2020

2021

A close up of a logo

Description automatically generated

Project: CATO

Company: DNASC (Definitely Not A Software Company)

Release #: 1.0

Professor: Calvin Caldwell

Analyst: Jihyuk Chung

Email: jihyuk.chung@oit.edu

Date: Oct 16, 2020

SIGNATORY PAGE

|  |  |
| --- | --- |
| X\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_ |
| Author: Jihyuk Chung | Date |
|  |  |
| X\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_ |
| Reviewer: Calvin Caldwell | Date |

REVISION HISTORY

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Authors** | **Company** | **Version** | **Date** | **File Name** | **Comments** |
| Jihyuk Chung | DNASC | 1.0 | April 18, 2020 | [CST412] Use Case Model by Jihyuk Chung.docx | Final Draft |
|  |  |  |  |  |  |

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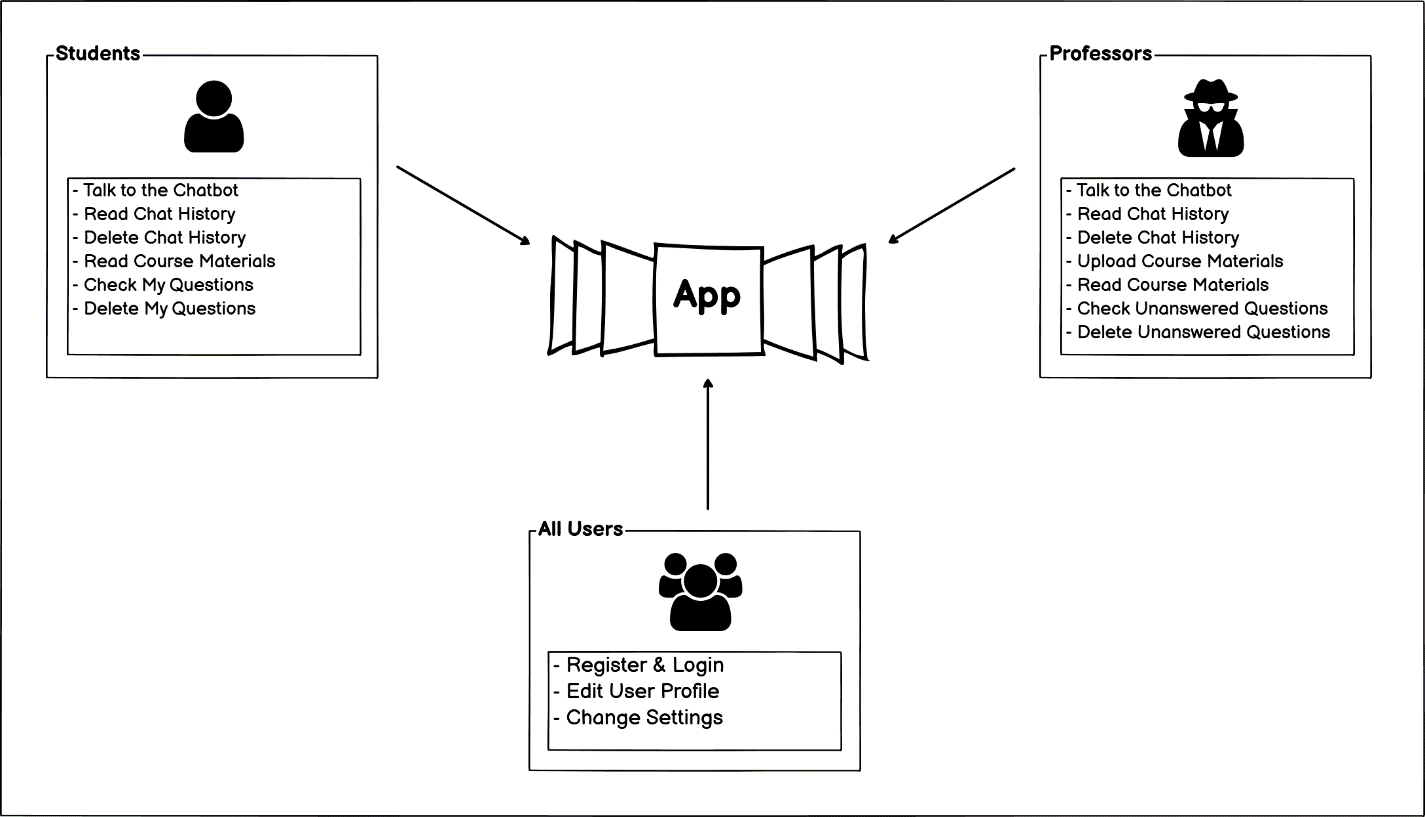
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1. CONTEXT DIAGRAM



