GUHOO
TECHNOLOGIES

ABE (Artificial intelligence Benefits Explorer):
Using Artificial Intelligence to assist people in need

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I. Introduction

A. Document Purpose/Overview

1. The purpose of this document is to describe the software build process and specifics/requirements of ABE, an online system that helps American people by matching their profiles with benefits, support programs, and services provided by local, state, and federal governments, as well as charities and organizations in the United States. ABE will be a new innovation that integrates AL/LLM (large language model) platforms such as OpenAI's GPT-3.5/4. The ABE team, which consists of 3 high school students, will build the system during Q3 and early Q4 of 2023. This document describes the scope, objectives, and goals of the new system. In addition to describing non-functional requirements, this document models the functional requirements with user cases, interaction diagrams, context diagrams, and class models. This document is intended to direct the design and implementation of the target system in an object-oriented language, integrating Open AI and cloud computing.

B. Project Summary

1. Date: 2023 July - November
2. Project Name: ABE (Artificial intelligence Benefits Explorer)
3. Project Manager & Lead Developer: Chiming Wang
4. Developers: Chiming Wang, Erin Yalin Cai, Frankie Chong
5. Project Analysts: Chiming Wang, Erin Yalin Cai, Frankie Chong

C. Background

1. The United States Government, various nonprofit organizations, and charities provide many assistance, benefits programs, and services to American people in need. However, needy people face challenges in finding available benefits information. Some reasons for this include but are not limited to:

   a) Information about available benefits programs is scattered throughout various websites all over the internet, which is difficult to browse through.

   b) Information from private charities and nonprofit organizations is usually listed at the bottom of search results and is hard to find.

   c) Many search results can include unique requirements that the user may not satisfy.

   d) Information and sources about benefits and services are not intuitive or clear to understand for many users.

2. ABE, Artificial intelligence Benefits Explorer, aims to be a tool to assist users in finding benefit information that matches their needs and profiles.
3. Artificial Intelligence (AI) and Large Language Model (LLM) technologies have been around for a long time. AI can enhance our lives by personalizing research and providing the right information at the right time. However, utilizing AI/LLM technologies remains complicated and technical. Artificial intelligence Benefits Explorer, or ABE, aims to provide an intelligent solution so that anyone can take advantage of the power of AI/LLM technologies.

D. Project Scope

1. The scope of this project is to develop a web-based tool, ABE (Artificial intelligence Benefits Explorer), that uses AI and LLMs to intelligently explore social benefit information for the user, and match the information with his or her individual profile. This is a new system that will require the use of cloud services (Amazon AWS) for hosting the web server, as well as other services such as Botpress to host the AI chatbot and chat flows. User information will be stored on the cloud but will be instantly deleted if the user closes the browser tab/window. Multi-language support may be added later.
2. The internal details of these purchased services are not part of this project. Issues of website security, other than password protection within the site, are not part of this project. Phone/email alerts are not part of this project but may be added in the future.

E. System Purpose

1. Users
   a) Users who can benefit from ABE are American people who are in need of social benefits programs. This includes but is not limited to:
      (1) Unemployed or underemployed users who are in need of extra income
      (2) Military veterans who going through financial difficulties
      (3) Single mothers, elderly people, retirees, and disabled users
      (4) Immigrants who are in need of financial assistance
2. Location
   a) This web app will be available on the internet, at www.guhoo.com/abe or abe.guhoo.com.
3. Responsibilities
   a) The primary responsibilities of the new system are to:

          (1) Provide users with a text box and reliable input methods to input information and specify their needs

          (2) Provide users with the most up-to-date and accurate information from the web and databases

          (3) Allow users to customize their requests and personal information, and provide outputs based on this information

      b) Other desired features of this system include, but are not limited to:

          (1) A modern look and feel throughout the website

          (2) Navigation links to the original website(s) where information was referenced from

    4. The core of the project: ABE will be developed to integrate the latest AI/LLM technologies to fulfill the needs/requests of users who search for social benefits.

F. Functional Objectives

    1. High Priority Objectives

      a) This system shall:

          (1) Allow users to input their requests in keywords, phrases, or multiple-choice options/checkboxes

          (2) Process user requests by applying ChatGPT/AI/LLM functionalities

          (3) Return descriptive and accurate information based on user requests

    2. Medium Priority Objectives

      a) This system shall:

          (1) Process complete sentences

          (2) Allow special characters

    3. Low Priority Objectives

      a) This system shall:

          (1) Have a modern look and feel to make it easier for the users to navigate and use the tool.

G. Non-functional Objectives

    1. Reliability

      a) This system shall:

          (1) Be completely operational at least 99% of the time.

          (2) Have a maximum downtime of 15 minutes after a failure.

    2. Usability

        a) A user who already is an internet user shall be able to use the website in 6 seconds.

        b) The number of web pages navigated to access the fulfillment page should not exceed 3.

3. Performance

        a) The system shall be able to support 10,000 simultaneous users.

        b) The mean time to view a web page for US-based users shall not exceed 6 seconds.

        c) The mean time to display fulfillment information should not exceed 10 seconds.

