



# ChatterJack Chatbot

## Design Review #3

Team JabberJack

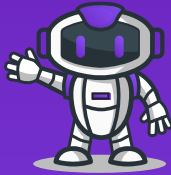
Team Member: [Sara](#), [Jiasheng](#), [Tyler](#), [Gabriel](#)

Faulty Mentor: [Felicity H. Escarzaga](#)

Client: Dr. Andy Wang

Date: 04/08/2022

# Problem Statement:



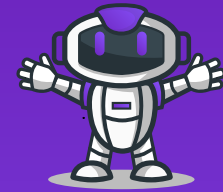
## 01. Distraction of Staff

- ❖ Staff have a job to do and needing to answer questions may pull them away from other tasks
- ❖ If they do not know the answer to a question then they must find it



## 02. Scattered Data

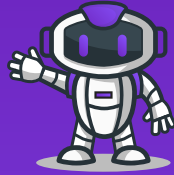
- ❖ Data regarding the university is scattered and buried under complex queries and countless portals
- ❖ Often outdated and unreliable



## 03. Unanswered Questions

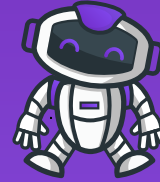
- ❖ Students/Visitors have many questions and cannot always find the answer online
- ❖ Could email, leads to wait times and often leaves questions unanswered

# Solution Overview



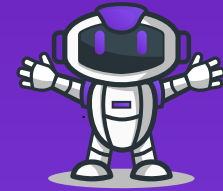
## 01. Centralized Database

- ❖ Place data in a central location for ease of accessibility



## 02. Easily Updatable

- ❖ Updatable information behind an authentication system
- ❖ Keeps information up to date and allows manual entry of information

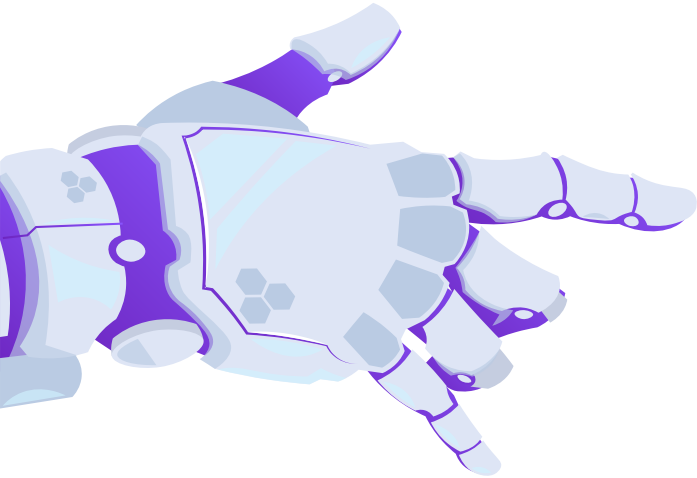


## 03. Quick answers

- ❖ Provide answers to visitors/students in a short amount of time
- ❖ No question left unanswered (provided the bot knows it)

# Requirements Overview

## Key Requirements

**01**

### User Level

- ❖ Input question through text/speech
- ❖ Receive back answers through text/speech
- ❖ Administrators will be able to edit DB information

