Introduction to Artificial Intelligence - C951

Part 1

A: Explain the functionalities of the chatbot and how they will meet the needs described in the scenario.

The chatbot engages in a conversation with the students, asking questions to understand their interests, strengths, and goals. For example, the chatbot might ask, “What part of the computer science discipline do you enjoy the most?” and based on the student's response, the chatbot will recommend the best career paths. This functionality allows the bot to simulate a one-on-one interaction that would typically be done by a career counselor meeting.

If a student expresses an interest in problem-solving, the chatbot might suggest roles such as a Software Engineer or Data Scientist if the student enjoys working with statistical analysis. The chatbot can recommend at least five distinct job roles that require a computer science degree, tailored to the student’s interests and responses.

The chatbot is available 24/7 and can take requests from many inquiries simultaneously, allowing one career advisor to adequately handle several students. This automation enables career advisors to focus on other or more complex tasks while the chatbot provides career guidance to common career-related questions. The chatbot can be scaled to accommodate an increasing number of students as the university’s enrollment increases.

B: Identify**five** computing job types that your chatbot can recommend based on student interaction with the chatbot.

Software Engineering (SWE) – The chatbot may recommend software engineering if the conversation with the student suggests that he or she is proficient or interested in coding, software design, or algorithmic thinking. Students who enjoy these things will be equipped with problem-solving skills, that allow them to design, build, and maintain complex computing applications.

Software Engineer in Test: The chatbot ay recommend a Software Engineer in Test role if the conversation with the student suggests that he or she enjoys doing manual testing, automated testing, coding, and quality assurance. Students who enjoy working with code to ensure that it meets or exceeds software quality standards and building testing tools to validate those standards will enjoy this role.

Data Science – The chatbot may recommend data science if the conversation with the student suggests that he or she enjoys data analysis, statistical modeling, or machine learning. Students who enjoy working with large datasets and exploring or computing insights from said datasets will see Data Science to build predictive models or find data-driven solutions for business needs.

Cybersecurity Specialist - The chatbot may recommend a Cybersecurity Specialist role if the conversation with the student suggests that he or she enjoys working with security protocols and preventing cyber threats. Students who enjoy these activities will need to know about system security, cryptography, and threat detection.

DevOps Engineer – The chatbot may recommend a DevOps Engineer role if the conversation with the student suggests that he or she enjoys working with system operations, cloud infrastructure or automation tools. Students who enjoy these activities will be interested in software development and IT roles as they work on the deployment pipeline to ensure proper and streamlined software releases to customers and end users.

C.  Provide the generated chatbot code files to support the**five** identified job types from part B.

Jobs.aiml

<?xml version="1.0" encoding="UTF-8"?>

<aiml version="2.0">

<category>

<pattern>WHAT JOBS CAN I APPLY FOR</pattern>

<template>You can apply for the following jobs: Software Engineer (SWE), Data Scientist, Cybersecurity Specialist, Software Engineer in Test, and DevOps Engineer. Do you like problem solving, working with data, security, testing software, or working with cloud infrastructure?</template>

</category>

<category>

<pattern>I LIKE PROBLEM SOLVING</pattern>

<template>If you enjoy problem-solving, you might be interested in becoming a Software Engineer (SWE) or a Software Engineer in Test.</template>

</category>

<category>

<pattern>I LIKE WORKING WITH DATA</pattern>

<template>If you enjoy working with data, you should consider a career as a Data Scientist.</template>

</category>

<category>

<pattern>I AM INTERESTED IN SECURITY</pattern>

<template>For those interested in security and protecting systems from threats, a Cybersecurity Specialist role might be a good fit.</template>

</category>

<category>

<pattern>I ENJOY TESTING SOFTWARE</pattern>

<template>If you enjoy testing software and ensuring quality, a Software Engineer in Test role may suit you well.</template>

</category>

<category>

<pattern>I LIKE WORKING WITH CLOUD INFRASTRUCTURE</pattern>

<template>If you are interested in system operations and cloud infrastructure, a DevOps Engineer role might be a great fit.</template>

</category>

</aiml>

Udc.aiml

<?xml version="1.0" encoding="UTF-8"?>

<aiml>

<category>

<pattern>\*</pattern>

<template>I have no answer for that.</template>

</category>

</aiml>

D.  Explain how the chatbot training cases were selected and how you used artificial intelligence markup language (AIML) to enhance the functionality of the chatbot. Provide examples of the chatbot’s functionality that represent the selected cases at the end of the training process in support of your explanation.

The chatbot training cases were selected based on common queries that students may have about their career options. Students often inquire about “What jobs can I apply for?” to have a better understanding about the career paths for computer science degree students. Also, students often ask about AIML categories which were designed to capture specific preferences, such as 'problem solving' or 'working with data,' which directly influence the job recommendations. AIML allows the chatbot to recognize these patterns in student input and respond with personalized advice based on the predefined categories created.

E.  Create an installation manual for the chatbot that includes the web link to access the live chatbot in the Pandorabot platform.

Installation Manual:

1. Download Grant Jung’s bot files
2. Sign up for a Pandorabots free account
3. Create a new bot by clicking the “+” sign on the left hand side next to ‘MY BOTS’
4. Upload Grant Jung’s bot ‘Counselor: expura’,
5. Run the bot

F.  Assess the strengths and weaknesses of the chatbot development environment and explain how they supported or impeded the construction of the chatbot.

A strength of the Pandorabots platform is its ease of use, particularly in its user-friendly framework for creating rule-based interactions and different categories with AIML. The design process is quite simple and informative for people new and learning to develop AI tools. The platform's interface makes it simple to upload files from others and manage your current AIML files that you are designing.

A weakness of Pandorabots is its limitation in that AIML relies on predefined patterns, categories, and responses and lacks the flexibility to handle more complex natural language patterns, which could limit the chatbot's conversational depth for students. However, I believe that this platform is a great starting point for developers to quickly learn the basics.

G.  Explain how the chatbot will be monitored and maintained to improve the final user experience.

Regular scheduled monitoring and maintenance are important to ensure the chatbot provides the best user experience and remains up to date. The engineer can review interaction logs to help identify patterns where the chatbot may not be responding effectively, allowing for updates to AIML categories or patterns to improve its accuracy in handling future student inquiries. As the job market evolves, the chatbot will be updated with new roles in tech fields, such as AI engineering or blockchain development, ensuring its recommendations are up to date. Tracking performance metrics, such as response time and engagement by users will help maintain the chatbot’s efficiency, while student feedback through surveys can inform improvements to the conversation interactions and job recommendations. By consistently maintaining and monitoring the chatbot, it will continue to offer valuable career advice to students, adapting to their needs over time, similar to that of a college career counselor.

H.  Provide a Panopto video recording that includes a verbal summary of the capabilities of your chatbot and an example of human interaction with the chatbot in which it provides meaningful career advice.

See ‘Intro to Artificial Intelligence NIP2 | C951 (student creators) [assignments]’ folder.