

**Software Requirements Specification**

**for**

**LA County, Hall of Administration Smart Board Directory**

**Version 1.2 approved**

**Prepared by Matthew Gerlits, Julius Macalutas, Christopher Ly, Jose Vega, Chelle Cruz, Cedric Tong**

**La County Hall of Administration**

**04/14/18**

# **Table of Contents**

Table of Contents................................................................................................................... 2

Revision History..................................................................................................................... 3

1. Introduction................................................................................................................ 4
   1. Purpose........................................................................................................... 4
   2. Intended Audience and Reading Suggestions................................................ 5
   3. Product Scope................................................................................................ 5
   4. Definitions, Acronyms, and Abbreviations .................................................. 6
   5. References...................................................................................................... 7
2. Overall Description.................................................................................................... 8
   1. Product Perspective........................................................................................ 8
   2. Product Functions........................................................................................... 8
   3. User Classes and Characteristics.................................................................... 9
   4. Operating Environment.................................................................................. 9
   5. Design and Implementation Constraints........................................................ 9
   6. User Documentation...................................................................................... 9
   7. Assumptions and Dependencies.................................................................... 9
   8. Apportioning of Requirements...................................................................... 10
3. External Interface Requirements............................................................................... 11
   1. User Interfaces............................................................................................... 11
   2. Hardware Interfaces....................................................................................... 11
   3. Software Interfaces........................................................................................ 11
   4. Communications Interfaces........................................................................... 12
4. Requirements Specification....................................................................................... 13
   1. Functional Requirements............................................................................... 13
   2. External Interface Requirements................................................................... 14
   3. Logical Database Requirements.................................................................... 14
   4. Design Constraints......................................................................................... 14
5. Other Nonfunctional Requirements........................................................................... 15
   1. Performance Requirements............................................................................ 15
   2. Safety Requirements...................................................................................... 15
   3. Security Requirements................................................................................... 15
   4. Software Quality Attributes........................................................................... 15
   5. Business Rules............................................................................................... 16
6. Other Requirements................................................................................................... 17

Appendix A: Glossary............................................................................................................ 18

Appendix B: Analysis Models............................................................................................... 19

Appendix C: To Be Determined List...................................................................................... 20

# **Revision History**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Date** | **Reason For Changes** | **Version** |
|  | 12/5/17 | Received new information | 1.1 |
|  | 04/14/18 | Final updates | 1.2 |
|  |  |  |  |
|  |  |  |  |

# 

# 

# 1. Introduction

This document will introduce the purpose, intended audience, product scope, definitions and acronyms, a description of the project, requirements, how it works, non-functional requirements and other requirements.

## Abstract

The goal of the Hall of Administration Smart Board Directory (HASBD) is to provide a user-friendly interface and showcase of the various rooms and departments of the floor inside the building to people who visit. An administrative web portal (ASP.NET Core 2.0) is integrated in order to store and retrieve department names, rooms, employees, and other information in a SQL server/database. Using the Amazon Alexa and Unity features, the interactive directory is created through a web page that displays an interactive map and voice/search module in order to find various services. By gathering data from the web portal, such as employee names, rooms, and room numbers, the Amazon Alexa and Unity components are able to guide the constituent to find directions to a room, display employee directories and FAQs, and even a lunch menu. Overall, the web page will be displayed through Industry Weapon software, which is the digital signage brand.

## 1.1 Purpose

The purpose of this document is to demonstrate the different levels of the software. We will cover few of the functionalities from the technical requirements as well as the not technical requirements. The smart board will have a variety of functionalities like: displaying a map to your “destination, displaying the best information you have requested, and displaying other important information like local events or the current weather. This document will deviate all the technical implementation of all software.

The Amazon Alexa Skill will provide a voice assisted directory experience, similar to the smart board itself. The user can ask for a specific service and the skill will give the location of the service.

The Unity map program launches a scaled blueprint of various floors of the building. A dropdown of different rooms/departments of a floor allows the user to get directions from the map. The interface will draw a path from the starting location to the destination, which will be highlighted. Also, a list of directions will be displayed, similar to how Google Maps generates a scrollable list of directions to the destination. The user can also tap on a certain section of the map, and a sidebar with basic information about the room will be shown.

