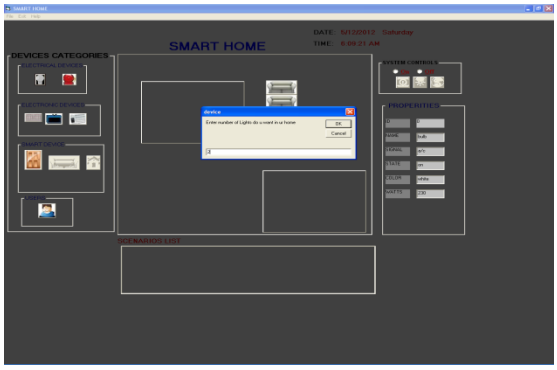


Figure 3. Input to the Devices



2.1.3 Arranging Rooms & Devices Accordingly

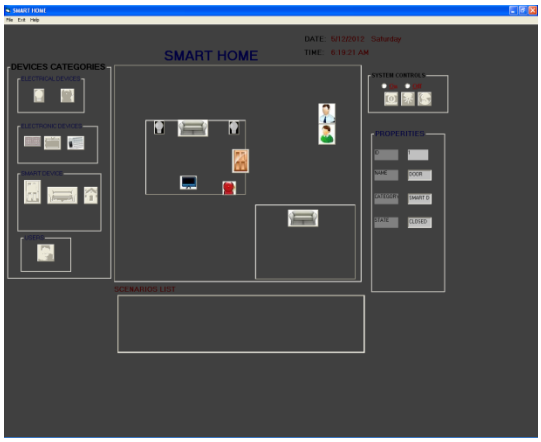
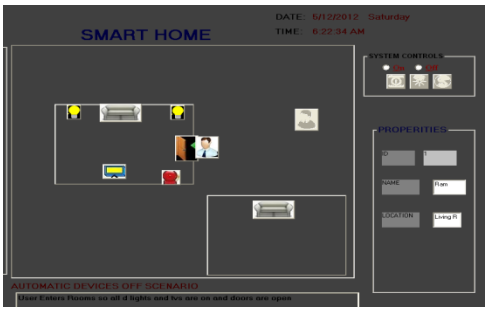


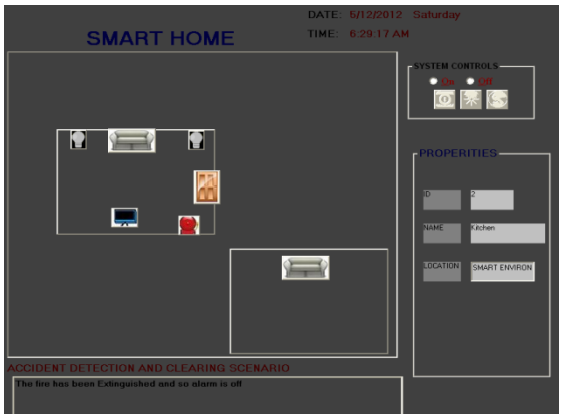
Figure 4. Arranging Rooms And Devices

2.2 User's Scenarios

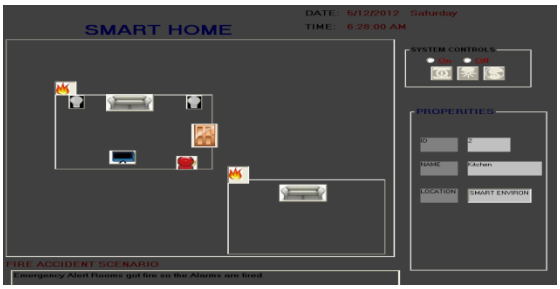
2.2.1 If User Enter's Room and Presses a Key , Devices on and Log Files are Saved



