Software Requirement Specifications(SRS)

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Chapter 1

Introduction

1.1 Product Overview

In todays world, electricity plays a vital role and hence theres a necessity to find a way to save electricity in various places where its being used in abundance. People do not take this seriously and do not put in efforts in order to save electricity. Usage of electricity has been continually increasing and in most of the places its being wasted and hence we look forward to propose a way in which electricity can be saved at places where its being wasted. We here are considering an example of a classroom where electricity is essential. Due to the busy schedule in todays life, its often observed that people forget to switch off the lights and fans in a room which leads to an increment in the electricity bill. Over a number of years, many advancements have been made in order to automate the working of electrical appliances in a building. We propose a system in order to automate the electric appliances of a classroom in order to save electricity as much as possible. We look forward to make use of a combination of motion detection algorithms and face detection algorithms in order to automate the supply of electricity, i.e switch it off in case no one is present in the room and switch it on in case of the presence of even one person in the room.

Chapter 2

Specific Requirements

2.1 External Interface Requirements

2.1.1 User Interfaces

The users of this system shall be anyone walking in or out of the classroom, the user need not perform any activity in order for this product to work efficiently. Hence, this will surely be a user friendly product. In case any human enters the classroom, the power supply will be given and the lights shall switch on. Similarly, in case any human is not present in the classroom, the power supply will not be given and the lights will be switched off. This system should work efficiently, as in the lights should not switch off in case even one human is present otherwise the product will not work as planned.

2.1.2 Hardware Interfaces

Computer/Laptop

1. Computer/Laptop shall have keyboard input.

2. Computer/Laptop shall have roller ball mouse input. .

3. Computer/Laptop shall have minimally a 19-inch monitor.

4. Computer/Laptop shall have at minimum 128 MB of RAM.

CCTV Camera

1. System shall capture the video of the classroom on a continual basis and capture the frames every six minutes and accordingly the decision shall be made as to whether the power supply is to be given or not.

Raspberry Pi

1. Relay Circuit for the Raspberry Pi Power Supply Automation in the classroom: A small relay circuit is to be made, to switch an appliance ON/OFF.

2. The Raspberry Pi is used to continually run a program.

2.1.3 Software Interfaces

1. Computer/Laptop shall have the Turbo C++ installed.

2. Computer/Laptop shall be Internet capable with at least one Internet browser available.

2.1.4 Communication Protocols

1. Computer/Laptop shall be Internet capable.

2. Computer/Laptop shall have USB connection slots available.

2.2 Software Product Features:

The CCTV camera will be capturing an image of the empty classroom which shall be used as the reference image in order to compare any other image captured in the duration, and based on the matching percentage of these two images, the specific action shall take place, i.e whether the power supply is to given or the power supply is not to be given.

1. The system shall have one of the inputs as a picture with no humans present. In such a case the reference image and the image captured will be same and hence the power supply will not be given.

2. Another input might be a picture with one or more humans present. In this case the percent match between the reference image and the original image will be low and hence the power supply will be given.

3. There might also be a situation such that only because the orientation of the benches or the chairs present in the classroom is changed there might be a low than expected matching percentage, but in order to deal with this case, the system shall have a threshold such that with minute changed in the classroom like these, the power supply shall not be given, hence such a situation will be dealt of with care

2.3 Software System Attributes

2.3.1 Reliability

1. Time Between Failures: The system shall not fail on average more than once per month.

2. Time to Repair: The system shall not take on average longer than two days to repair after a system failure.

2.3.2 Availability

1. System Availability: The system shall be available 95 percent of the time unless previously announced for scheduled maintenance or backup. This system will be used in a public place, hence the availability is necessary, otherwise our motive shall be failed, which is to save electricity.

2. System Maintenance Notification: In the event that the system will undergo foreknown system maintenance, it shall be notified.

2.3.3 Security

All the development work performed shall be password protected and the passwords used shouldn't be common passwords and shall be stored in a hash format using an efficient hashing algorithm.

2.3.4 Maintainability

The programming code developed for the system shall conform to programming style standards and shall be commented thoroughly as determined by a code review team. The camera used shall also be taken care of, and checked whether is functioning properly.

2.3.5 Portability

This system can be used at any public place or a private place as well, however we would want to draw the focus for using this system in the public place as at private places such as office cabins and residential houses, authorization system for power supply automation might work just fine. They're expensive but affordable for some families as well as offices. The system proposed by us is inexpensive and can be used in any public place and is efficient enough.

2.3.6 Performance

The system shall not add more than two seconds to the time required to perform an action if the system is not connected. For example, if it takes 3 seconds to turn the light on normally, it will take no longer than 5 seconds for the light to turn on through the system. And also if it takes 3 seconds to turn off the light when there are no humans then it shall not take more than 5 seconds to turn off these lights with the help of this system.