COMSM0127: Immersive Interaction and Audio Design

Lab 8: Intelligent Virtual Assistant

The objective of these labs is to make you aware of current communication technologies for interacting with both people and AI. The labs consist of two parts: i) we will guide you on implementing text-based Intelligent Virtual Assistants (IVA) that can be further used with avatars to create more realistic interactions, ii) we will provide an example of how to use this IVA tool to generate code in Unity. This example will give you a better understanding of how to utilise the IVA for advanced applications. However, please note that the model is primarily designed for language formatting, and not for generating code directly. As a result, you may encounter some errors that require you to review and adjust the generated code.

Guided Instruction

Task 1: Chatbot

Here we develop text-based IVA using ChatGPT, which is a large language model (LLM) developed by OpenAI. Specifically, we will be utilising ChatGPT to request access through its API and to answer questions.

1. Create an OpenAI account (Link) if you don't have one.
2. Adapting from the model provided by Dilmer, we provide you with the modified source code to be download from HERE).
3. Open the downloaded project in Unity Hub (ignore Safemode).
4. Delete the default 'Untitled' Scene and drag `Assets > Scenes > ChatGPT` to the Hierarchy.
5. Open the script from `Assets > Scripts > ChatGPT > ChatGTPSettings.cs`, add strings for **apiModel** and **apiOrganization**.
6. **Complete the ChatGPTResponse.cs script.** You should try to write a **ChatGPTResponse.cs** script yourself according to the response from (ChatGPT API reference) to deserialize the JSON data into C# objects.

   Hint: Ask ChatGPT to write a ChatGPTResponse script by providing the response of API reference. A C# representation based on this JSON object (Copy the Response code on the page) including JSON property attribute names.

7. **Check the ChatGPTRequest.cs script.** Check the propertyName of JsonProperty includes the "model" and "messages". And make sure that the object of ChatGPTMessage connects to the `ChatGPTResponse > ChatGPTMessage`. This will ensure that we can communicate with ChatGPT.
8. **Complete the ChatGPTClient script.**
   a) Remove the prompt line and add the script as follow. This will take a request which includes a model and an array of the messages.

   ```
   Model = chatGTPSettings.apiModel,
     Messages = new ChatGPTMessage[]
   {
       new ChatGPTMessage
       {
           Role = "user",
           Content = prompt
       }
   }
   ```

   b) Add the following two lines to 'SetRequestHeader' for authenticating against an OpenAI API using an API key and organization.

   ```
   request.SetRequestHeader("Authorization",
   $"Bearer chatGTPSettings.apiKey");
   request.SetRequestHeader("OpenAI-Organization",
   chatGTPSettings.apiOrganization);
   ```

9. Select the `ChatGPTClient` GameObject, add the `Assets > Settings > ChatGPT > ChatGTPSettings.asset` to Chat GPT Settings in the inspector.
10. Set the **Chat GPT Settings** for **ChatGPTClient**.
    a) **Open the OpennAI website to get the API key.** Generate a new API key by pressing the button `create new secret key`, and remember to copy the API keys (only appear once) to the `ChatGTPSettings > API key`.
    b) **Copy the Organization ID.** Click `Settings` on the left to find and copy the `Organization ID` to `ChatGTPSettings > API Organization`.
    c) Copy the Link `https://api.openai.com/v1/chat/completions` to `ChatGTPSettings > API URL`, and set the `ChatGTPSettings > API model` for `gpt-3.5-turbo`.
11. Select the `ChatGPTTester` GameObject (not the script), you can edit the prompt Prefix Constant, prompt and reminders for the request of ChatGPT.

    There are some example requests you can choose from the `Chat GPT Question` in the `ChatGPTTester`.

- why VR is the future?
- Speak to me "Hello World"

12. Now enter the play mode and try to talk with Chat GPT!

    Hint: You might want to add ‘In short’ or ‘Summarise’ as ChatGTP is quite wordy (expensive).

Task 2: AI Generator

Now we ask ChatGPT to generate Unity C# script and compile the generated code using Roslyn compiler in Play mode.