1. USE CASE CATALOG

|  |  |  |
| --- | --- | --- |
| **Use Case ID** | **Use Case Name** | **Description** |
| 100 | Chatbot | User ask questions and get responses from the chatbot |
| 200 | Course Materials | Professors can upload course materials to enhance the BERT algorithm and for a reference |
|  |  |  |

1. ACTOR CATALOG

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| User (Student) | Person | User with valid login can interact with the chatbot and read the course materials |
| User (Professor) | Person | User with valid login can interact with the chatbot and upload the course materials |
| Chatbot AI | System | The chatbot answers questions given by users |
|  |  |  |

1. FEATURES VERIFICATION MATRIX

|  |  |  |
| --- | --- | --- |
| **Feature #** | **Use Case ID** | **Use Case Name** |
| N/A | N/A | N/A |
|  |  |  |
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1. USE CASE 100 SPECIFICATION

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| --- | --- |
| **General Information** | |
| **Use Case Name\Number:** UC 100 Chatbot  **Subject Area:** User-Chatbot Interaction  **Description:** User ask questions and get responses from the chatbot | **Responsible Analyst:** Jihyuk Chung |

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| **Requirements / Feature Trace** | |
| **REQ#** | **Requirements Name and / or Short Description** |
| 5 | User must be able to ask questions to the chatbot |
| 10 | Chatbot must answer or give a response to the user |
| 15 | User must be able to send unanswered questions to associated professors |
| 20 | User must be able to delete their chat history |

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| **Revision History** | | |
| **Author** | **Date** | **Comments** |
| Jihyuk Chung | Oct 05, 2020 | First Draft |
| Jihyuk Chung | Oct 16, 2020 | Final Draft |

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| **Insertion Points in other Use Cases (Adds Only)** | | |
| **Use Case Name** | **Use Case Number** | **Step Inserted After** |
| N/A | N/A | N/A |
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| --- | --- | --- |
| **Actors** | | |
| **Actor Name** | **Person/System** | **Brief Description** |
| Users | Person | Users with valid login with a question |
| Chatbot AI | System | An interactive chatbot answers questions given |
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| **Pre-Conditions** | |
| **#** | **Description** |
| 1 | Welcome screen is displayed |
| 2 | User is logged in |
| 3 | User selects the chatbot page |
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| **Start Stimulus** |
| User enters a question to the chat box |

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| **Use Case Main Course Steps** | | | |
| **Number** | **Description** | **Adds/Alt Name/Number** | **Bus Rule#** |
| 1 | User selects the chatbot page |  |  |
| 2 | Chatbot gives a greeting or shows previous chat |  |  |
| 3 | User asks a question |  |  |
| 4 | Writes the question to the DB |  |  |
| 5 | Chatbot answers the question or make a response |  | 1, 2, 3 |
| 6 | Writes the answer to the DB |  |  |
| 7 | User rates the answer as unanswered or incorrect |  | 4, 5 |
| 8 | Popup asks the user to resubmit the question to an associated professor or professional |  | 4 |
| 9 | User sees the response |  |  |
| 10 | User deletes the chat history |  |  |
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| **Exception Conditions** | | |
| **Exception Situations** | **Action(s) on Exception** | **Adds\Alt UC #** |
| Invalid text | Chatbot response with inability to understand the question |  |
| No answers | Chatbot response with inability to find a valid answer |  |
| No internet connection | Website/app shows an error message |  |
| No permission | Website/app response with permission required |  |

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| **Post-Conditions** | |
| **#** | **Description** |
| 1 | Chat page is updated |
| 2 | Chatbot greets users when no previous history is found |

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| **Candidate Objects** | | |
| **Class/Object Name** | **Descriptions** | **Possible Attributes** |
| Users | Can ask questions to chatbot and professors. Can read previous chat history. | UserID, Name, Email, Position |
| Chat | Holds chat history | UserID, Chat, Date, Time, |

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| **Assumptions** | | | | | |
| **#** | **Assumption** | **Date Raised** | **Raised By** | **Date Verified** | **Verified By** |
| 1 | UI language is in English | Oct 5, 2020 | Chung |  |  |
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| **Issues** | | | | | |
| **#** | **Issue** | **Date Raised** | **Raised By** | **Date Verified** | **Verified By** |
| 1 | Need to enter a question to the chat box | Oct 5, 2020 | Chung |  |  |
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| **Other Comments** | | |
| **Author** | **Comment** | **Date** |
| N/A | N/A | N/A |
|  |  |  |

