COMP5423 Natural Language Processing Project

StoryWeaver: AI-Powered Text Adventure Game with Dynamic Plot Generation

Motivation.

This group project is designed to consolidate students' understanding and practical expertise in natural language processing. Students will gain extensive experience analyzing text data, designing language generation models, and building interactive systems through state-of-the-art NLP approaches. The collaborative nature of the project cultivates leadership abilities, effective teamwork, and professional communication skills through the delivery of high-quality technical outputs. By bridging theoretical NLP foundations with real-world interactive application scenarios, this project equips students with both the technical capabilities and professional competencies essential for success in NLP and AI development. Thus, it aligns with the Intended Learning Outcomes of COMP5423.

Task Specification.

In this project, students will team up to develop StoryWeaver, an AI-powered text adventure game that automatically generates dynamic plot content based on players' in-game choices. The system will leverage NLP techniques to understand player input, maintain narrative consistency, and produce contextually coherent story branches, creating an immersive and personalized gaming experience.

The system development will cover core NLP tasks, such as user intent recognition, context-aware text generation, plot consistency maintenance, and dialogue management. For example, when a player selects options like "negotiate with the village elder" or "explore the forbidden cave", the system will generate corresponding story segments that align with the game's overall setting and previous plot developments. The focus will be on building a responsive and engaging narrative system that adapts to diverse player choices.

To successfully complete the project, each group will go through the following key steps, using the knowledge and techniques learned in class and beyond:

- **Data preparation:** Collect and organize relevant datasets for training and testing NLP generation models, including text adventure game scripts, branching narrative corpora, dialogue datasets, and plot consistency annotation samples. Preprocess the data by cleaning text noise, segmenting plot units, and labeling narrative logic to ensure consistency and quality.
- **Algorithm design:** Explore state-of-the-art natural language processing approaches including context-aware text generation, user intent recognition, plot consistency detection, and dialogue management. Implement efficient real-time generation pipelines and design effective plot branching strategies. Integrate multiple NLP models to provide coherent and personalized narrative outputs.
- **System implementation:** Develop the interactive text adventure game system using frameworks such as Hugging Face Transformers, PyTorch, and Gradio. Create a user-friendly interface that processes player input choices and outputs dynamically generated plot content with smooth logical connections.

- **Performance evaluation:** Assess the system's narrative quality, interaction responsiveness, and user experience for text adventure game players. Measure plot coherence scores, generation response times, player choice matching accuracy, and the satisfaction of immersive gaming experience, and so on.

Important Dates.

There are two important demonstrations that students need to prepare:

1. **In-Class Presentation with a Live Demonstration (18:30 to 21:20 April 8, 2026)**:
   (1) Each group will give a **8-minute** presentation during the April 8, 2026 class. The presentation should showcase the task settings, challenges, methodologies, and their developed visual assistance system's functionality, features, and effectiveness. During the presentation, students will conduct a live demonstration, showcasing the system's capability to assist in real-world scenarios.
   (2) **The PPT should be submitted to Blackboard before demonstration** and the submission entry is: *Assessments/Group Project PPT*. The TA will download the files beforehand.
2. **Project Report Submission (by 23:59 on April 26, 2026, Sunday)**:
   (1) **Project Report (page limit: up to 15 pages):** Alongside the class presentation, each group should submit a comprehensive project report. The report should document the task setting, background, system development process, challenges, methodologies, outcomes, and evaluation results. Additionally, **the group members' roles and contributions made by each group member** (including names and student IDs of all team members) should be delineated. This report shall be limited to 8 A4 portrait pages with a single column, with unlimited space for APA-formatted references and a maximum of 2 pages for figures and tables (students are encouraged to include figures and tables to make the content more visually appealing and easy to understand), and no specific formatting requirements apply to them; a table of contents and cover page are not required. The main text must follow the following formatting rules: Times New Roman in 12 point, 2.5 cm margins on all sides, and single-line spacing.
   (2) **Group Information:** https://docs.google.com/spreadsheets/d/1vkEmJXKz2WyVf254i1_AEgLkMDc8SHc6x_Jba_Ww13A/edit?usp=sharing
   (3) **Submission Rule:** Please submit our final project report (PDF file) to Blackboard. Please name the file with your Group ID, such as "Group10.pdf". The final PDF file should be submitted to Blackboard and the submission entry is: *Assessments/Group Project Report*. Please keep the size of the uploaded file as small as possible (less than 40 MB). Take note that only one team member needs to upload the final file to the blackboard. Don't forget to double-check if the submission is saved successfully before leaving. Multiple submissions are allowed, and we will only mark the last submission.