**02**

### Non - Functional

- ❖ Intuitive user interface
- ❖ Speed - 5 sec response time maximum

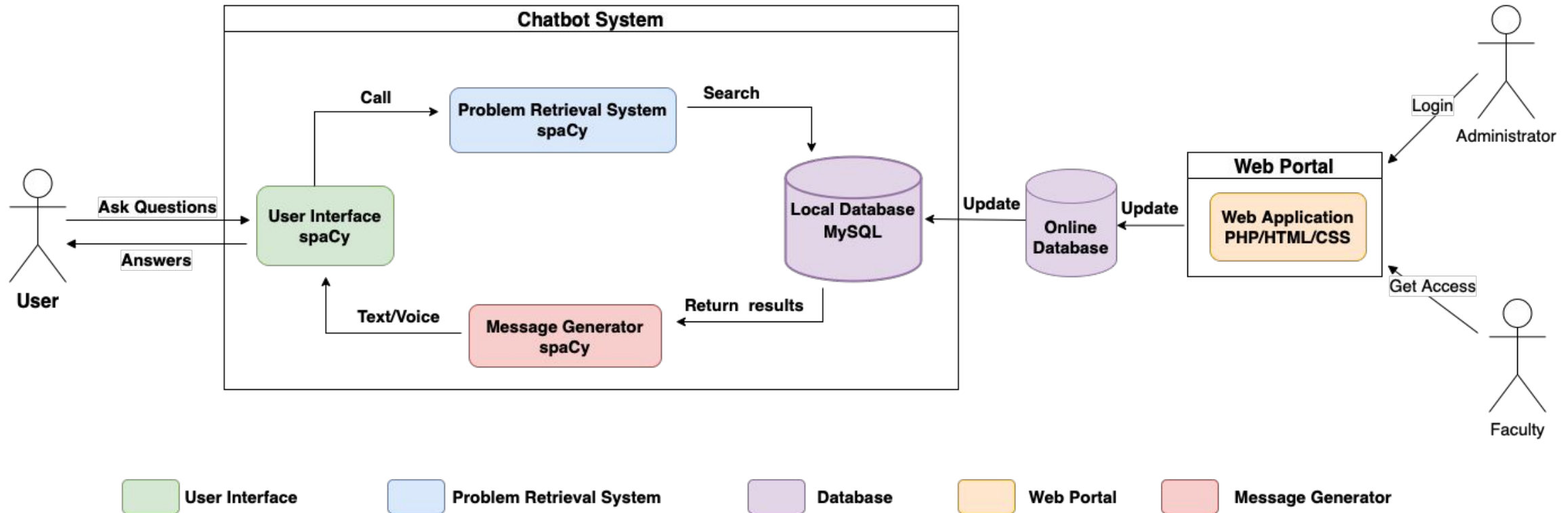