4. Security

        a) The web app shall not keep any user data, or give it to any third-party groups. If the web app keeps user data, it will do so with the user's explicit consent.

5. Supportability

        a) The system shall be able to accommodate and implement the latest available OpenAI GPT LLM models.

        b) The system shall be viewable and usable from most internet connections and web browsers, including (but not limited to) Google Chrome, Firefox, and Microsoft Edge.

6. Online User FAQ

        a) The system shall provide a tutorial page and FAQ web page that explains how to navigate the web app/GUI.

            (1) A customer support chatbot can also be developed to help users answer questions about ABE (not part of the ABE project, but related to it)

        b) The FAQ/tutorial page shall be easily accessible.

7. Components that must be purchased

        a) Botpress Bot Building API (GPT)

        b) Amazon AWS cloud services

8. Interfaces

        a) The system must interface with:

            (1) The most advanced ChatGPT/OpenAI LLMs

            (2) Amazon AWS cloud services (EC2 instances)

H. The Context Model

1. Context Goals - The goal of the system is to process users' search requests and return accurate information by:

a) Allowing user information and user requests to be captured and stored directly on the cloud
b) Providing users with the most accurate and up-to-date benefits information from online resources.

2. Context Chart
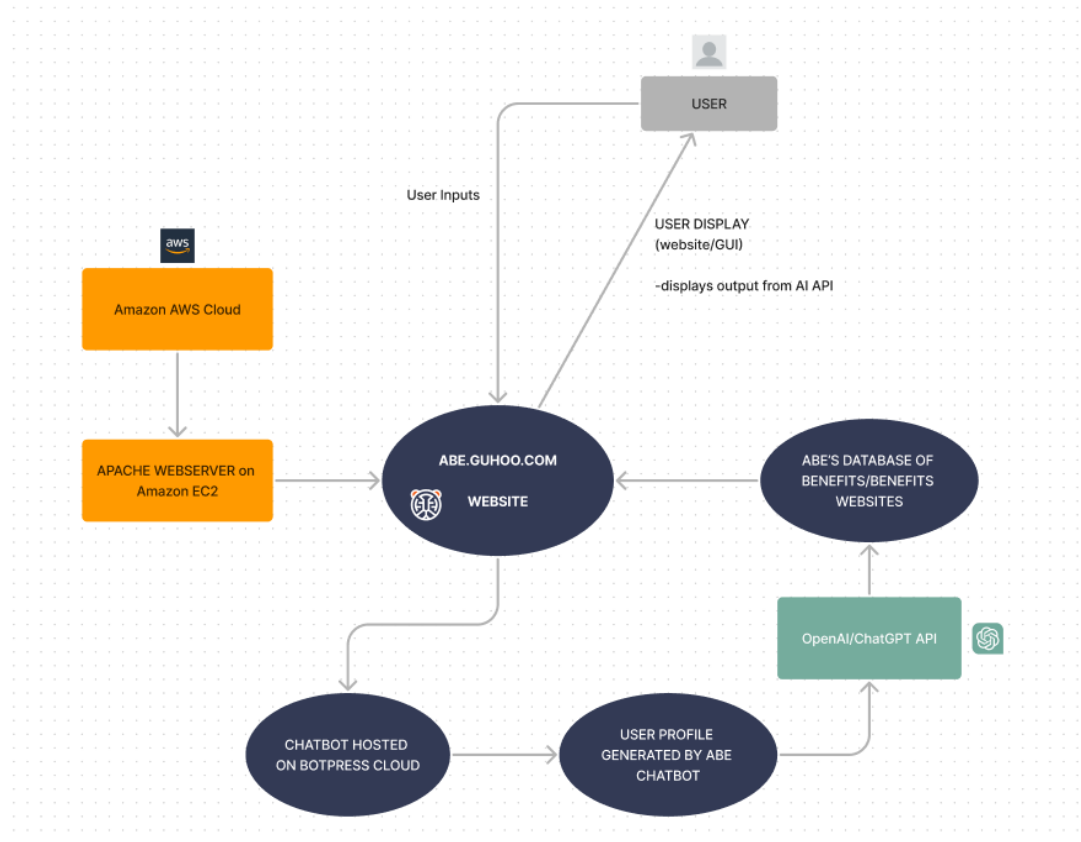
3. System Externals - These are vital components that are outside the system
   a) User: A user is any person who uses ABE to search for benefits information
   b) Benefit: Social and financial benefits programs, such as those provided by governments, NGO and other charities
   c) Fulfillment: Benefits and suggestions that fulfill the users' requests.
   d) OpenAI/ChatGPT LLMs: AI models that provide AI/LLM processing/responses
   e) Profile: The description of the user, which the AI chatbot generates based on data that the user inputs. This includes information including, but not limited to, age, citizenship status, location (state/territory),

4. User Interfaces
   a) The web app shall be able to be accessed from any computing device with access to the internet. This includes any computing device running browsers such as (but not limited to) Google Chrome, Firefox, and Microsoft Edge.
5. Hardware Interfaces
   a) The web app shall be able to be accessed from computing devices including (but not limited to) modern smartphones, desktops, laptops, tablets, and other computing devices with internet connections and web browsers.
6. Software Interfaces
   a) Frontend software/services: HTML and an embedded application
   b) Backend software/services: Amazon AWS Cloud (EC2 instance), Botpress (JavaScript), other databases
7. External Interfaces
   a) ABE uses APIs to communicate with external services. The following APIs are used: Botpress APIp and OpenAI API.

