**CHAPTER 3 – SYSTEM REQUIREMENT SPECIFICATION**

**3.1. Introduction**

**3.1.1. Overview**

There are 5 main keys:

* Introduction: provides an overview of this document. It includes the purpose, scope, definitions, acronyms, abbreviations, references and overview
* Main functions: describes the general factors that affect the product and its requirements HSS
* Use Cases List:
* Non-functional Requirements
* Hardware infrastructure: contains all hardware requirements to a level of detail sufficient to enable designer to design a system to satisfy those requirements, and testers to test that the system satisfies those requirements

**3.1.2. Purpose**

System requirement specification outlines functional and non-functional requirements of the project called Infrared Ray Smart Control, which is system that contains hardware and software, helps people control most common infrared device in house by smartphone. It also describes design constraints, and other factors necessary to provide a complete and comprehensive description of the requirements of the system. All members will work (design, code, test) based on information provided in this chapter.

**3.1.3. Communication Protocol**

Between sensors and Arduino Mega 2560: GPIO (General-purpose input/output)

Between Arduino Mega 2560 and Raspberry Pi: Serial (UART)

Between Raspberry Pi and Camera:

Between Raspberry Pi and Android application: UDP

**3.2. Main functions**

3.2.1. Detection suspicious activities by sensors

3.2.2. Realtime notification

3.2.3. Watch realtime video

3.2.4. Smart doorbell: Initiate a call between doorbell outside your home and your smartphone

3.2.5. Control the system: Activate/deactivate system to stop receiving notification

**3.3. Use Cases List**

|  |  |
| --- | --- |
| **Use Case** | **Note** |
| UC-1 Login |  |
| UC-2 Activity Log |  |
| UC-3 Camera |  |
| UC-4 Call Doorbell |  |
| UC-5 Control System |  |
| UC-6 View Manual |  |
| UC-7 Reboot System |  |
| UC-8 Logout |  |

**3.3.1. Login**

|  |  |  |  |
| --- | --- | --- | --- |
| **UC ID and Name** | **UC-1: Login** | | |
| **Created By:** | **CuongTV** | Date Created: | **2/15/2016** |
| **Primary Actor** | **User** | Secondary Actors: | **N/A** |
| **Trigger:** | Trigger when first login to Android application for authenticating | | |
| **Description:** | **- User** logins in the first time to application to access the system (Raspberry Pi or server)  **- User** uses a username and password that assigned to Raspberry Pi before for confirming the access (stored in server’s database) | | |
| **Preconditions:** | PRE-1. User is on login application screen | | |
| **Post Conditions:** | POST-1. Display home screen | | |
| **Normal Flow:** | 1. Actor enters username and password in text view “Username” field and “Password” field 2. Actor pushes “Enter” button. 3. After logging in successfully then go to the Home screen | | |
| **Alternative Flows:** | N/A | | |
| **Exceptions:** | **E1 – Blank Textbox**   * System detects whether or not user entered the username or password into text field * If the text box is empty, show the error message in small box: “Please input the username and password then login again” (OK button in message box to back to retry)   **E1 – Invalid Username or Password**   * System indicates that the username or password entered is not valid * A message “Wrong username or password. Please re-enter” will appear (OK button in message box to back to retry) | | |
| **Priority:** | High | | |
| **Frequency of Use:** | Low | | |
| **Business Rules** | N/A | | |

**3.3.2. Activity Log**

|  |  |  |  |
| --- | --- | --- | --- |
| **UC ID and Name** | **UC-2: Activity Log** | | |
| **Created By:** | **CuongTV** | Date Created: | **2/15/2016** |
| **Primary Actor** | **User** | Secondary Actors: | **N/A** |
| **Trigger:** | Pushing the “Activity Log” button | | |
| **Description:** | **- User** pushes “Acitivity Log” button on home screen  **- The Application** shows on screen the list of activities, from today back to the very beginning (or the last clear time) | | |
| **Preconditions:** | PRE-1. User is on home application screen | | |
| **Post Conditions:** | POST-1. Display activity log screen | | |
| **Normal Flow:** | * Actor pushes the “Activity Log” button on home screen * After pushing, then go to the Activity Log screen | | |
| **Alternative Flows:** | N/A | | |
| **Exceptions:** | N/A | | |
| **Priority:** | High | | |
| **Frequency of Use:** | High | | |
| **Business Rules** | N/A | | |

**3.3.3. Camera**

|  |  |  |  |
| --- | --- | --- | --- |
| **UC ID and Name** | **UC-3: Camera** | | |
| **Created By:** | **CuongTV** | Date Created: | **2/15/2016** |
| **Primary Actor** | **User** | Secondary Actors: | **N/A** |
| **Trigger:** | Pushing “Watch Camera” button | | |
| **Description:** | **- User** pushes “Watch Camera” button on home screen  **- The Application** shows on screen the list of working cameras in your system  - **User** can choose a particular camera for watching purpose | | |
| **Preconditions:** | PRE-1. User is on home application screen | | |
| **Post Conditions:** | POST-1. Display camera screen | | |
| **Normal Flow:** | * Actor pushes the “Watch Camera” button on home screen * After pushing, then go to the Camera screen | | |
| **Alternative Flows:** | N/A | | |
| **Exceptions:** | N/A | | |
| **Priority:** | High | | |
| **Frequency of Use:** | High | | |
| **Business Rules** | N/A | | |

