

Syracuse Chatbot

System Requirements Specification

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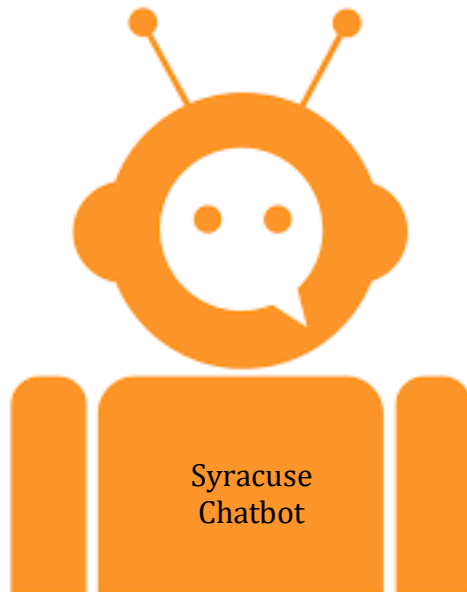


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1. Revision History

Name	Date	Comment	Version
Bharath Karumudi	02/11/2019	Document Structure	0.1
Haixin, Bharath	02/13/2019	Added content to sections 1 to 4.	0.2
Haixin, Bharath	02/17/2019	Added use case and sequence diagrams	0.3
Haixin, Bharath	03/21/2019	Added section 5 and modified section 3	0.4
Bharath, Haixin	03/24/2019	Reviewed and Published	1.0

2. Introduction

2.1 Purpose

This document will provide all the requirements for the project Syracuse Chatbot. It will serve as a reference for both developers and customers during the development of the final version of the system.

2.2 Project Scope

Syracuse Chatbot is an AI Chatbot that receives questions from users, tries to understand the question, and provides appropriate answers. The application does this by converting an English sentence into a machine-friendly query, then going through relevant data to find the necessary information, and finally returning the answer in a natural language sentence. In other words, it answers your questions like a human. For example, when it receives the question "How much I owe?", it will give a response "You owe a total of \$3500 to the University at this time."

The main objective is creating a Web based application, and sample web, mobile interfaces (through Slack and Facebook messengers) that demonstrate the use of the application.

The goal is to provide Syracuse students a quick and easy way to have their questions answered.

2.3 Overview of the Document

1. Revision History: Provides the date of, reason for, and people who were involved with the modification of this document.
2. Introduction: Provides an overview of the application, explain the objectives and goal of the project and describe the document structure.
3. Description: Provides the specification of the system model, the classes model and the main constraints.
4. Requirements: Provide the analysis of the requirements by feature and also provides some other constraints that affect performance, safety and security.
5. Glossary: Definitions of terms used.

3. Description

3.1 Product Perspective

Chatbot is a web-hosted application, developed based on the current bot technology. This application acts as an intermediate media between users and the master databases. A user can interact with Chatbot via simple English sentences to request and update information from certain databases. These English sentences are analyzed by a Language Understanding Intelligent Service (LUIS) which is integrated with the Chatbot.

There will be four main units to the system working together to understand the question and return an appropriate answer:

Generic question construction - capable of taking a natural language question and making it more generic.

Generic answer construction - capable of taking a generic question template and providing a generic answer template.

Generic answer population - capable of taking a generic answer template and populating it with information from the database to form an answer.

Information extraction - capable of finding information available from the database.

3.2 Product Functions

Syracuse Chatbot shall be able to query on following in the current version:

