

Project Number: 18

Project Title: AI chatbot for future energy workforce development

Project Clients: Dr. Hua Chai

Project specializations: Software Development;Web Application Development;Computer Science and Algorithms;Artificial Intelligence (Machine/Deep Learning, NLP);Big data Analytics and Visualization;Human Computer Interaction (HCI);

Number of groups: 5 groups

Main contact: Dr. Hua Chai

Background:

Achieving net-zero goals requires expanding the clean energy workforce. However, a major challenge is the lack of accessible and accurate information about pathways into clean energy roles. This project aims to develop an AI-driven chatbot that supports a broad spectrum of users (e.g., K–12 students, prospective and current university students, sector shifters, returning or retired workforce, to experienced professionals), who want to learn about and engage in clean energy careers. The chatbot will offer tailored recommendations on education programs (including degree pathways at UNSW), career options, and upskilling/reskilling opportunities. For instance, younger audiences might access simplified, real-world STEM applications, while current or prospective university students can explore relevant degree programs, and experienced professionals can receive advanced career guidance.

Requirements and Scope:

- Develop an AI chatbot capable of understanding diverse user needs and backgrounds, with structured conversation flows that adapt to each user’s context.
- Provide personalized career and education guidance across different life stages by offering tailored STEM insights, academic recommendations, reskilling pathways, and upskilling opportunities for individuals transitioning into or advancing within the clean energy sector.
- Implement or prototype automated real-time data scraping to keep job postings and industry demand insights up to date (e.g., job boards, industry sources).
- Create an intuitive, web-based chatbot interface to be delivered within the project timeline.
- Lay the foundation for continuous improvement through usage analytics and easy expansion to new user groups or institutions.

Required Knowledge and skills:

- Implement or integrate NLP frameworks (e.g., Rasa, GPT-based models) to handle varied user queries with context-awareness.
- Structured Database: Develop a robust data model for university programs, career pathways, job postings, and user profiles.
- Automated Data Gathering: Explore web scraping or API-based solutions to fetch live job postings, ensuring timely and relevant career guidance.
- Front-End: Build a responsive UI/UX that accommodates multiple user demographics.
- Back-End: Establish secure, scalable, and well-documented server-side functionalities and APIs.
- Ensure the system can handle concurrent requests while safeguarding user data and maintaining system integrity.
- Provide accurate, unbiased responses and uphold strong data privacy practices.

Expected outcomes/deliverables:

- A functional AI Chatbot (Web-Based) that offers tailored interactions for identified user segments.
- A well-structured, version-controlled codebase (GitHub, GitLab, etc.)
- Documentation including technical documentation and user & maintenance guides
- Project Report & Presentation: An overview of the design process, technical approaches, outcomes, and potential for future improvements.