I. **System Requirement Analysis - The system/project's technical requirements that must be satisfied/developed**
   1. Web-based Application (Software Requirement/SR)
      a) Description: The application shall be a web app that can be run on a browser website/webpage.
      b) Resource(s): Botpress will be used to build the AI chatbot and chat flows.
      c) Costs: $TBD + the development time required to implement the web app
   2. Minimal Browser Access (SR)
      a) Description: The app shall not require access to storage, cookies, or any other browser-related functionalities.
      b) Resource(s): Design the app in a way that does not rely on browser storage or cookies.
      c) Costs: None.
   3. Integration with Botpress & OpenAI API
      a) Description: The app shall seamlessly integrate with the ChatGPT API to generate responses.
      b) Resource(s): Utilize OpenAI API for generating responses, as well as Botpress Cloud API

  c) Costs: TBD. Possible service fees associated with using OpenAI API & Botpress API

4. No Database Requirement
  a) Description: The app shall not require any databases for its functioning.
  b) Resource(s): Develop the app without the need for database integration.
  c) Costs: None.

5. Responsive design
  a) Description: The app shall be designed to be responsive and accessible across various devices and screen sizes.
  b) Resource(s): Responsive design frameworks or custom CSS will be utilized.
  c) Costs: TBD. Development/testing time is required to ensure responsiveness.

6. Compatibility with multiple browsers
  a) Description: The app shall be compatible with popular web browsers such as (but not limited to) Chrome, Firefox, Safari, and Edge, ensuring consistent functionality and appearance across all browsers and devices.
  b) Resource(s): Compatibility testing and browser-specific code adjustments may be required.
  c) Costs: $TBD (close to zero). Time required for compatibility testing and development adjustments.

7. Scalability
  a) Description: The app shall be designed to handle increased user traffic and scale as the user base grows.
  b) Resource(s): AWS EC2 can be utilized (already done)
  c) Costs: TBD. Potential costs associated with scaling infrastructure.

8. Privacy and data security
  a) Description: The app shall prioritize privacy and data security, ensuring that user conversations and personal information are protected and not stored
  b) Resource(s): Don't store any conversation data. ChatGPT/OpenAI Privacy Policy should be displayed on the page
  c) Costs: $Close to zero

9. Non-Monetization
  a) Description: The app shall not be monetized

b) Resource(s): Ensure the app does not incorporate any monetization elements.
c) Costs: None.

J. User Requirement Analysis - This section contains user requirements that must be satisfied/developed. This section can also serve for User Acceptance Testing.

1. Simple User Interface
   a) Description: The app's user interface shall be simple, featuring three text boxes and buttons for user interaction.
   b) Resource(s): Utilize HTML, CSS, and ReactJS components to design the user interface.
   c) Costs: None.

2. Clear User Instructions
   a) Description: The app shall have clear and easily understandable instructions to guide users in utilizing its features.
   b) Resource(s): Incorporate user instructions within the app's interface.
   c) Costs: None.

3. ChatGPT/Botpress Response Display
   a) Description: The app shall display ChatGPT/Botpress responses & outputs in a simple textbox at the bottom left of the interface.
   b) Resource(s): Integrate the response display feature within the app's user interface.
   c) Costs: None.

4. User Feedback
   a) Description: The app shall provide users with the ability to provide feedback via email, or an embedded Google form.
   b) Resource(s): Include an email feedback mechanism within the app. Incorporate an embedded Google Form within the app's website.
   c) Costs: None.

K. Optional System Requirement Analysis - This section contains the optional system technical requirements that may be developed in the future release.

1. Multiple Chat Themes
   a) Description: The app shall provide an option for users to change how the app looks: colors, theme, etc
   b) Resource(s): None
   c) Costs: None. Time to learn and develop.

2. Copy button

      a) Description: The app shall provide an option for users to copy the outputs from the app.

      b) Resource(s): None

      c) Costs: None. Time to learn and develop.

3. Conversation History Storage

      a) Description: The APP may implement cookies to store past conversations as an optional feature.

      b) Resource(s): Implement cookie functionality if desired for storing previous conversations.

      c) Costs: TBD. Development time and potential security considerations related to implementing cookies.

4. Clear conversation history

      a) Description: The app shall provide an option for users to clear their conversation history if desired.

      b) Resource(s): UI components and data management functionality can be developed.

      c) Costs: TBD. Development time is required for implementing the conversation history-clearing feature.

5. Dyslexic Font Option

      a) Description: The app shall include a dyslexic font option to cater to users with dyslexia.

      b) Resource(s): Provide a dyslexic font choice within the app's user interface.

      c) Costs: None.

6. Multi-language support

      a) Description: The app shall include a way for users to select a language other than English

      b) Resource(s): Change the Bot settings/chat flow to switch languages

      c) Costs: Development time. $None