Assessment Rubrics.

The project will take 15% of the final grade with the assessment rubrics as follows. The rubric assesses the project based on the given criteria, with a scale of 3% to 1%, where 3%

represents the highest level of achievement and 1% represents the lowest. The descriptions provided in the rubric can be tailored to the project's specific requirements.

1. **Appropriateness (3%)**:
   - Task settings, challenges, methodologies, and system functionality are highly appropriate and relevant. (3%)
   - Task settings, challenges, methodologies, and system functionality are mostly appropriate and relevant. (2.5%)
   - Task settings, challenges, methodologies, and system functionality demonstrate some level of appropriateness. (2%)
   - Task settings, challenges, methodologies, and system functionality are inadequate. (1.5%)
   - Task settings, challenges, methodologies, and system functionality are inappropriate. (1%)
2. **Soundness (3%):**
   - The project demonstrates a comprehensive and well-organized development process with clear and logical explanations. (3%)
   - The project demonstrates a mostly comprehensive and well-organized development process with mostly clear and logical explanations. (2.5%)
   - The project demonstrates some level of organization and logic in the development process, but with some unclear explanations. (2%)
   - The project demonstrates limited organization and logic in the development process and provides inadequate explanations. (1.5%)
   - The project is disorganized and lacks a clear or logical development process with unclear or illogical explanations. (1%)
3. **Excitement (3%):**
   - The project presents innovative and engaging ideas that consistently capture the attention of the audience. (3%)
   - The project presents engaging ideas that mostly capture the attention of the audience, but may lack consistency. (2.5%)
   - The project presents some level of engagement, but with areas of improvement and inconsistent audience attention. (2%)
   - The project lacks innovation and fails to capture the audience's excitement consistently. (1.5%)
   - The project lacks excitement or fails to engage the audience. (1%)
4. **Presentation (3%):**
   - The presentation is highly polished and professional, with excellent delivery and effective use of visual aids. (3%)
   - The presentation is mostly polished and professional, with good delivery and adequate use of visual aids. (2.5%)
   - The presentation has some areas of improvement in polish and professionalism, and delivery may lack consistency. (2%)
   - The presentation lacks polish and professionalism, and delivery is weak. Visual aids are ineffective. (1.5%)
   - The presentation is poorly executed, making it difficult to follow, with ineffective use of visual aids. (1%)
5. **Writing (3%):**
   - The project report is well-written, with clear and concise explanations of ideas and proper use of grammar and formatting. (3%)

- The project report is mostly well-written, with mostly clear and concise explanations of ideas and mostly proper use of grammar and formatting. (2.5%)
- The project report is adequately written, with some clarity issues and inconsistent use of grammar and formatting. (2%)
- The project report is poorly written, with unclear or confusing explanations and significant errors in grammar and formatting. (1.5%)
- The project report is very poorly written, with numerous clarity and formatting errors, making it difficult to understand. (1%)

Assessment Rubrics.

You are welcome to send any questions regarding the group project to the teaching assistant, Ms. WANG Bingbing (bing-bing.wang@connect.polyu.hk). It is strongly recommended that your email subject line begins with "COMP5423+Group Project+Group id" (for example, "COMP5423+Group Project+Group5"). If you do not receive a reply within 48 hours, please forward your query to the course instructor.