Overview:

This assignment is designed to develop your theoretical and practical competencies in chatbot design and development using the Rasa platform. It will guide you through the comprehensive process of designing, prototyping, and deploying a sophisticated chatbot aimed at enhancing customer interactions within an online retail environment. You will engage in thorough research, apply advanced conversational UI design principles, leverage AI and NLP techniques, and ensure robust testing and deployment practices.

Learning Outcomes:

LO1. Innovate conversational UI design, integrate cutting-edge interaction design principles, and demonstrate the ability to create chatbots that adapt to evolving user needs.

LO2. Conduct in-depth research on the latest trends in conversational UI design, critically analyse the impact of AI, NLP, as well as user experience principles, and identify opportunities for improvement in chatbot design and development.

LO3. Demonstrate professional expertise in UI design and chatbot development through the creation of context-aware, user-centric chatbots and effective communication of design rationale and outcomes to stakeholders.

Assessment Criteria: Weighting 100%

Assignment Goals:

- **Objective:** Develop a sophisticated chatbot designed specifically for enhancing customer interaction within an online retail environment.
- **Scope:** The chatbot will handle customer inquiries, manage complaints, assist with orders, and recommend products based on user interactions.
- **Intended Outcomes:** Improved customer satisfaction, efficient management of interactions, reduction in customer service workload.

Assignment Tasks:

2. Conducting In-Depth Research

- Conduct comprehensive research on the latest trends in conversational UI design, critically analysing the impacts of AI and NLP technologies, as well as user experience (UX) principles.
- Identify current gaps and opportunities for innovation and improvement in chatbot design and development.
- Document findings clearly, providing evidence from peer-reviewed journals to support analysis.

3. Analysis of Functional and Non-Functional Requirements

- **Functional Requirements:**
  - Customer inquiries and complaints management
  - Order tracking and updates
  - Product recommendations based on user preferences

    - Seamless escalation to human agents
- **Non-Functional Requirements:**
    - **Performance:** Real-time response (under 2 seconds per query)
    - **Usability:** Intuitive interaction, minimizing user learning curve
    - **Ethical Considerations:** Transparent handling of user data, ethical use of AI recommendations

4. Creation of Chatbot Prototype and User Interaction

- **Prototype:** Design a conversation flow prototype clearly illustrating dialogue paths and decision branches.
- **User Interface Elements:** Utilize advanced UI elements such as quick replies, buttons, rich media cards, and seamless human-agent transition indicators.
- **Integration Points:** Prototype should clearly show integrations with external databases (product databases, order management systems).
- **Flowcharts:** Provide clear conversation flowcharts for the chatbot UI interactions.

5. Programming Work, AI, and NLP Techniques

- **Technical Implementation:**
    - Rasa Open Source for dialogue management and natural language understanding (NLU)
    - **Front-end:** ReactJS or similar advanced UI frameworks for custom interface design
    - API integrations for data retrieval and system interactions
- **AI and NLP Integration:**
    - Intent classification, entity extraction, dialogue state management
    - Use of Transformer-based models for NLU enhancements

6. Testing

- **Rasa NLU Tests:**
    - Use the built-in command ***rasa test nlu*** to evaluate how accurately the model recognizes intents and entities.
    - User satisfaction measured via usability testing and feedback surveys
    - Inspect whether the system correctly identifies entities (e.g., names, dates, product IDs).

- **Conversation Flow Tests**
    - Run ***rasa test core*** to validate how the system transitions between dialogue states based on user input.

- **Stories and Rules**

    - Ensure the chatbot follows defined stories and rules without unexpected deviations.
    - Verify that it handles edge cases (e.g., unknown or out-of-scope queries).

7. Deployment

- **Deployment Process:**
    - Select a cloud platform (AWS, Azure, or Google Cloud Platform) and justify your

choice.
    - The most cost-effective approach is to deploy your chatbot using free-tier services like Heroku Free Dynos, GCP Free Tier, or AWS Free Tier

8. Grading Criteria:

- Project Goals & Requirements Clarity (15%)
- Research and Trend Analysis Depth (15%)
- Prototype Design & Interaction Quality (20%)
- Technical Implementation & NLP Integration (20%)
- Testing Robustness (15%)
- Deployment and Documentation (15%)

Submission Guidelines

Prepare a comprehensive report showcasing your chatbot design, implementation, and evaluation:

- Include screenshots or embedded visuals illustrating conversation flows, UI designs, model architecture, training progress, and evaluation metrics.
- Ensure all code is well-commented with clear replication instructions.
- Your report must be clear, organized, and visually appealing, using the BSBI assignment template available on Canvas.
- Upload your submission as a single file (PDF or DOC) on the BSBI portal.
- Python scripts or Jupyter notebooks should be uploaded to a repository platform (e.g., GitHub) with a shared link included.
- Cite all sources using the Harvard Referencing System.
- Submit your assignment electronically by the specified deadline.