**03**

### Environmental

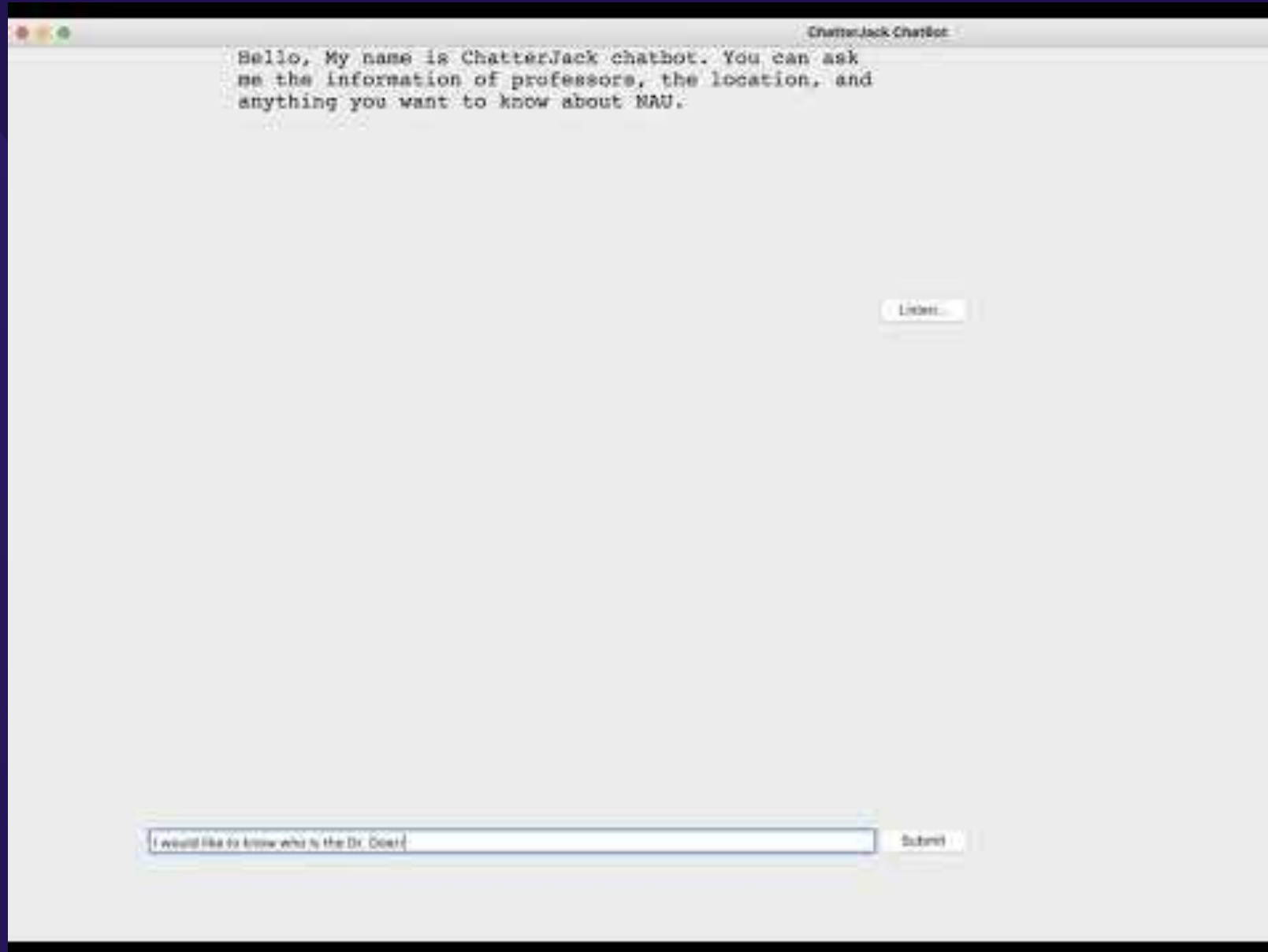
- ❖ OS - Windows
- ❖ Physical integration with M.E project (stretch)

# Implementation Overview

- Problem Retrieval System (Python: spaCy-NLP)
- Database (MySQL)
- Message Generator (Python: spaCy + pymysql)
- Web Portal (PHP+MySQL)
- User Interface (Python: wxpython)





# ChatterJack Chatbot



# Chatterjack Chatbot Login Page

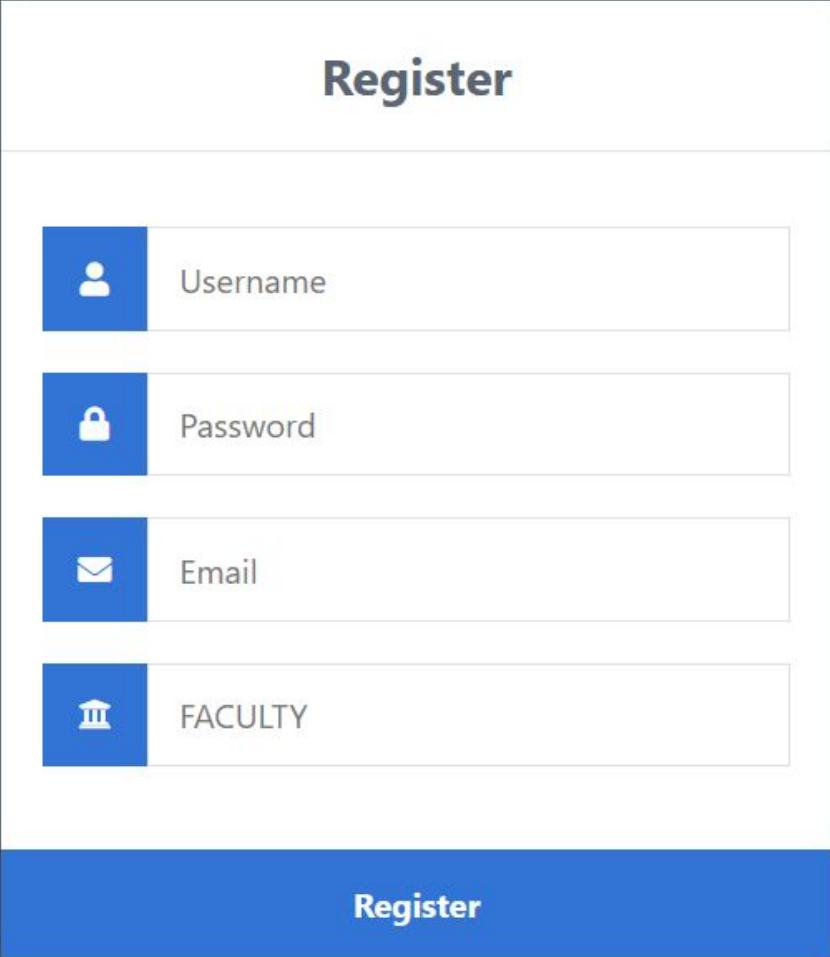
Login

 Username

 Password

Login

# Chatterjack Chatbot Register Page



The image shows a registration form titled "Register" on a dark blue background. The form is white and contains four input fields, each with a blue icon on the left and a label to its right. The fields are: "Username" with a person icon, "Password" with a lock icon, "Email" with an envelope icon, and "FACULTY" with a building icon. Below the fields is a blue button labeled "Register".



# Chatterjack Chatbot Admin Home Page

## Manage Information Database

Insert Information:

Insert

Edit Information:

Modify

Delete Information:

Delete

Search for Information:

Search

# Chatterjack Chatbot Admin Insert Page

Select which table you want to insert information:  PERSON  CLASS  ORG

SELECT

RESET

NEW

person\_name:

Full name, eg: Kyle Nathan Winfree

person\_spe\_name:

Special name, eg: D

\_where:

Office, eg: Room 315 in SICCS Building

\_who:

Job, eg: associate director for Undergraduate Programs, SICCS

\_when:

Office hour, eg: 3pm on every Wednesday

sex:

Male/Female

author:

Author, eg: Winfree

SUBMIT

RESET

# Chatterjack Chatbot Admin Modify Page

## PERSON table

id	person_name	person_spe_name	_where	_who	_when	author	operation
1	Kyle Nathan Winfree	Winfree	Room 315 in SICCS Building	associate director for Undergraduate Programs, SICCS	3pm on every Wednesday	Kyle N Winfree	<input type="button" value="MODIFY"/>
2	Eck Doerry	D	Room 215 in SICCS Building	professor of the CEIAS	2pm on every Wednesday	Eck Doerry	<input type="button" value="MODIFY"/>
2	<input type="text" value="Eck Doerry"/>	<input type="text" value="D"/>	<input type="text" value="Room 215 in SICCS Building"/>	<input type="text" value="professor of the CEIAS"/>	<input type="text" value="2pm on every Wednesday"/>	<input type="text" value="Eck Doerry"/>	<input type="button" value="OK"/>
3	Michael	Michael	Room 296 in Engineering Building	professor of CEIAS	3 pm on every Monday and Wednesday	Michael	<input type="button" value="MODIFY"/>

# Chatterjack Chatbot Admin Delete Page

Select which table you want to delete information:  PERSON  CLASS  ORG

SELECT

RESET

NEW

Delete a row:

✓ Select one Person

Kyle Nathan Winfree

Eck Doerry

Michael

Delete

# Chatterjack Chatbot Admin Search Page

Select which table you want to search information:  PERSON  CLASS  ORG

Input the Search Information:

## PERSON table

id	person_name	person_spe_name	_where	_who	_when	author	sex
1	Kyle Nathan Winfree	Winfree	Room 315 in SICCS Building	associate director for Undergraduate Programs, SICCS	3pm on every Wednesday	Kyle N Winfree	Male
2	Eck Doerry	D	Room 215 in SICCS Building	professor of the CEIAS	2pm on every Wednesday	Eck Doerry	Male
3	Michael	Michael	Room 296 in Engineering Building	professor of CEIAS	3 pm on every Monday and Wednesday	Michael	Male

# Chatterjack Chatbot Faculty Page

## Faulty Management System

Select which table you want to modify or delete information:  PERSON  CLASS

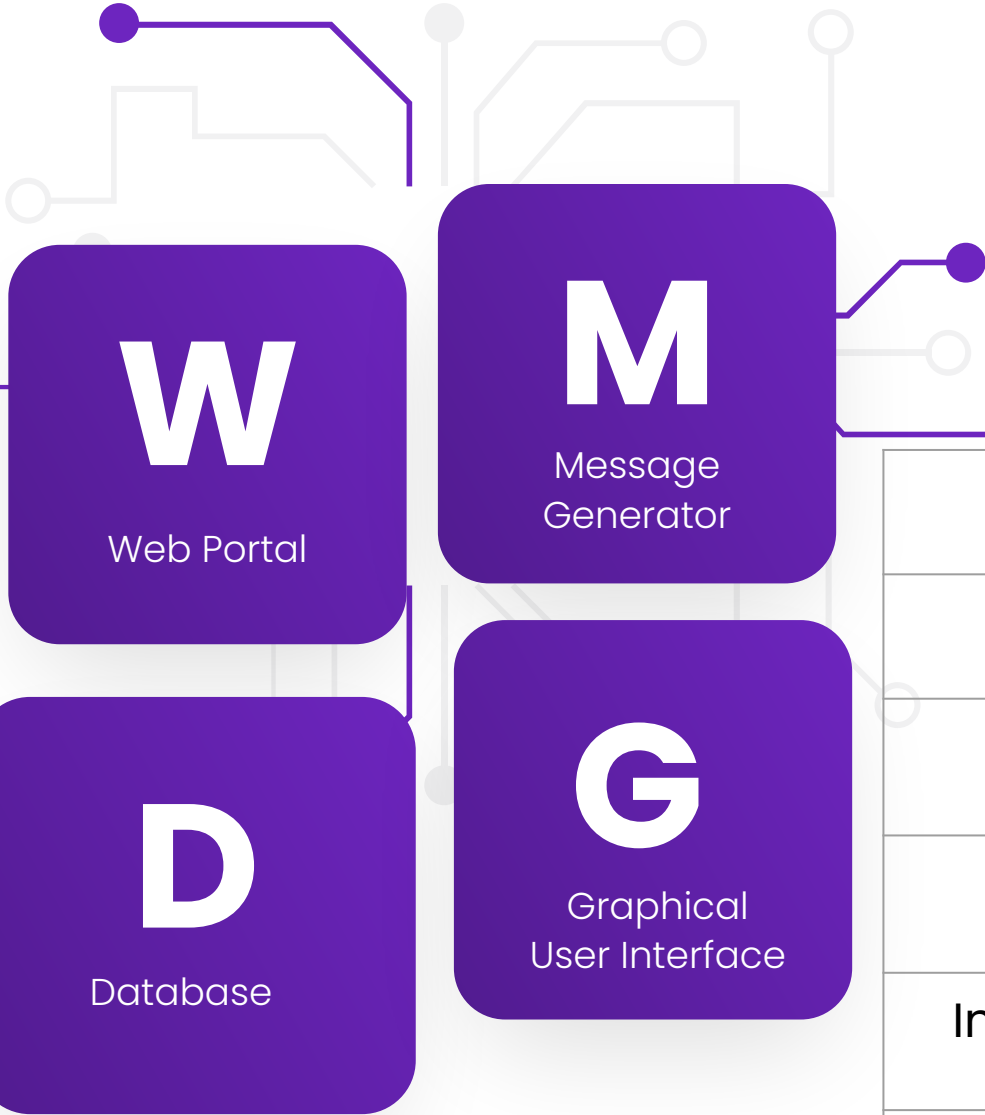
Input your User Name:

### PERSON table

id	person_name	person_spe_name	_where	_who	_when	author	operation
3	Michael	Michael	Room 296 in Engineering Building	professor of CEIAS	3 pm on every Monday and Wednesday	Michael	<input type="button" value="MODIFY"/>
3	<input type="text" value="Michael"/>	<input type="text" value="Michael"/>	<input type="text" value="Room 296 in Engineering Building"/>	<input type="text" value="professor of CEIAS"/>	<input type="text" value="3 pm on every Monday and Wedne"/>	<input type="text" value="Michael"/>	<input type="button" value="OK"/>

### CLASS table

id	class_name	_where	_who	_what	_when	author	operation
1	CS480	Room 104 in SBS West	Dr. Michael	Operating System	2 pm every Monday and Wednesday	Michael	<input type="button" value="MODIFY"/>



# Challenges and Resolutions

Challenges	Resolutions
Database Layout	Simpler database
Web Portal	PHP & MySQL vs. Framework
Python Library for GUI	Kivy
Integrate Speech-To-Text	Python Library
Server End	Chatbot

# Testing Plan

## Unit Testing

❖ Natural Language Processing

Function Tested	Expected	Outcome
segmentSentence()	Use token from spaCy segment the input sentence	PASS
segmentList()	Store each word in a list from token result	PASS
interrogative()	Grab the interrogative	PASS
person()	Grab the normal person using entity from spaCy	PASS
nau()	Grab the normal person using entity from spaCy	PASS
expandPerson()	Grab the specific name, eg: Dr. D	PASS
classes()	Grab the specific name using regular expression	PASS
intention()	Store all grabbing information into a dictionary and corresponding labels	PASS

Grab key information

Function Tested	Expected	Outcome
tf()	Calculate the tf-idf value of inputting and standard information	PASS
compare()	Store the inputting information and tf-idf value in a dictionary	PASS
perCheck()	By tf-idf value, judge whether correct the inputting information (person and organization)	PASS
claCheck()	By tf-idf value, judge whether correct the inputting information (class)	PASS

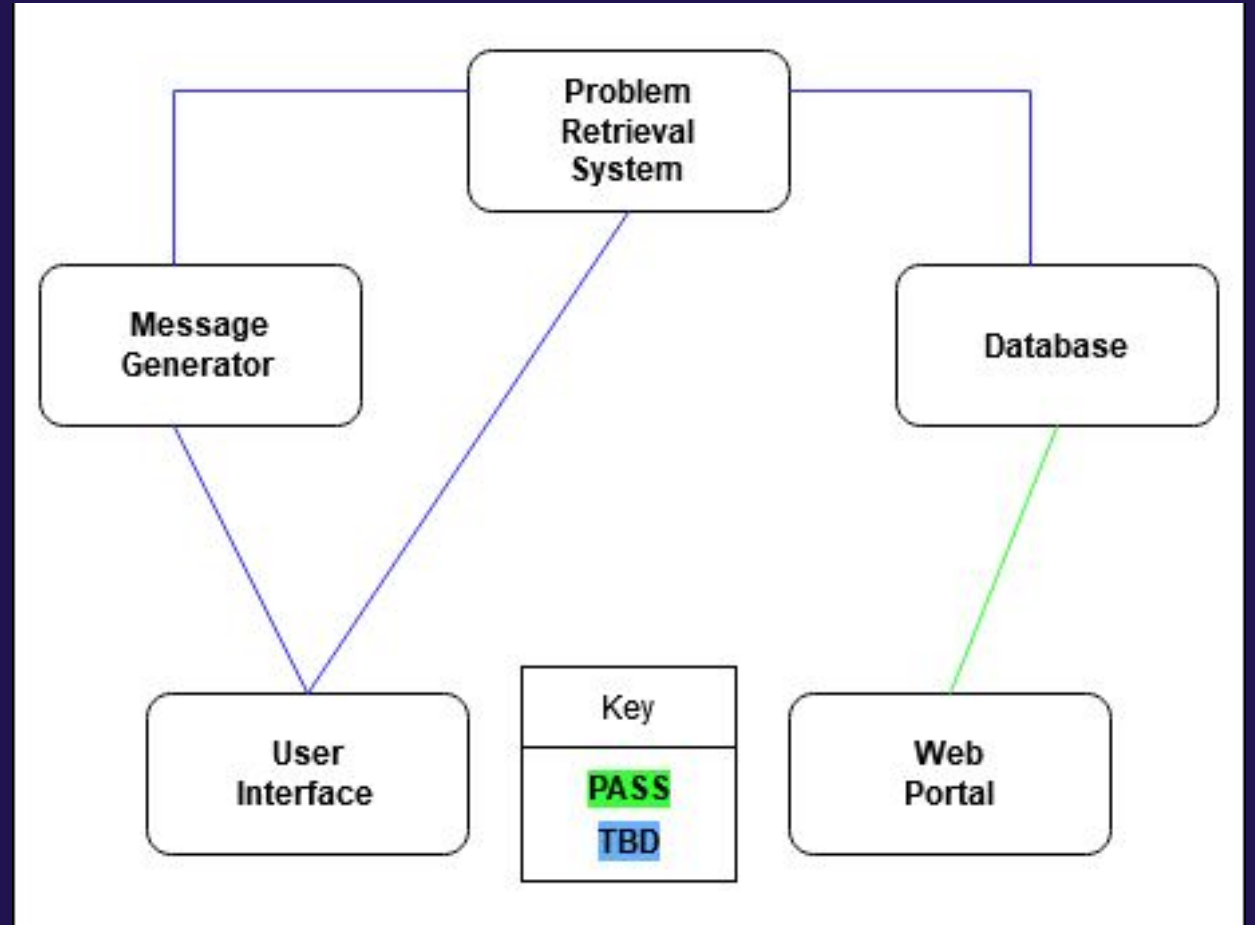
Correct Fuzzy Finding



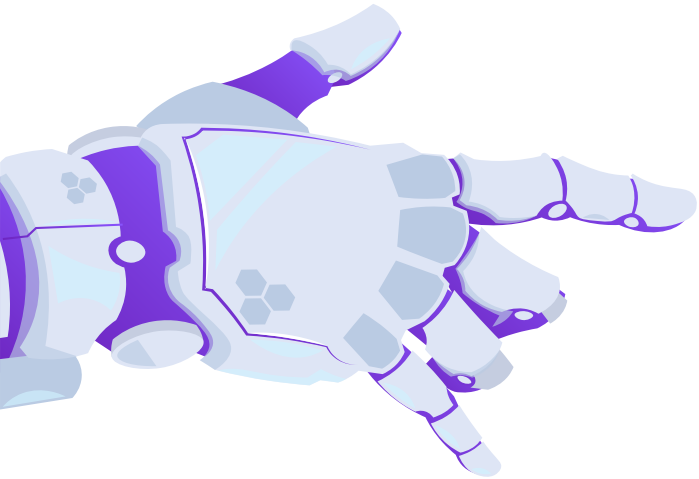
# Testing Plan

## Integration testing

- ❖ Problem Retrieval System
- ❖ Message Generator
- ❖ User Interface
- ❖ Web Portal
- ❖ Database



## End-users Testing



# Testing Plan

**01**

### General User (Anyone) 5-6 People

- ❖ Input questions through text/speech
- ❖ Receive answers through text/speech
- ❖ Rate (1-10) on Usability, Enjoyment, + Engagement

**02**

### Faculty Users 5-6 People

- ❖ Only modify or check the data related their own information