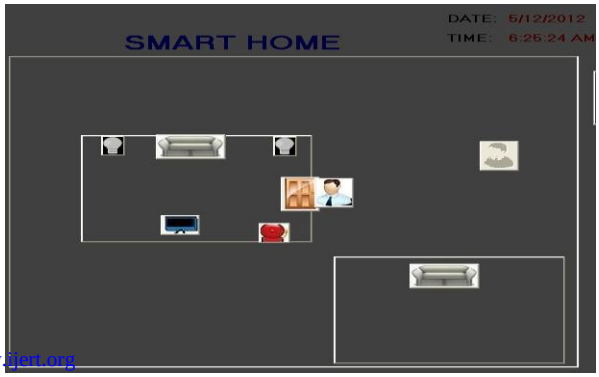
2.2.2 If User Leaves Room & Presses A Key , Devices Off



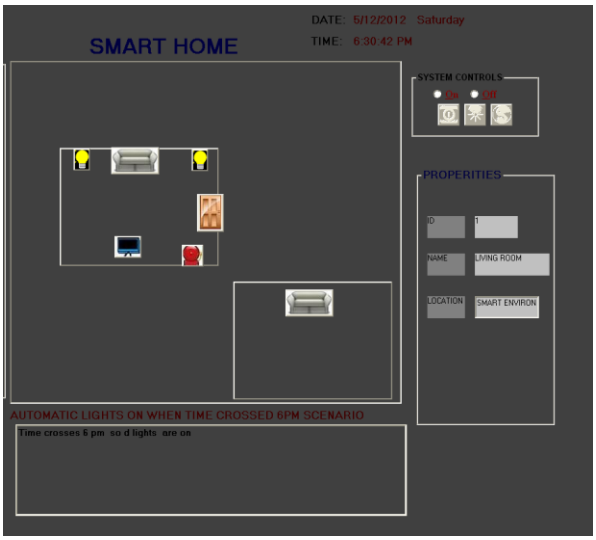
2.2.3 If no User is in Home and Fire Accident Occurs, then Fire Alarm Triggers Automaticaly



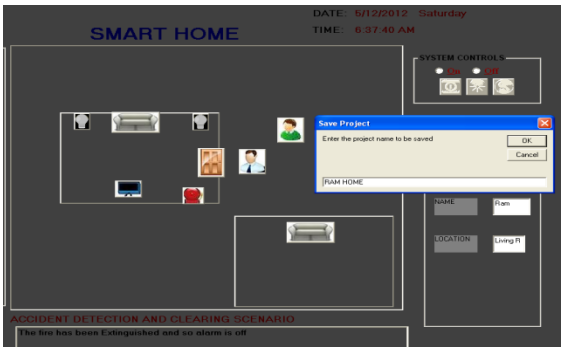
2.2.4 If Fire is Extinguished , then the Fire Alarm Gets Off



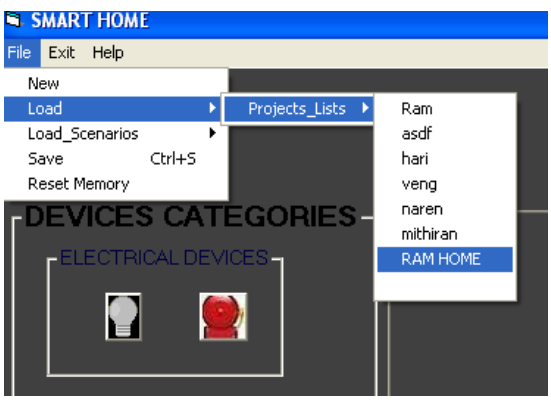
2.2.5. If No User's Are In Home And Time Have Crossed 6pm Then Lights Alone Get On Automatically