## **1.2 Intended Audience and Reading Suggestions**

This SRS will contain the overall scope of the project, external requirements, how it works, non functional requirements, and other requirements.

The overall scope will cover in detail what the project is about, the functions, what users will be using the product, the operating environment, user documentation, assumptions and dependencies.

The external requirements section will cover in detail about the user interface, hardware interface, software interface, and communication interface.

The requirements specifications will cover all the necessary software requirements with enough detail. The functional requirements, external interface requirements, logical database requirements, and design constraints are also listed.

The non-functional requirements will cover in detail the performance, safety, and security requirements.

The other requirement section will cover in detail the requirements that was not listed under a section within the SRS.

## **1.3 Product Scope**

This software will be able to direct constituents to their needed location through an interactive smart board. In addition, there is a voice navigation system where the user will be able to speak to the interactive directory to get what they need.

This software will not be able to access private information.

Once released, the LA County Hall of Administration will use this software to provide a smart directory for their constituents. The software will include interactive directories that assist the public to find services like meeting times, new events, lunch menus, and various events and activities happening within the building and county.

## **1.4 Definitions, Acronyms, and Abbreviations**

**Definitions**

**Amazon Alexa Skill** - Voice-driven applications that run on any Alexa powered device, such as the Amazon Echo or the Echo Dot

**Amazon Web Services:**

* **Lambda** - Event-driven computing cloud service from Amazon Web Services that allows developers to provision resources for a programming function on a pay-per-use basis without having to be concerned about what Amazon storage or compute resources will support it.
* **API Gateway** - A fully managed service that makes it easy for developers to create, publish, maintain, monitor, and secure APIs at any scale. It handles all the tasks involved in accepting and processing up to hundreds of thousands of concurrent API calls, including traffic management, authorization and access control, monitoring, and API version management.
* **DynamoDB** -Amazon DynamoDB is a fast and flexible NoSQL database service for all applications that need consistent, single-digit millisecond latency at any scale. It is a fully managed cloud database and supports both document and key-value store models.

**Alexa Skills Kit** **(ASK)** - A collection of self-service APIs, tools, documentation, and code samples that makes it fast and easy for you to add skills to Alexa. ASK enables designers, developers, and brands to build engaging skills and reach customers through tens of millions of Alexa-enabled devices.

**Amazon Voice Services (AVS)** - The Alexa Voice Service (AVS) enables you to integrate Alexa directly into your products. We provide you with access to a suite of resources to quickly and easily build Alexa-enabled products, including APIs, hardware and software development tools, and documentation.

**ASP.NET Core 2.0** - Cross-platform, high-performance, open-source framework for building modern, cloud-based, Internet-connected applications.

**Unity** - Cross-platform game engine developed by Unity Technologies, which is primarily used to develop both three-dimensional and two-dimensional video games and simulations for computers, consoles, and mobile devices.

**Acronyms**

* ADA - Americans with Disabilities Act
* API - Application Programming Interface
* AI - Artificial Intelligences
* ASK - Alexa Skills Kit
* AWS - Amazon Web Services
* AVS - Amazon Voice Services
* HASBD - Hall of Administration Smart Board Directory
* HoA - Hall of Administration
* I/O - Input/output
* GUI - Graphical User Interface
* JSON - JavaScript Object Notation

## **1.5 References**

* AWS Documentation
* Alexa Skills Kit
* Alexa Voice Services
* ASP.NET Core 2 Documentation
* LA County Websites
* Unity Engine

# 

# 

# 2. Overall Description

The Hall of Administration has requested that software be developed for the smart boards that will be replacing their currently out-dated directories. The software will provide a GUI that users can interact with in order to assist them with tasks such as finding an office, or looking at a list of daily events. The software will be displayed on smart screens at main entrances of several floors of the Hall of Administration building.

They have also requested an Amazon Alexa Skill be developed alongside the smart board, which will also assist with the replacement of their current out-dated directories. This will function similarly to the smart board. It will provide location of the services requested, weather, and will also be displayed alongside the smart board.