1. Open `Assets > Scripts > ChatGPTTester.cs`, and uncomment the last five lines (`Process And Compile Response`) for compiling the C# Code generated by the ChatGPT.

2. Select the GameObject `ChatGPTLogger > CompileButton`. In the `Button > On Click()`, Select the + button to add a new action.

3. Click and drag the GameObject `ChatGPTTester` from the Hierarchy onto the empty Object field to assign it.

4. Change the **No Function** to **ChatGPTTest.ProcessAndCompileResponse**

5. Select the `ChatGPTTester` GameObject(not the script), you can edit the prompt Prefix Constant, prompt and reminders for the request of ChatGPT.

   There are some example requests you can choose from the `Chat GPT Question` in the `ChatGPTTester`.

   - Print “Hello world"
   - Generate rotating cubes
   - Loads a PlayerArmature from Resources consistently every 1/2 second, get StarterAssetsInputs component, set the "move" field to a vector2 with 1.0f for x and 0 for y, then set the "jump" field to true

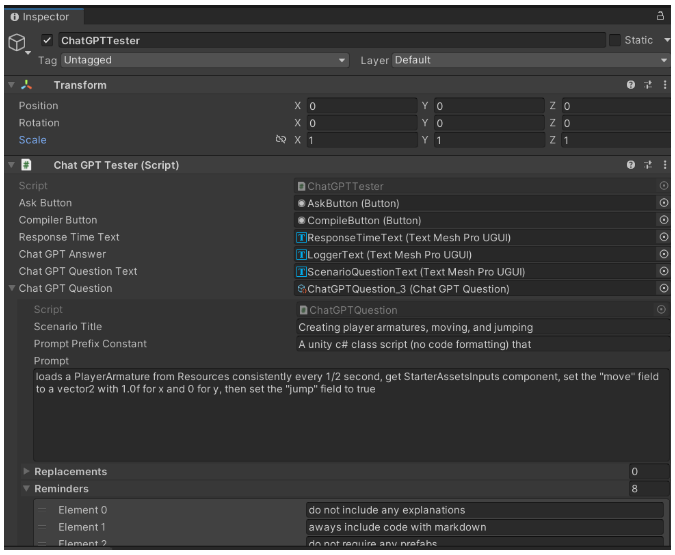
6. Now enter the Play mode ask ChatGPT to generate the code and compile the code.

Finally, try to integrate this Panel into your VR room.

Task 3 [Stretch Goal]: Voice Chat

This task we use Photon Voice 2 (Link to document) as example. Photon Voice 2 Photo Voice 2 (Link) is a real-time multiplayer voice communication using cloud-based system. Here is an example of implementing Photo Voice on Quest.
GitHub: Link
How to:

- Part 1: Link
- Part 2: Link
- Part 3: Link
- Part 4: Link



Inspector
ChatGPTTester
Static
Tag Untagged
Layer Default

Transform

	X	Y	Z
Position	0	0	0
Rotation	0	0	0
Scale	1	1	1

Chat GPT Tester (Script)

Script	ChatGPTTester
Ask Button	AskButton (Button)
Compiler Button	CompileButton (Button)
Response Time Text	ResponseTimeText (Text Mesh Pro UGUI)
Chat GPT Answer	LoggerText (Text Mesh Pro UGUI)
Chat GPT Question Text	ScenarioQuestionText (Text Mesh Pro UGUI)
Chat GPT Question	ChatGPTQuestion_3 (Chat GPT Question)
Script	ChatGPTQuestion
Scenario Title	Creating player armatures, moving, and jumping
Prompt Prefix Constant	A unity c# class script (no code formatting) that

Prompt
loads a PlayerArmature from Resources consistently every 1/2 second, get StarterAssetsInputs component, set the "move" field to a vector2 with 1.0f for x and 0 for y, then set the "jump" field to true

Replacements	0
Reminders	8
Element 0	do not include any explanations
Element 1	aways include code with markdown
Element 2	do not require any prefabs

Figure 1: *A request prompt on the script of Inspector*