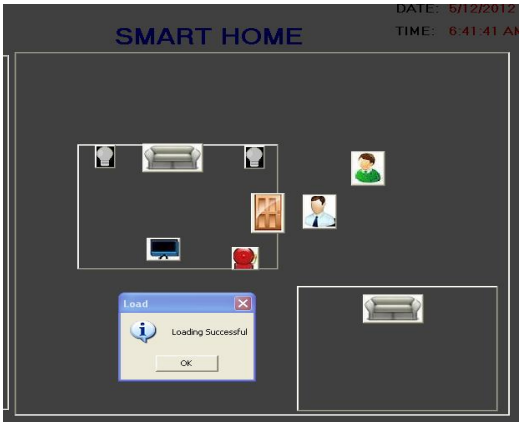


2.2.6 Saving Home Design As Project By Specifying Name

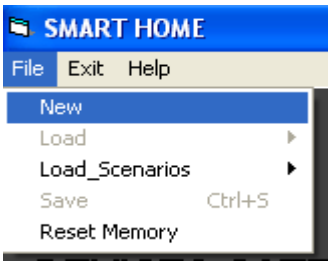


2.2.7 Loading The Same Project By Specifying Name





2.2.8 Creating A New Home Project



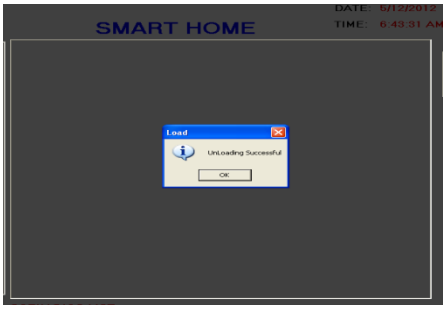
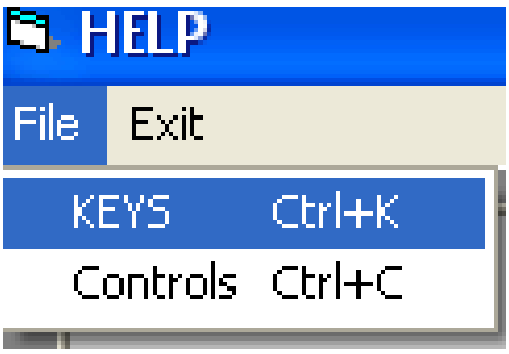


Figure 5. creating a new project

2.2.9 Help Options

Key Controls



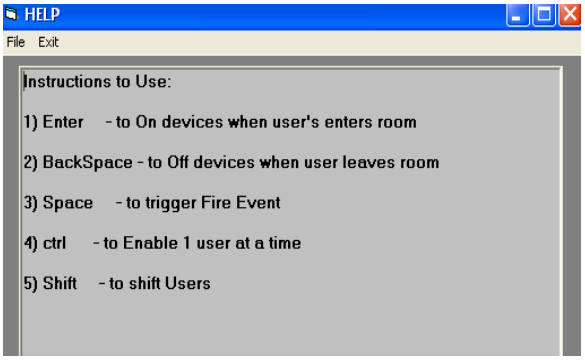
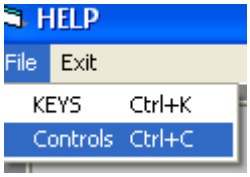


Figure 6. Help Options

Controls View



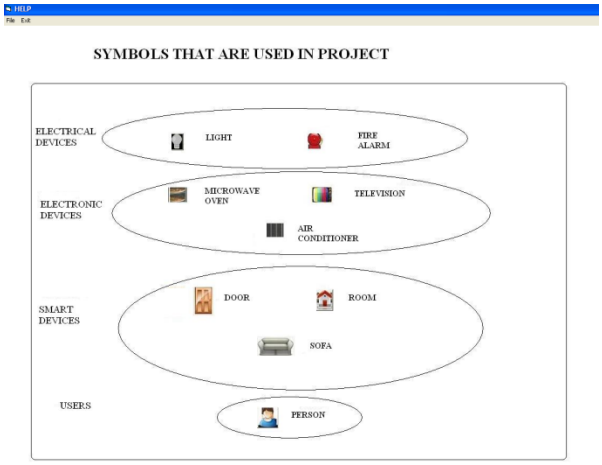


Figure 7. Controls View

3.Conclusion

In ubiquitous computing environments, ubiquitous applications are not small and stand-alone but are complex system. In this paper we present the SmartHome Simulator that reflects the relationship between the environment and other factors in smart home. By using this simulator, users can customize the environment at ease such as determining the optimal union sensor and device placement.

4.References

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