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| **Frequency of Execution** | | | | | |
| **Frequency:** | Min: N/A | Max: 20,000 | Avg: N/A | (OR)Fixed: |  |
| **Per:** | Hour: | Day: | Week: | Month: | Other: |

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| **Timing Information** | | | | | | | |
| **#** | **At /**  **Between** | **Step(s)** | **Timing**  **Unit** | **Min** | **Avg** | **Max** | **Comments** |
| 1 | Between | (01) Loads the chat history | S | N/A | N/A | 2 | Pagination |
| 2 | Between | (04) Bot makes a response | S | N/A | N/A | 5 | AI Calculation |
| 3 | Between | (08) Deletes chat history | S | N/A | N/A | 5 | Recursive |
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| **Volume Information** | | | | | | |
| **#** | **Step #** | **Unit of Measure** | **Min** | **Avg** | **Max** | **Comments** |
| 1 | 02, 09 | Gigabyte | N/A | N/A | <1 | Maximum free Firebase storage |
| 2 | 04, 05 | Megabyte | N/A | N/A | <=1 | Maximum Firebase document size |
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| **Alternate Course General Information** | | |
| **Alternate Course Name \ Number:** | N/A | |
| **Description:** | N/A | |
| **Reason for Execution:** | Non Exception: | Exception: |

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| **Insertion Point** |
| **Step Inserted After** |
| N/A |

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| **Pre-Conditions** | |
| 1. | N/A |
| 2. |  |

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| --- | --- | --- | --- |
| **Alternate Course Steps** | | | |
| **#** | **Step Description** | **Adds Use Case #** | **Business Rule(s)#** |
| 1. | N/A | N/A | N/A |
| 2. |  |  |  |
| 3. |  |  |  |
| 4. |  |  |  |

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| **Post-Conditions** | |
| 1. | N/A |
| 2. |  |

1. USE CASE 200 SPECIFICATION

|  |  |
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| **General Information** | |
| **Use Case Name\Number:** UC 200 Course Materials  **Subject Area:** Course Materials for BERT algorithm  **Description:** Professors can upload course materials to enhance the BERT algorithm and also as a helpful guide | **Responsible Analyst:** Jihyuk Chung |

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| **Requirements/Feature Trace** | |
| **REQ#** | **Requirements Name and / or Short Description** |
| 5 | Professor uploads the course materials |
| 10 | Users must be able to read and download course materials |
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| --- | --- | --- |
| **Revision History** | | |
| **Author** | **Date** | **Comments** |
| Jihyuk Chung | Oct 05, 2020 | First Draft |
|  |  |  |

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| --- | --- | --- |
| **Insertion Points in other Use Cases (Adds Only)** | | |
| **Use Case Name** | **Use Case Number** | **Step Inserted After** |
| N/A | N/A | N/A |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| **Actors** | | |
| **Actor Name** | **Person/System** | **Brief Description** |
| Users (Students) | Person | Users with valid login can read the course materials |
| Users (Professors) |  | Users with valid login can upload the course materials |
|  |  |  |

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| **Pre-Conditions** | |
| **#** | **Description** |
| 1 | Welcome screen is displayed |
| 2 | User is logged in |
| 3 | User selects the course materials page |

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| **Start Stimulus** |
| User clicks the ‘Upload’ button |

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| **Use Case Main Course Steps** | | | |
| **Number** | **Description** | **Adds/Alt Name/Number** | **Bus Rule#** |
| 1 | User selects the course materials page |  |  |
| 2 | User uploads a document |  |  |
| 3 | User clicks upload more and uploads additional documents as needed |  |  |
| 4 | User submits the course materials |  |  |
| 5 | BERT algorithm is updated |  | 2 |
| 6 | User views and downloads the course materials |  |  |
|  |  |  |  |

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| --- | --- | --- |
| **Exception Conditions** | | |
| **Exception Situations** | **Action(s) on Exception** | **Adds\Alt UC #** |
| Invalid file | System response with inability to find the file in the user’s system |  |
| File size too big | Chatbot response with inability to upload the file |  |
| No internet connection | Website/app shows an error message |  |
| No permission | Website/app response with permission required |  |

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| **Post-Conditions** | |
| **#** | **Description** |
| 1 | Course materials page is updated |
| 2 | BERT algorithm is updated (if needed) |

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| --- | --- | --- |
| **Candidate Objects** | | |
| **Class/Object Name** | **Descriptions** | **Possible Attributes** |
| Users | Can upload and read or read course materials | UserID, Name, Email, Position |
| Materials | Storage for the uploaded course materials | MeterialID, Course ID |