The administrative web portal requires department staff to have an account in order to login, fill out department information such as name, contacts, and info, and update the SQL database associated with it. Different employees have different priority and authorization in order to perform a greater variety of tasks.

**2.1 Product Perspective**

This software will be standalone, built on a Windows 8/8.1/10 system, and will function using touch screen functionality. The software will need to interact with Active Directory.

In addition, the Amazon Alexa Skill will be deployed alongside the smart board. It will be voice activated with the same features the smart board itself will have, but primarily voice based. In combination with the Alexa Skills. This voice recognition will translate the input audio to text, which will be used without background processes to invoke commands and pass information of the database.

## **2.2 Product Functions**

The software will need to perform the following functions:

* Provide a map for users to view
* Provide directions on the map to queried locations
* Display schedules of daily activities
* Display information in an advertising format
* Schedule times and dates in which information will be displayed
* Speech to text
* Provide templates that can be updated with new information
* Provide a portal for tenants to manage database

## **2.3 User Classes and Characteristics**

Constituent: The average user who will be using software. They will be using the software on a non technical level to query and view information.

Tenant: The users that work in the building

Administrator: The user who monitors and updates the data displayed on the smart boards. They will be in charge of making sure the software is functioning properly.

## **2.4 Operating Environment**

The software will exist on a Windows 10 machine. Our software will be using components from Unity that will need to coexist with active directory.

The Amazon Alexa Skill will exist on the Alexa Skills Kit hosted on their Lambda functions.

**2.5 Design and Implementation Constraints**

Our only implementation constraint will be that it must be ADA compliant.

## **2.6 User Documentation**

There are README.md for each component of this project.

## **2.7 Assumptions and Dependencies**

The voice command requirement is dependent on the noise level of the environments, and quality of the mic controls. If the rooms the smart boards are placed in are too noisy, the voice recognition will suffer severe accuracy loss. Background noise as well will cause inaccurate detections resulting in inaccurate results. The Amazon Alexa Skill will also suffer accuracy loss if it is placed into a noisy room.

## **2.**8 **Apportioning of Requirements**

Voice commands on the smart boards could potentially be delayed due to time constraints. 360 view from the inside of the building could also be delayed due to time constraints.

# 

# 

# 

# **3. External Interface Requirements**

## **3.1 User Interfaces**

The UI shall consist of a map of the building which will be the main component, a directory displaying room numbers and names (displayed on right), including utilities such as time and weather. Each section (map, directory, events, etc.) may be clicked to display full screen instead of main directory page. (This is how the application will navigate.) Also, other features and information such as events, menus, ads, and feeds may be included depending on liaison’s request. A search input will be included as a module that will display search results as a list based on the user’s request.

This will be compliant with ADA standards.

The UI will be created as a web page. It will be designed using several front end frameworks such as Bootstrap CSS and Vue.js. Templates gathered online are used as references and could be used as a starting point to creating the actual layout of the directory.

The interface will be a general layout for all departments/floors. Content and information can be dynamically displayed by gathering data from the database, so that each floor will have unique content but a similar layout.

## **3.2 Hardware Interfaces**

HASBD will require Industry Weapon Digital Signage for displaying directory UI. The smart board will run on at least Windows 10. Additional devices may include microphone. The UI’s main colors will be black, gray, and blue, in compliance with the LA County website.

The Amazon Alexa Skill will require any Alexa powered device to work along with a stable, wireless internet connection.

## **3.3 Software Interfaces**

ASP.NET Core 2.0

Alexa Skills Kit

Microsoft SQL Server

Unity

## **3.4 Communications Interfaces**

HASBD shall be run on a web browser since it is a web application.

Amazon Alexa Skill shall be ran on any Alexa powered device.