- ❖ Rate (1-10) on simplicity of operation and Design

**03**

### Administrative Users 5-6 People

- ❖ All operations to manage database
- ❖ Rate (1-10) on simplicity of operation and Design






# Conclusion

- ✓ Use NLP to grab the key information
- ✓ Text-to-Speech/Speech-To-Text
- ✓ Comprehensive Database
- ✓ Complete Integration/User testing
- ✓ Set a foundation



# Questions



**Get in touch  
with us**

**JabberJack always jabbers**

**“Intelligent brain” for LumberJack**



**@JabberJack**



# Prototype Review

## 1. Problem Retrieval System - Grab Information

### 01 Technology

1. Segment question NLP Library: spaCy
2. Search: SQL Language + pymysql

### 02 Key Information

- INTER: all interrogatives
- Person: Faculty
- Class: Classes
- ORG: Organizations, colleges, locations

```

Hello, My name is ChatterJack chatbot. You can ask me the information
I would like to know where is the Dr. Winfree's office?
{'_where': 'INTER', 'Winfree': 'PERSON'}
Do you have any other questions?
Who is the Dr.D?
{'_who': 'INTER', 'D': 'PERSON'}
Do you have any other questions?
I would like to know when does Dr. Michael start his CS480 class?
{'_when': 'INTER', 'Michael': 'PERSON', 'CS480': 'CLASS'}
Do you have any other questions?
Where is the Engineering Building?
{'_where': 'INTER', 'engineering': 'ORG'}
Do you have any other questions?
What is the CEIAS?
{'_what': 'INTER', 'ceias': 'ORG'}
Do you have any other questions?
no
{}
Thanks for asking. Hopefully, the answer will help you. Have a nice
  
```

# Prototype Review

## 1. Problem Retrieval System – Fuzzy Finding

- ✓ Python library – sklearn
- ✓ tf-idf to calculate the similarity

```
Question: I would like to know who is the doctor winfrey?  
He is the associate director for Undergraduate Programs, SICCS.
```

```
Compare: doery  
Similarity:  
{'Winfrey': 0.4472135954999579, 'Doerry': 0.9486832980505138, 'Michael': 0.16903085094570328, 'CS480': 0.0, 'CS421': 0.0}  
Return name: Doerry
```





# Prototype Review

## 2. Database (Three Tables)

### PERSON

id	person_name	person_spe_name	_where	_who	_when	author	sex
2	Eck Doerry	D	Room 215 in SICCS Building	professor of the CEIAS	2pm on every Wednesday	Doerry	Male

### ORG

id	org_name	_where	_what	_who	_how	author
2	ceias	Engineering Building	College of Engineering, Informatics, and Applied Sciences is NAU's newest college	Dr. Andy Wang	Mountain 10 or LOUIE Bus	Andy Wang

### CLASS

id	class_name	_where	_who	_what	_when	author
1	CS480	Room 104 in SBS West	Dr. Michael	Operating System	2 pm every Monday and Wednesday	Michael

# Prototype Review

## 3. Message Generator

01

**NLP Library: spaCy**

02

**Answers**

- Greeting
- Answers

(Keywords from DB + sentence Components)

```
7/22/2017 11:11:11 AM\n\nHello, My name is ChatterJack chatbot. You can ask me the information of profes\n\nI would like to know where is the Dr. Winfree's office?\nHis office is at Room 315 in SICCS Building.\nDo you have any other questions?\nYes\n\nWhat else do you want to know?\n\nWho is the Dr. D?\nHe is the professor of the CEIAS.\nDo you have any other questions?\n\nYes. When does Dr. Michael start his cs480 class?\nIt starts at 4 pm every Monday and Wednesday\nDo you have any other questions?\n\nWhere is the engineering building?\nIt is in the Engineering Building\nDo you have any other questions?\nno\n\nNone\n\nThanks for asking. Hopefully, the answer will help you. Have a nice day!
```

# Prototype Review

## 4. Web Portal – Faculty & Administrator (Administrative System)

### Faulty Management System

Select which table you want to modify or delete information:  PERSON  CLASS

Input your User Name:

#### PERSON table

id	person_name	person_spe_name	_where	_who	_when	author	operation
3	Michael	Michael	Room 296 in Engineering Building	professor of CEIAS	3 pm on every Monday and Wednesday	Michael	<input type="button" value="MODIFY"/>
3	<input type="text" value="Michael"/>	<input type="text" value="Michael"/>	<input type="text" value="Room 296 in Engineering Building"/>	<input type="text" value="professor of CEIAS"/>	<input type="text" value="3 pm on every Monday and Wedne"/>	<input type="text" value="Michael"/>	<input type="button" value="OK"/>

#### CLASS table

id	class_name	_where	_who	_what	_when	author	operation
1	CS480	Room 104 in SBS West	Dr. Michael	Operating System	2 pm every Monday and Wednesday	Michael	<input type="button" value="MODIFY"/>

### Manage QA Database

Insert Question-Answer Pairs:

Modify Question-Answer Pairs:

Delete Question-Answer Pairs:

Search Question-Answer Pairs:

Login Out:

Faculty Management System

Administrator Management System

# Prototype Review

## 4. Web Portal – Register & Login (Administrative System)

- 01 **Users**
  1. Administrator
  2. Faculty

A mockup of a login form with a white background and a blue header. The header contains the word "Login" in bold. Below the header are two input fields: the first is labeled "Username" with a person icon, and the second is labeled "Password" with a lock icon. At the bottom of the form is a blue button with the text "Login".

A mockup of a register form with a white background and a blue header. The header contains the word "Register" in bold. Below the header are four input fields: the first is labeled "Username" with a person icon, the second is labeled "Password" with a lock icon, the third is labeled "Email" with an envelope icon, and the fourth is labeled "FACULTY" with a building icon. At the bottom of the form is a blue button with the text "Register".

# Prototype Review

## 5. User Interface



### 01. Current User Interface

- ✓ Text Box and Pop Window: [wxpython](#)
- ✓ Text-To-Speech: [gtts](#)

### 02. The Future of User Interface

- ✓ A Smiling Face
- ✓ Speech-To-Text