- Student profile information
- Classes and schedules
- Payment information

3.3 Constraints

3.3.1 Limited Question Scope

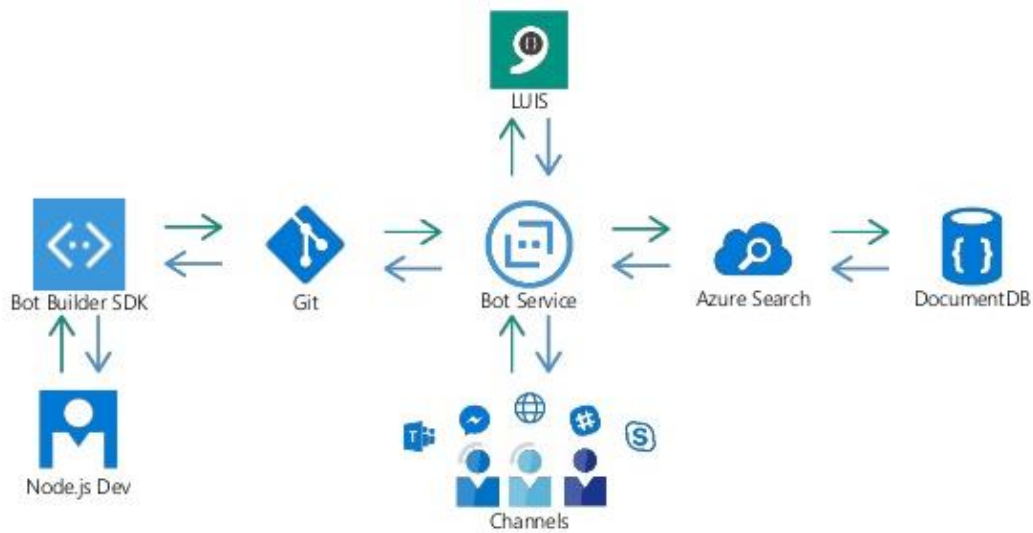
Creating a Chatbot able to answer every single question about Syracuse is not possible to implement within the duration of the project, so the system will be able to answer questions about limited topics.

3.3.2 Language

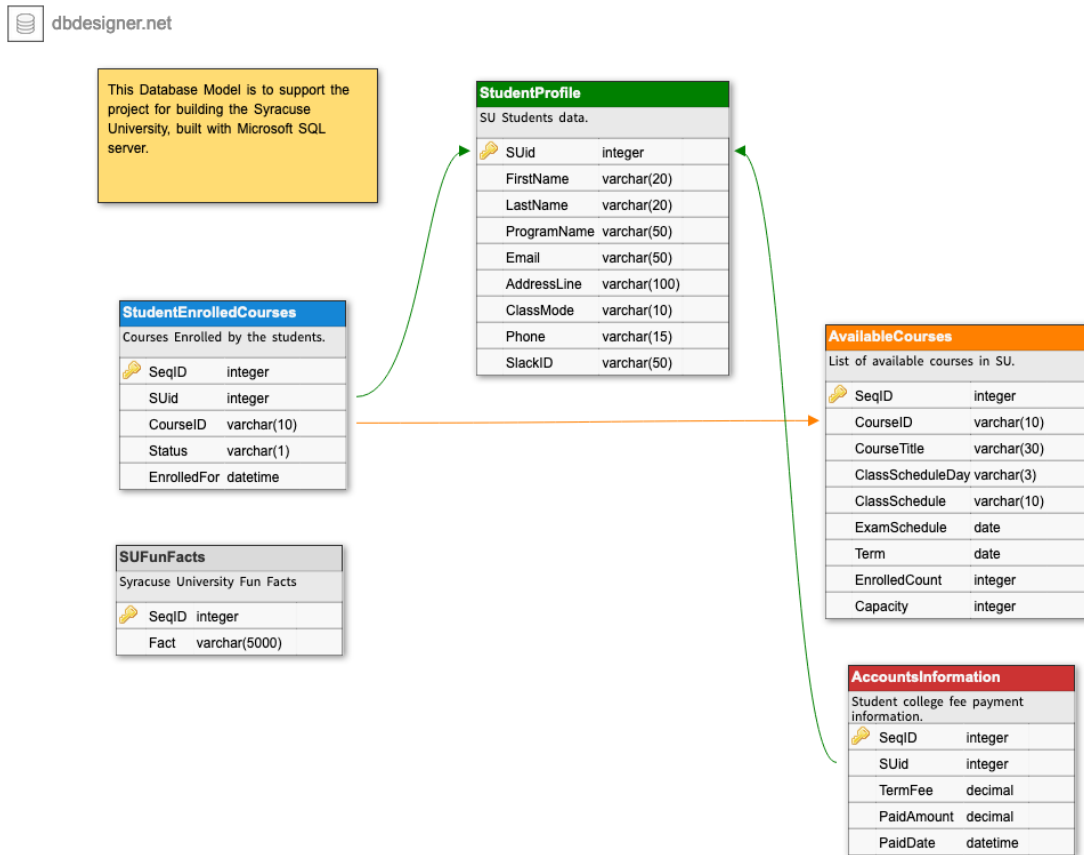
The system will only support questions in standard English.