# 

# **4. Requirements Specification**

## **4.1 Functional Requirements**

|  |  |
| --- | --- |
| **Requirements Related to Design Module 4.1: Main Directory Page (MDP)** | |
| Requirement No. | Requirement Description |
| 4.1.1 | The MDP shall display directory of rooms and departments. |
| 4.1.2 | The MDP shall display a map of the building. |
| 4.1.3 | The MDP shall display utilities such as weather and time. |
| 4.1.4 | The MDP shall display a drop down of rooms |
| 4.1.5 | The MDP shall include list of rooms most searched. |
| 4.1.6 | The MDP shall include FAQ section. |
|  |  |
|  | 2.2.1 Map Submodule (MM) |
| 4.1.5 | The MM shall display a 3d representation of a floor. |
| 4.1.6 | The MM shall create a path depending on the room destination. |
| 4.1.7 | The MM shall display a list of directions |
| 4.1.8 | The MM shall gather information from SQL database. |
| 4.1.9 | The MM shall classify locations according to categories defined by the HOA. |
|  |  |
|  | 2.2.2 Administrative Portal Submodule (APM) |
| 4.1.10 | The APM shall manage the database through SQL server. |
| 4.1.11 | The APM shall add/remove entries in a database. |
| 4.1.12 | The APM shall require authentication and various priorities for users. |
| 4.1.13 | The APM shall require users to fill out basic template of information for department. |
|  |  |
|  | 2.2.3 Most Popular Searches Submodule (MPSM) |
| 4.1.14 | The MPSM shall display the most popular searches of users. |
|  |  |
|  | 2.2.4 SQL Database Submodule (SQL) |
| 4.1.15 | The SQL shall store tables containing information about the floor/department. |
|  |  |
|  | 2.2.5 Alexa Skills Module (ASM) |
| 4.1.16 | The ASM shall contain intents that are commonly asked in regards to using other submodules. |
|  |  |
|  | 2.2.6 Path Finding Module (PFM) |
| 4.1.17 | The PFM shall display a path from the directory’s location to the destination based on the user’s search request. |
|  |  |
|  | 2.2.7 Search Module (SM) |
| 4.1.18 | The SM shall display results in a vertical pane depending on user request. |
| 4.1.19 | The SM shall include a search input for user in order to get search results. |
|  |  |

## **4.2 External Interface** Requirements

Input shall be received from users who touch on various areas of the screen. Input can also be received by speech. Output will be displayed depending on what the user searches. The content of map and search results will be updated depending on user input.

## **4.3 Logical Database Requirements**

Possible data entities:

* Room Number
* Employee Name
* Department
* Event Name
* Event Date
* For Map: nodes and edges can represent various rooms and paths of the floor (graph)
* Room Category

## **4.4 Design Constraints**

Interface must be short enough for people with disabilities to reach parts of the screen with little/no effort in compliance with ADA standards. Interface must also fit dimensions of screen width and height.

Application must be able to run within or alongside Industry Weapon’s software.

# **5. Other Nonfunctional Requirements**

## **5.1 Performance Requirements**

Numerical / statistical requirements imposed on the software such as:

* The number of terminals to be supported is still being finalized with the Liaison
* There may be one or more user(s) will be using the smart board at one time
* The information being displayed will be the location, department, office and the name based on the inputs of the user

The number of transactions of tasks is based on the user. It depends on if the user knows what he/she is looking. There can be a possibility of a large number of transactions if the user does not know what to look for. During peak times, the number of tasks will be greater than normal workload conditions.

## **5.2 Safety Requirements**

The smart board shall be compliant to all of the ADA complaints.

## **5.3 Security Requirements**

The software shall be resistant against to SQL injections as well as compliant to LA County Hall of Administration network security. The public should only be able to view public information when using the smart board.

Tenants should only be able to access their own database data when using the Directory Management Portal.

## **5.4 Software Quality Attributes**

The database can be dynamically changed when needed. Users of the smart board are allowed to view specific attributes from the database. The smart board shall be voice activated if need be. The device shall be user friendly via touch screen, but not limited to other I/O devices.

## **5.5 Business Rules**

The smart board shall display advertisements dynamically that sponsored by the LA County. The smart board shall display a live stream of the HoA meetings for the public.

# 

# 

# **6. Other Requirements**

At this time, there is no other requirements.

# Appendix A: Glossary

# 

# 

# Appendix B: Analysis Models

# Appendix C: To Be Determined List