**3.3.4. Call Doorbell**

|  |  |  |  |
| --- | --- | --- | --- |
| **UC ID and Name** | **UC-4: Call doorbell** | | |
| **Created By:** | **CuongTV** | Date Created: | **2/15/2016** |
| **Primary Actor** | **User** | Secondary Actors: | **System** |
| **Trigger:** | Pushing “Call Doorbell” button | | |
| **Description:** | **User** can make a call from smartphone (VoIP) to the doorbell system to communicate with guest outside your home | | |
| **Preconditions:** | PRE-1. User is on home application screen | | |
| **Post Conditions:** | POST-1. Display Calling screen | | |
| **Normal Flow:** | * Actor pushes the “Call Doorbell” button on home screen * After pushing, then go to the Calling screen * Actor pushes the “Start Call” button on Calling screen * Actor pushes the “End Call” button on Calling screen to end the call | | |
| **Alternative Flows:** | N/A | | |
| **Exceptions:** | N/A | | |
| **Priority:** | High | | |
| **Frequency of Use:** | High | | |
| **Business Rules** | N/A | | |

**3.3.5. Control System**

|  |  |  |  |
| --- | --- | --- | --- |
| **UC ID and Name** | **UC-5: Control System** | | |
| **Created By:** | **CuongTV** | Date Created: | **2/15/2016** |
| **Primary Actor** | **User** | Secondary Actors: | **N/A** |
| **Trigger:** | Pushing “Active” or “Deactive” button | | |
| **Description:** | **User** can activate/de-activate to receiving/stop receiving real time notification | | |
| **Preconditions:** | PRE-1. User is on Settings screen | | |
| **Post Conditions:** | POST-1. “Activate” button turns into “Deactivate” or vice versa | | |
| **Normal Flow:** | * User pushes “Settings” button on home screen * After pushing, then go to Settings screen * User pushes “Activate” or “Deactivate” button on Settings screen * If the button is “Activate”, it turns into “Deactivate” and vice versa | | |
| **Alternative Flows:** | N/A | | |
| **Exceptions:** | N/A | | |
| **Priority:** | Medium | | |
| **Frequency of Use:** | Medium | | |
| **Business Rules** | N/A | | |

**3.3.6. View Manual**

|  |  |  |  |
| --- | --- | --- | --- |
| **UC ID and Name** | **UC-6: View Manual** | | |
| **Created By:** | **CuongTV** | Date Created: | **2/15/2016** |
| **Primary Actor** | **User** | Secondary Actors: | **N/A** |
| **Trigger:** | Pushing “Help” button on home screen | | |
| **Description:** | **User** can move to manual screen to see how to use this application | | |
| **Preconditions:** | PRE-1. User is on home application screen | | |
| **Post Conditions:** | POST-1. Display Manual screen | | |
| **Normal Flow:** | * Actor pushes the “Help” button on home screen * After pushing, then go to the Manual screen | | |
| **Alternative Flows:** | N/A | | |
| **Exceptions:** | N/A | | |
| **Priority:** | Medium | | |
| **Frequency of Use:** | Low | | |
| **Business Rules** | N/A | | |

**3.3.7. Reboot System**

|  |  |  |  |
| --- | --- | --- | --- |
| **UC ID and Name** | **UC-7: Reboot System** | | |
| **Created By:** | **CuongTV** | Date Created: | **2/15/2016** |
| **Primary Actor** | **User** | Secondary Actors: | **N/A** |
| **Trigger:** | Pushing “Reboot System” button in Settings screen | | |
| **Description:** | **User** can send the reboot command to reboot the system | | |
| **Preconditions:** | PRE-1. User is on Settings screen | | |
| **Post Conditions:** | POST-1. Rebooting the system | | |
| **Normal Flow:** | * User pushes “Settings” button on home screen * After pushing, then go to Settings screen * User pushes “Reboot System” in Settings screen | | |
| **Alternative Flows:** | N/A | | |
| **Exceptions:** | N/A | | |
| **Priority:** | Medium | | |
| **Frequency of Use:** | Low | | |
| **Business Rules** | N/A | | |

**3.3.8. Logout**

|  |  |  |  |
| --- | --- | --- | --- |
| **UC ID and Name** | **UC-8: Logout** | | |
| **Created By:** | **CuongTV** | Date Created: | **2/15/2016** |
| **Primary Actor** | **User** | Secondary Actors: | **N/A** |
| **Trigger:** | Trigger when user pushing the “Logout” button in Settings screen | | |
| **Description:** | **- User** can logout from the application when un-neccessary to prevent from unwanted security issues | | |
| **Preconditions:** | PRE-1. User is on Settings screen | | |
| **Post Conditions:** | POST-1. Display Login screen | | |
| **Normal Flow:** | * User pushes “Settings” button on home screen * After pushing, then go to Settings screen * User pushes “Logout” in Settings screen | | |
| **Alternative Flows:** | N/A | | |
| **Exceptions:** | N/A | | |
| **Priority:** | High | | |
| **Frequency of Use:** | Low | | |
| **Business Rules** | N/A | | |

**3.4. Non-Functional Requirement**

3.4.1. Accessibility

3.4.2. Reliability

3.4.3. Availability

3.4.4. Security

3.4.5. Safety

3.4.6. Performance

3.4.7. Portability

**3.5. Hardware Infrastructure**

|  |  |
| --- | --- |
| **Name of Hardware** | **Illustration Photo** |
| Raspberry Pi B+ |  |
| Arduino Mega 2560 |  |
| PIR Sensor |  |
| Magnetic Switch |  |
| Push Button |  |
| Microphone |  |
| Speaker |  |