3.4 System Architecture

3.4.1 System Architecture Diagram



3.4.2 Database Model



3.4.3 Platforms and Services utilized

3.4.3.1 Microsoft Cognitive Service - Language Understanding Intelligent Service (LUIS)

3.4.3.2 Microsoft Bot Framework

3.4.3.3 Database as a service in Microsoft Azure

3.4.3.4 GitHub as Source Code Manager

3.4.3.5 Kudu as build and deployment agent

3.4.3.6 Slack Messaging service

3.4.3.7 Facebook Messenger

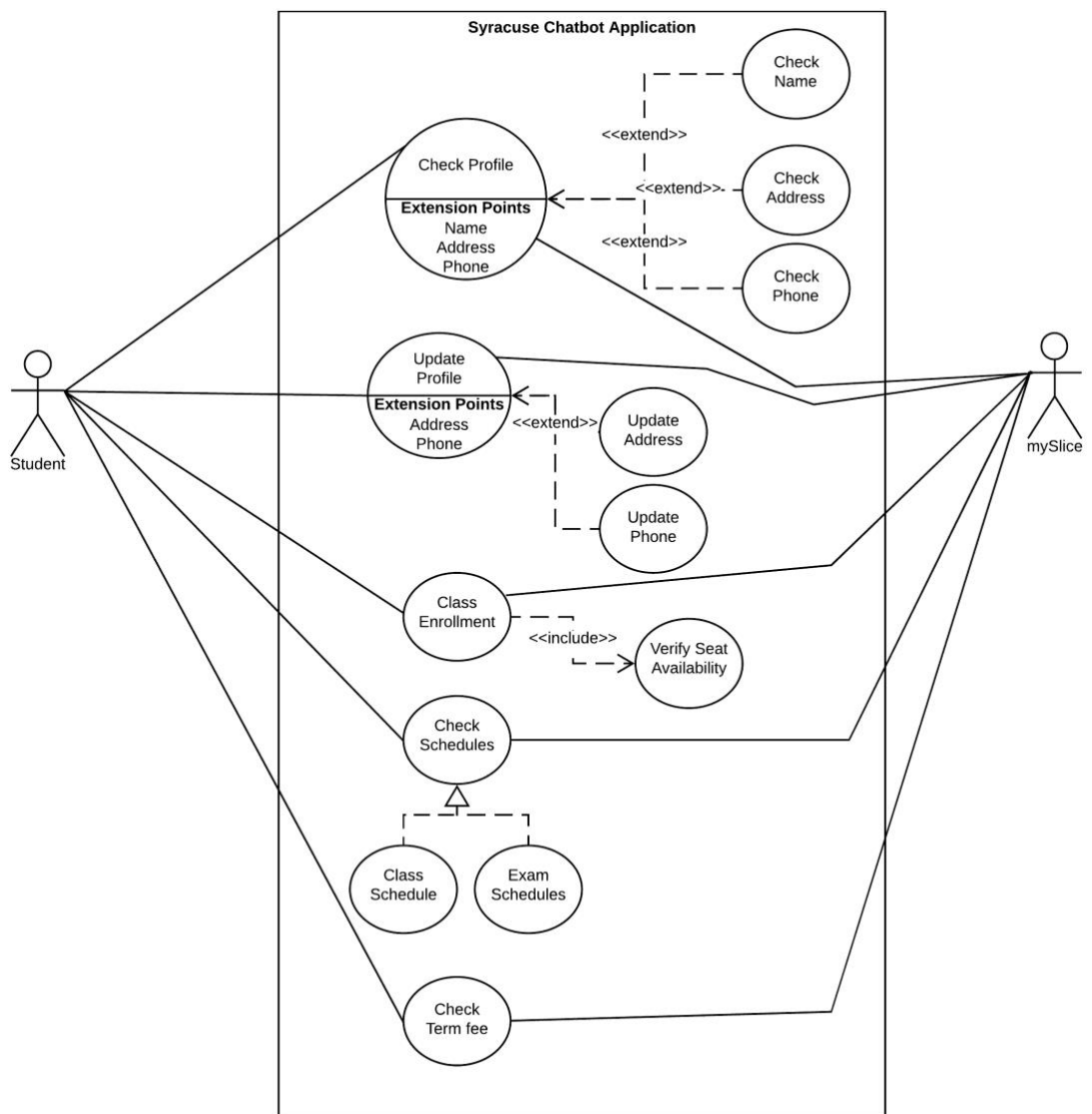
3.4.3.8 Trello for Project Management

3.4.3.9 Lucid Chart for use case and sequence diagrams

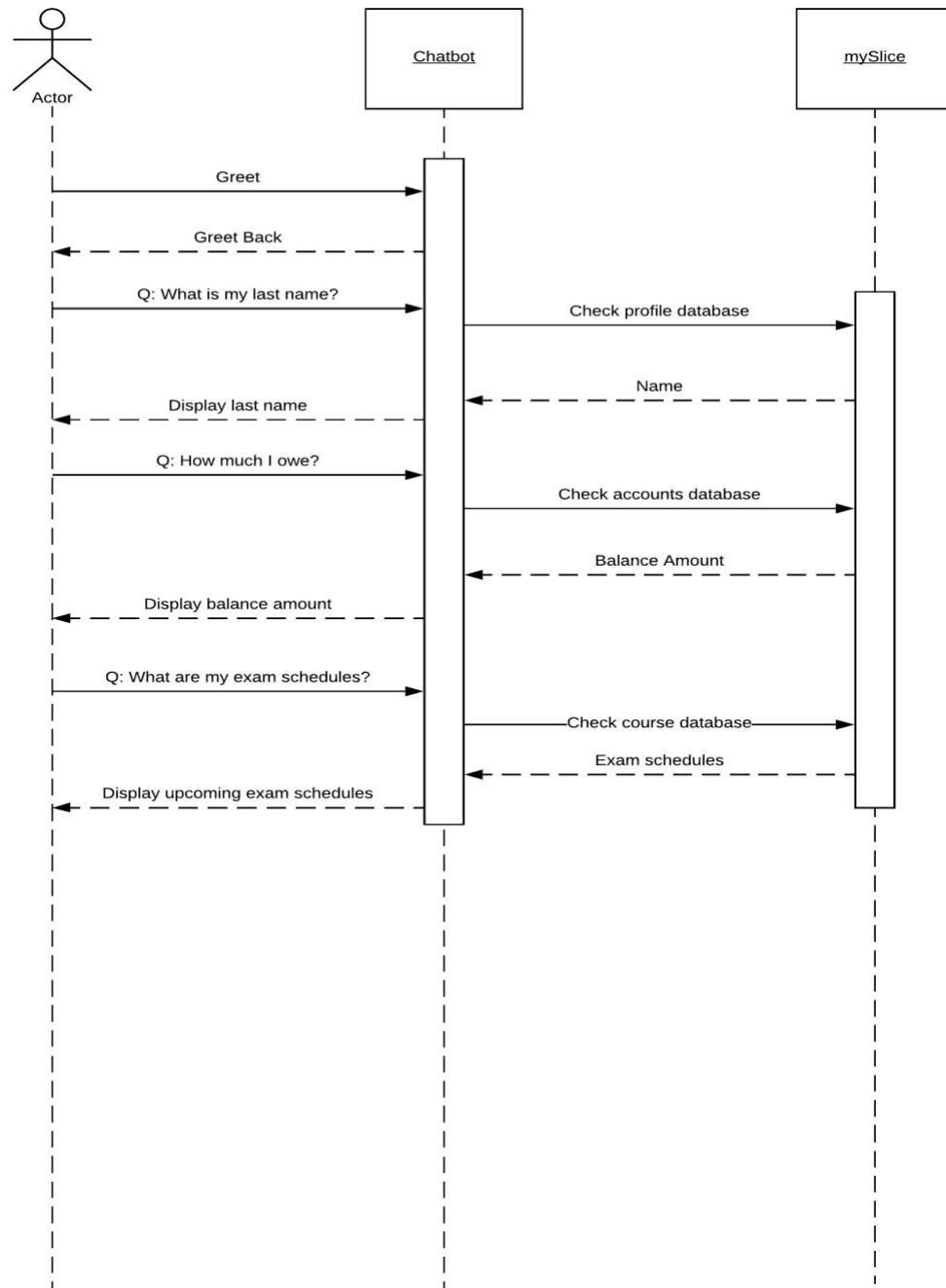
3.4.3.10 DBdesigner for database modeling

3.5 System Models

3.5.1 Use case diagram



3.5.2 Sequence diagram



4. Requirements

4.1 Functional User Requirements

- UR1.** A student shall be able to check his/her profile details such as Name, Email, phone number, address on the records.
- UR2.** A student shall be able to update his/her phone number and Address details.
- UR3.** A student shall be able to check for the offered courses.
- UR4.** A student shall be able to enroll for the classes.
- UR5.** A student shall be able to check term fee and balance.
- UR6.** A student shall be able to check his/her class schedules.
- UR7.** A student be able to check his/her exam schedules.
- UR8.** The user shall be able to use the bot through Web, Slack and Facebook messenger (optional).

4.2 Functional System requirements

- SR1.** The bot shall be able to understand the question and provide the appropriate answers.
- SR2.** When a student greets the bot, the bot shall greet the user back and should display a fun fact, if there is any available, about Syracuse University.
- SR3.** When a student asks the bot to show his/her records, it shall pull only his/her first name, last name, email, address and phone.
- SR4.** When a student asks to update either address or phone, the bot shall able to take the input from the student and update the MySlice database and shall provide a confirmation to the student.
- SR5.** When a student asks the bot to enroll for a course, the bot shall first check the seat availability for the course. If available, the student shall be enrolled; if no seats are available, it shall show no seats are available message.


- SR6.** When a student asks the bot to provide the term fee details, it shall check the MySlice database and shall display the balance due. If nothing is due, it shall display No payment is required.
- SR7.** When a student asks for his/her class schedules, the bot shall check all the enrolled courses and return their class schedules.
- SR8.** When a student asks for the upcoming exam schedules, the bot shall check all the enrolled courses and return their upcoming exam schedules.
- SR9.** The bot should be integrated with Slack and Facebook messenger.
- SR10.** A standalone web-based application shall be available.


4.3 Non-functional requirements


- NR1.** The Chatbot shall be able to respond to users' request within one second.
- NR2.** The Chatbot shall be easy to use. Normally a user should be able to learn to use within 30 minutes.
- NR3.** The system shall support questions in standard English.
- NR4.** The bot shall able to handle concurrent users with no limit.
- NR5.** The return answers should be in an English language sentence.
For example, when the bot receives the question "What is my term fee balance?", it should give a response "You owe \$3500 and the due date is March 14, 2019."
- NR6.** The application shall be developed in node.js.
- NR7.** The application shall be hosted in Azure cloud environment.
- NR8.** The bot should be available to the users all the time. Scheduled maintenance is acceptable.
- NR9.** A code base shall be maintained in GitHub.
- NR10.** The development should use Continuous Integration and Continuous deployment.


5. Examples of demonstrations:


5.1 Checking profile


 **Haixin** 10:31 AM
Hi


 **CuseBot** APP 10:31 AM
Hello, Welcome to Syracuse University! I am a bot and here to help you!
Did you know? There are more than 245,000 Syracuse University alumni living in 162 countries and territories.


 **Haixin** 10:31 AM
What is my first name?


 **CuseBot** APP 10:31 AM
Your First name as in records is: Haixin


 **Haixin** 10:31 AM
What is my email?

 **CuseBot** APP 10:31 AM
Your Email in records is: hc123@syr.edu

 **Haixin** 10:31 AM
What is my address?

 **CuseBot** APP 10:31 AM
Your address as in records is: 100 woodview CT CA

 **Haixin** 10:39 AM
What is my profile?

 **CuseBot** APP 10:39 AM
Your profile in University records is as below:
Name: Haixin Chang Enrolled in: Computer Science with online mode. You are reachable at: hchang04@syr.edu and 1122441123.
Located at: 123 Seaview Rd, Seattle, WA

5.2 Updating profile



Haixin 10:31 AM

Update my address



CuseBot APP 10:31 AM

What is your new address?



Haixin 10:32 AM

123 Seaview Rd, Seattle, WA



CuseBot APP 10:32 AM

Ok you want to change your address to 123 Seaview Rd, Seattle, WA

Updating your address...

Your address has been updated to 123 Seaview Rd, Seattle, WA



Haixin 10:32 AM

Update my email



CuseBot APP 10:32 AM

What is your new email?



Haixin 10:32 AM

hchang04@syr.edu



CuseBot APP 10:32 AM

Ok you want to change your email to hchang04@syr.edu

Updating your email...

Your email has been updated to hchang04@syr.edu



Haixin 10:32 AM

Update my name



CuseBot APP 10:32 AM

Sorry, you cannot update your name

5.3 Enroll for classes



Haixin 10:37 AM

Enroll for CSE682



CuseBot APP 10:37 AM

Checking for the seat availability.....

8 seat(s) are available at this time.

Congratulations! You are now enrolled in CSE682.



Haixin 10:37 AM

Register for CSE700



CuseBot APP 10:37 AM

Checking for the seat availability.....

Sorry this class is full for the term.



Haixin 10:38 AM

Register for CSE682



CuseBot APP 10:38 AM

Checking for the seat availability.....

You have already enrolled in this course.

5.4 Check class and exam schedule



Haixin 11:15 AM

what is my class



CuseBot APP 11:15 AM

Your class schedule:

Software Engineering on Tuesday at 9:00 PM



Haixin 11:15 AM

what is my exam





CuseBot APP 11:15 AM

Your exam schedule:

Software Engineering on 2019-06-18

5.5 Check the account balance due

 **Haixin** 10:38 AM
What is my due?

 **CuseBot** APP 10:38 AM
You owe a total of: \$1400 to the University for this term.


5.6 User Differentiation


We use application tokens to identify who is interacting with the system. Based on generated token, will identify the student and show his/her details.


☆ **CuseBot**
Messages About


Today


ⓘ ⚙️ 🔍 Search @ ☆ ⋮


 **Bharath** 10:48 AM
Hello


 **CuseBot** APP 10:48 AM
Hello, Welcome to Syracuse University! I am a bot and here to help you!
Did you know? SU's original colors were pink and pea green.


 **Bharath** 10:48 AM
Show my profile

 **CuseBot** APP 10:48 AM
Your profile in University records is as below:
Name: Bharath Karumudi Enrolled in: Cybersecurity with online mode. You are reachable at: bhkarumu@syrr.edu and 2488827545. Located at: 132 Woodview Ct, Apt 324 Rochester Hills MI 48307

 **Bharath** 10:48 AM
When is my next class?

 **CuseBot** APP 10:48 AM
Your class schedule:
Software Engineering on Tuesday at 9:00 PM
Machine Learning on Wednesday at 8:00 PM

 **Bharath** 10:48 AM
How much I owe?

 **CuseBot** APP 10:48 AM
You owe a total of: \$1300 to the University for this term.

+

Message CuseBot

@ 😊

Based on the user profile.

6. Source Code and Test interface

The project was built using Microsoft Azure cloud services and the development – deployment integration was done with Continuous Integrity – Continuous Deployment (CI/CD) pipeline. Any commits to the master node will be pulled by the Kudu agent which build and deploys the code automatically.

- The source code is maintained in GitHub: [Link](#).
- A test web interface can be accessed: [Link](#).

7. System evolution

Bot technology has been widely used in many aspects of people's lives. Along with the development of Artificial Intelligence (AI) technology, we expect the bot services will be more prevalent and provide more functions.

In the future releases, we would like to evolve the system to add the below use cases:

- Scheduling the appointments with Professors and Student Advisors.
- Submitting the assignments through bots.
- Integrating Orange Alert system to alert Syracuse Students and Staff.
- Paying the term fee and other balances.
- Booking the conference rooms.
- Displaying the grades and GPAs.
- Sending the notifications like grade availability, course access.
- Submitting the course surveys.
- Shopping the text books from University library.
- Placing an order in University Cafeteria for a coffee or any other food.
- Providing general information like Address and other knowledge base information using QnA maker.
- Integrating with University services over APIs.
- Integrating with Voice Assistants like Alexa, Cortana, Siri and Google Home.