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| **Assumptions** | | | | | |
| **#** | **Assumption** | **Date Raised** | **Raised By** | **Date Verified** | **Verified By** |
| 1 | Language is in English | Oct 5, 2020 | Chung |  |  |
|  |  |  |  |  |  |

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| **Issues** | | | | | |
| **#** | **Issue** | **Date Raised** | **Raised By** | **Date Verified** | **Verified By** |
| 1 | Need to upload file to the system | Oct 5, 2020 | Chung |  |  |
|  |  |  |  |  |  |

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| --- | --- | --- |
| **Other Comments** | | |
| **Author** | **Comment** | **Date** |
| N/A | N/A | N/A |
|  |  |  |

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| --- | --- | --- | --- | --- | --- |
| **Frequency of Execution (Upload)** | | | | | |
| Frequency: | Min: N/A | Max: 20,000 | Avg: N/A | (OR)Fixed: | |
| Per: | Hour: | Day: | Week: | Month: | Other: |

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| --- | --- | --- | --- | --- | --- |
| **Frequency of Execution (Download)** | | | | | |
| Frequency: | Min: N/A | Max: 50,000 | Avg: N/A | (OR)Fixed: | |
| Per: | Hour: | Day: | Week: | Month: | Other: |

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| **Timing Information** | | | | | | | |
| **#** | **At /**  **Between** | **Step(s)** | **Timing**  **Unit** | **Min** | **Avg** | **Max** | **Comments** |
| 1 | Between | (01) Load materials | S | N/A | N/A | 3 |  |
| 2 | Between | (02) Upload materials | S | N/A | N/A | 3 |  |
| 3 | Between | (05) Update algorithm | S | N/A | N/A | N/A | Background |
| 4 | Between | (06) Download materials | S | N/A | N/A | 5 |  |
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| **Volume Information** | | | | | | |
| **#** | **Step #** | **Unit of Measure** | **Min** | **Avg** | **Max** | **Comments** |
| 1 | 01 | Gigabyte | N/A | N/A | 5 | Maximum free Cloud Storage |
| 2 | 06 | Gigabyte | N/A | N/A | 1 | Download operation per day |
|  |  |  |  |  |  |  |
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| --- | --- | --- |
| **Alternate Course General Information** | | |
| **Alternate Course Name \ Number:** | N/A | |
| **Description:** | N/A | |
| **Reason for Execution:** | Non Exception: | Exception: |

|  |
| --- |
| **Insertion Point** |
| **Step Inserted After** |
| N/A |

|  |  |
| --- | --- |
| **Pre-Conditions** | |
| 1. | N/A |
| 2. |  |

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| --- | --- | --- | --- |
| **Alternate Course Steps** | | | |
| **#** | **Step Description** | **Adds Use Case #** | **Business Rule(s)#** |
| 1. | N/A | N/A | N/A |
| 2. |  |  |  |
| 3. |  |  |  |
| 4. |  |  |  |

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| **Post-Conditions** | |
| 1. | N/A |
| 2. |  |

1. CRUD MATRIX

|  |  |  |  |  |  |  |  |
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| **Use Case ID** | **Use Case Name** | **Person** | **Tx** | **C3** | **C4** | **C6** | **C7** |
| 100 | Chatbot | CRUD |  |  |  |  |  |
| 200 | Course Materials | CRUD |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

1. LOW FIDELITY UI

A picture containing text

Description automatically generated

Graphical user interface, text, application, chat or text message

Description automatically generatedGraphical user interface, text

Description automatically generated

1. APPENDIX A – GLOSSARY OF TERMS

N/A

1. APPENDIX B – BUSINESS RULE

|  |  |
| --- | --- |
| **Rule #** | **Description** |
| 1 | Chatbot find answers base off from hardcoded intents with questions and answers. However, the chatbot will interpret similar questions and find patterns to identify the right answers. |
| 2 | When the Chatbot is supplied by user uploaded course materials, it will use pre-trained BERT (Bidirectional Encoder Representations from Transformers) algorithm to find answers. |
| 3 | When the Chatbot cannot find an answer or not confident enough with an answer found using the BERT method, it should inform that to the users instead of ignoring or picking a random answer from the database. |
| 4 | Unanswered questions will be saved and send to a professor if the student accepts it. |
| 5. | At some point, the Chatbot will train itself based on how correct the answer is. Answers marked to be incorrect will be less likely to be used again. |
|  |  |

1. APPENDIX C – CHANGE REQUEST FORM

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date Requested: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Description of Proposed Change:

Reason for change:

Comments: