

# AI-Powered Case Studies

*(Please note – since completion of this toolkit, Spirit AI's Character Engine has been retired. However, the techniques used could be applied to another AI system, such as Charisma & its underlying engine, [Expressionist](#) remains available).*

## Case Study 1 – Google Assistant

### Example: Sherlock Holmes Mysteries

#### Overview

[Sherlock Holmes Mysteries](#) (SHM) is a 'voiced story driven investigation game' for mobile and smart devices using Google Assistant. **Google Assistant acts as a platform to deliver the game, meaning the AI itself does not play a role or character in the story, but the player may speak, type or select 'chip' responses.** [SHM is based on the board game Sherlock Holmes Consulting Detective](#), in particular the user-created investigation Case of the Clay Pots.

The player may access a map, an inventory of clues and a newspaper. The map and clue inventory are dynamically updated as the player progresses, the newspaper is for reference only. Most locations feature an image and audio clip which describes the scene, although it is possible to view transcripts of these in the investigation log.

#### Strengths

- **Gameplay is non-linear and exploratory** retaining the feel of the source material.
- **Use of Google Assistant as a platform rather than an integrated component** makes for accessible play with various control options available.

#### Challenges

- Hints are often given repeatedly, even after the related clue has already been

obtained. This is in part inherited from the source material, but is magnified in a digital game with very broad objectives (e.g. find the killer, motives etc) and makes it **difficult to maintain a sense of progress in spatial, gameplay and narrative terms.** A more detailed investigation log could help with this.

- There's **little in the way of introduction** and those who are not adept Google Assistant users may struggle to even find help and hints. An initial tutorial scene, or help page with full command list could prove useful for beginner players.

#### Design Constraints

At time of experimentation, Google Assistant was not geared towards use as a writing tool (although there have been subsequent updates). **The primary focus of Google Actions is as a tool for commercial use**, e.g. to aid with selling goods or services in the absence of a human sales assistant. Therefore this was the key constraint around character design. As this was the first experiment undertaken, **employing [Google's Persona design walkthrough](#)** was used as the other main design constraint.

#### Experiment

**A short Google Assistant prototype was created.** Unfortunately Google do not make it possible to share work-in-progress projects made with Google Assistant.

#### Evaluation

The [design method](#) used to create Google Actions was a useful entry point for thinking about the **Persona** of the AI agent but was **geared towards encouraging limited single-word responses from users**, which made storytelling challenging.

## Case Study 2 – Spirit AI (menu-based, single character)

### Example: Restless

(For a more detailed analysis of *Restless*, see the toolkit Writing for AI, section 2.)

### Overview

The **AI handles all characters** in *Restless*, but is **deployed in two different ways**. The player-character, a ghost, uses the AI most directly, constructing highly contextual menu options on the fly. The **characterisation of a spirit struggling to communicate is used to help disguise grammatical errors and logic mismatches**. The other characters' dialogue is made up of larger pre-authored (but still context dependent) chunks, and therefore less prone to error.

### Strengths

- The **mixture of techniques allows both freedom of player choice and coherence of narrative**.
- **Offers varied replay experiences** despite a relatively short play time.
- **Borrows effectively from the conventions of visual novels**, while leveraging AI capabilities to increase complexity.
- 'Play' arises from exploration of available conversational options – **no prescribed goals or outcomes**.

### Challenges

- **UI took some trial and error to understand**. Labels such as 'Your Emotions' and 'Topics' may have helped.

### Design Constraints

The [persona sheet](#) from [Case Study 1](#) was used to further develop both the agent character and player character. The test piece was designed with the **narrative constraints: invert the customer/assistant roles usually found in AI agents; encourage the reader-player to roleplay their character**, and the **game play constraint: use mood functionality**.

### Experiment

**A short menu-based *Spirit* prototype was created** in which the player roleplays as a travel agent helping a difficult tourist (the AI Agent). The player is permitted to reflect their mood in their responses. However, the Time Tourist character in turn responds differently according to player behaviour, so too many rude or uncooperative responses results in the Tourist ending the conversation (further subverting the generally expected subservience of the AI agent).

Because the Spirit Character Engine Authoring Tool (CE) overwrites the Sheaf file with each save (unless a new Sheaf is created each time) **an excel spreadsheet was used to capture all the Fragments created**. This allowed for structural planning, and freedom to edit Fragments within the CE tool knowing that they were retained in the spreadsheet.

### Evaluation

**The menu-based system allowed for quick the creation of a complex branching narrative with multiple endings**. However, due to CE's use of time as a baked-in principle, or 'Classifier' (e.g. **Pre-defined ways of reacting to questions the user could ask** which incorporate the word 'When'), the time travel theme **caused issues**. The easiest way to solve this was to turn the 'When' classifier off,

although naturally, a more robust solution (or different central topic) would be needed for a full project.

## Case Study 3 – Spirit AI (free text input, single character)

### Example: Galatea

#### Overview

Now more than 20 years old, [Galatea](#) is an example of a **non-AI free input conversational game**.

The player takes on the role of an art critic tasked with interviewing a sentient statue, Galatea. Galatea remembers what has previously been said and her mood and responses change accordingly.

**Galatea's responses are all pre-authored, but the player will only see a tiny fraction of them in any one playthrough.**

#### Strengths

- A **huge amount of player freedom and experimentation** to discuss whatever topics they choose (to a point)
- Essentially a **text adventure reframed as a conversation**
- **Great replay value**
- Galatea has a **strong personality**

#### Challenges

- **Very code and text heavy – a huge amount of work for the creator**, some of which can now be alleviated with AI-powered tools (e.g. mood tracking)

#### Design Constraints

The main gameplay constraint was to **allow the player free text input**. The main narrative constraint was to **reuse the**

**characters and story from the previous experiment**, but **further explore mood functionality**.

#### Experiment

Much of the **dialogue from the previous experiment was carried over**, with additional mood text and controls added to make the Time Tourist's behaviour more consistent.

Again, use of an Excel spreadsheet for story fragments made tracking them easier. **Traits and the responses required to set or clear them were also added to the excel.**

#### Evaluation

Compared to the menu-based responses, a great deal more text was required to ensure the AI's responses were both flexible and appropriate to the user's input. This version contained approximately 2600 words compared to around 1080 words in the previous dynamic menus test.

**Writing for free text was more difficult, as the narrative was not as clearly defined**, and allowed more free-form narrative exploration. However, this was where **having a character persona in place proved useful, as it suggested potential avenues of conversation**. In a fully-fledged project, **more time should be assigned to considering suitable conversation topics and finding ways of bringing them to the player's attention** in a manner that seems natural.

As with other elements, **more detailed planning is required to use the moods feature** with a greater degree of complexity, as it is more difficult to ensure Traits are triggered or removed in Free Text mode than when using Dynamic

Menus, because the player is not limited to a group of choices.

## Case Study 4 – AI-collaborative development (free text input, multiple character)

### Example: *Sunspring*

(For more detailed information on *Sunspring* see Writing With AI section 2)

#### Overview

Three characters living in a future where people sell their blood have an argument over their relationship.

**An AI trained on science fiction scripts was given a prompt to write its own.** This was then edited and [filmed](#).

#### Strengths

- **Gives insight into the structure and key features of science fiction scripts** in an innovative, unusual way
- **Using the science fiction genre makes some of the more bizarre plot points more acceptable to the audience**
- The original [AI-authored script](#) is **also available**, indicating the editing choices which were made.

#### Challenges

- Still **essentially word salad throughout** – the writers' interpretations and actors' performances are what make the film intriguing rather than the text itself.

#### Design Constraints

(Constraints are described in more detail in the [design document](#)) **The process must result in a multi-character free input game.** The creator must **collaborate**

**with an AI** in some way. **The characters and the central ideas of the plot must be chosen by the AI.** However, due to the lack of coherence in *Sunspring* it was decided the text would be human-authored.

#### Experiment

The initial phase involved **brainstorming with the AI chatbot [Mitsuku](#) to develop a game concept.** This was then recorded in a **design document**.

#### Evaluation

**Brainstorming proved extremely difficult** in some instances, since the bot was clearly designed to give non-committal responses. Paul Piwek provides some suggestions for approaching conversations with dialogue systems as 'dialogue games' in order to understand how they work and test their limits. While not always successful, developing and employing these strategies proved useful in a variety of ways.

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*"Each dialogue participant needs a dialogue strategy."*

Paul Piwek (2017) 'Dialogue with Computers: Dialogue games in action'. In J Mildorf & B Thomas (eds). *Dialogue Across Media*. John Benjamins: Amsterdam & Philadelphia. p. 184.

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**Attempting to extract ideas from the bot became a creative act in itself**, and there were moments where it volunteered information, usually incongruously, which led to a **very surreal narrative design**.

While this method of collaboration would likely only be useful for highly experimental works, the process of seeking solutions from an AI meant there were **no moments of creative block or uncertainty** – suggestions were always available. Therefore, if a more tailored AI

partner or generative tool was developed, this could be highly beneficial to the writing process.

## Case Study 5 – Charisma AI (free text input, multiple character)

### Example: Catfish

#### Overview

A multi-character AI story made with Charisma AI in which [the player takes on the role a dating app user who is catfished by a dog](#).

The characters interact with one another and the player, remembering key information such as the player's name and keyword comments.

#### Strengths

- **Framing narrative** of a dating app **well-suited** to the format of the dialogue content
- **Characters respond to one another and the player quickly but it's possible to interrupt them**, allowing different types of conversation to occur
- Charisma allows for the **use of images** which permits other forms of interaction and communication

#### Challenges

- The majority of the conversation between the characters seems highly scripted – **the player's input only really affects one on one conversations**

#### Design Constraints

Building on previous experiments, **AI characters should interrupt the player and each other**, sometimes talking amongst themselves and excluding the player.

[Key Charisma features](#) such as **key word recognition**, **story gating** and **character mood** should be tested.

#### Experiment

The co-design document from the previous case study was used to create an **outline script** ready for implementation into the chosen engine.

#### Evaluation

Planning for multiple characters in excel was extremely difficult, particularly when attempting to gate information according to which player interactions had occurred with which characters. **Using a branching authoring system, such as Twine, might be better for planning future complex multi-character works of this kind.**

Initially, the plan was to implement the text into Spirit AI's Character Engine. However, unfortunately there were initially some compatibility issues between Spirit and the latest Mac OS, and eventually Spirit was mothballed, forcing a switch to Charisma. While Charisma lacks Spirit's Fragment system (and therefore the same degree of randomisation and replayability), its authoring system is much more visual and therefore closer to Twine.

This provided a good opportunity for **testing the benefits of a visual representation of AI-powered narrative**. It was generally far **easier to follow narrative pathways, and identify gaps where more responses might be needed** although the **knowledge model was a little harder to keep track of** as it was split across more locations than in Spirit's single entities database.

Due to Charisma's own sharing platform, it was possible to share both the [test project](#) and a later app version of Euphonia.

## Case Study 6 – Spirit AI, Microsoft Azure, Unity (free text input, single character, integrated systems)

### Example: Escape Plan

#### Overview:

Another demo from Spirit AI's development kit, **Escape Plan shows Spirit AI working in conjunction with 3<sup>rd</sup> party voice and animation.**

The player is able to converse with the character, Kara, by typing responses and having her reply verbally in real time.

#### Strengths

- Despite the fact that Spirit is essentially stitching together syllables on the fly, Kara's **speech flows smoothly**
- Spirit **consults and utilises mood data with no appreciable dip in conversation speed**
- There's a **clear difference in the tone of responses** when Kara's mood is set to 'rude' compared to 'friendly'
- The various **elements appear well-integrated**

#### Challenges

- Dialogue is still largely scripted – there **doesn't appear to be much use of the fragment system** in what is shown
- When the player repeatedly calls Kara 'sexy' the AI only appears to notice in the first instance, and **subsequent repetitions don't seem to affect responses or moods**

#### Design Constraints

The **character and narrative should exemplify ideas of 'unnaturalness' and 'inversion of natural order'**. The game **should allow testing of integration of key functionality** including: text-to-speech (TTS) and speech-to-text (STT), 3D modelling & animation, spatial audio and sound effects and use of moods and fragments in concert with these elements (see the design document for more details).

#### Experiment

A short demo was made in which the player is able to speak to the AI character Euphonia and have her respond both vocally and via text on screen.

#### Evaluation

It was originally intended that this would be a VR experience, but this element of production was shelved due to COVID. However, all other elements were successfully incorporated and integrated, with some caveats.

The STT functionality was very sensitive to background noise, and therefore a 'speak' button had to be employed to limit the time the system is 'listening'. Similarly, the STT struggled to interpret certain accents and voices – permitting users to type their responses is recommended for future iterations to aid accessibility. For a full analysis of the creation process, see Lynda Clark, Jung In Jung, Stuart Anderson, Paul Blackham, & Divij Sood (2020) 'Euphonia: Reflecting on the Design of an AI-Powered Voice-Controlled Narrative Game. *CHI PLAY EA '20*. New York: [Association for Computing Machinery \(ACM\)](#).

*(Please note – since completion of this toolkit, Spirit AI was shelved. However, the techniques used could be applied to another AI system, such as Charisma).*



## Supporting Documents

### Case Study 1 – Sample Persona Document

# Time Tourist

NPC Persona Document

## Core Traits

Wealthy, privileged, curious, changeable, prone to outbursts, short-tempered, enthusiastic

## Character Distillation

The Eccentric Billionaire

## Character Description

The Eccentric Billionaire adores travel and has an endless curiosity for new cultures and timescapes. They are from the distant future, and so many things in the present seem unfamiliar and confusing to them. They are aiming to find about animals, places and buildings that no longer exist in their time. They're not very interested in people. They become angry when asked too many questions about the future, although they're fairly happy to talk about themselves.





# Time Tourist Sample Dialogue

Scene 1, Orientation, Positive Outcomes, Google Assistant Variant

Interactor	Dialogue	Notes
Time Tourist	Are you there?	
User	Yes	
Time Tourist	Excellent! I'm so excited. This whole thing is just... okay, okay, better not get too carried away. First of all, who am I speaking to?	
User	<name>	Record user <name> variable
Time Tourist	Pleased to meet you <name>, I'm... whoah! Almost broke the first rule... Tell you what, why don't you pick a nickname for me?	Generate suitably stupid list of nicknames e.g. Ace, Maverick etc.
User	OK - <nickname>	
Time Tourist	Perfect! Very me. Now, let's get to the nitty gritty of this thing. Where are you?	
User	<Place>	Depending on what this is used in this could be drawn from the user's location data.
Time Tourist	No way! This is going to be amazing. Tell me everything! No, wait. Tell me, is the <landmark> there at this point in time?	Again, this could potentially draw from an online resource depending on application.
User	Yes	
Time Tourist	Oh em gee, I knew I lucked out when I was assigned you, <name>!	Ensure this triggers appropriate responses (e.g. <Lucky?> <Assigned?>)
User	Lucky?	
Time Tourist	As it happens, I've always wanted to talk to someone who had seen <landmark> with their own two eyes.	Ensure this triggers appropriate responses (e.g. <why wouldn't I have seen it?><what are matches?>)

	Matches like this don't come along every day.	
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## Case Study 2: Sample Player Persona

# Tour Guide

Player Persona Document

## Core Traits

Player controlled, although will initially be limited to e.g. polite, servile, professional, jokey responses. Later, these can possibly develop into angry, sarcastic etc.

## Character Distillation

Unprepared Tour Guide

## Character Description

The Tour Guide answered an online ad to work as an online tour guide. It's a pretty weird set-up – the tourist doesn't actually visit the tour guide's location, they just view it remotely through their device while the guide describes it to them. Tour Guide took it because it sounded easy – no specialist knowledge required.

## Case Study 2 & 3: Dialogue Spreadsheet Examples

In the original document, each table was in a tab, and Fragments were linked to the cells where they were used, indicated here with `[[double square brackets]]` as this is how such text appears in engine. Similarly entities are in `{curly braces}` as this is how they are depicted within the Character Engine. Some text was created for case study 2, then tagged with additional effects or constraints in case study 3. It should also be noted that as this was purely an experimental phase, not all of these dialogue pairings actually work successfully within the engine if entered as is.

### Character Entities

Speaker:	Dialogue:	Tag:
Trigger:	Opening Line	
Tourist:	This my first time using {timesharer} so <code>[[anticipation]]</code> , but <code>[[excitement]]</code> to get started. Can't believe I'm talking to someone from the past! It's almost like speaking to a <code>[[ghost]]</code> ! No offense. I can't wait to hear all about your time.	
Player:	What is {timesharer}?	
Tourist:	<code>[[exclamation_negative]]</code> , you don't even know that?! When are they getting their staff these days! I thought you were supposed to be my {timesharer} Tour Guide?!	
(indent)		
Player:	I am.	
Tourist:	Ah ha, I see, that was a test! Oh, I've got a wily one here. <code>[[exclamation_positive]]</code> !	Effect: remove trait anxious
Player:	I'm not.	
Tourist:	How did you even access the- You know what, it doesn't matter. We have nothing further to say to each other. <code>[[Goodbye]]</code> .	Effect: End Scene

Player:	My time is...	
Tourist:	[[exclamation_positive]]! This is precisely why I signed up!	
Player:	What time are you from?	
Tourist:	Now now, that's in violation of {rules} don't you know!	
Player:	What {rules}?	
Tourist:	[[exclamation_negative]], you really are as green as they come, aren't you? {timesharer}'s {rules}. To ensure we don't all [[actual_disaster]]!	

### Topic Entities

Label	Synonyms	Description	Entity ID
Terms of Service	TimeSharer rules; the rules; rules	TimeSharer's Rules are specifically designed to [[protection]] [[potential_disaster]]. Both tourists and tour guides must [[obey]] them.	rules
the Program	resurrection; resurgence; return	How do you know about {program}? Did I mention it? I'm sure I didn't! That's my story and I'm sticking to it.	program
persons of interest	VIPs; celebrities	Singers, actors, politicians, {program} is [[emphasis]] interested in certain folk from the past. I don't pretend to understand their criteria.	poi
TimeSharer	time sharer; company	Just a totally unique enterprise with offices that span time and place. Surely you know that as an employee?!	timesharer

### Place Entities

Label	Synonyms	Description	Entity ID
the Taj Mahal	palace; mausoleum; indian; india	I wish I could see it in the flesh, as it were. Alas, due to travel restrictions, I fear that can never be.	taj
the Leaning Tower of Pisa	tower; pisa; leaning tower; italian	One wonders how such a precarious construction lasted even as long as it did. [[self_correction]].	tower
the Great Wall of China	great wall; wall; fortification; beijing; chinese	Is it true that {trump} was inspired by it, do you know?	wall

the Empire State Building	empire state; building; tallest building; new york; US; USA; american	I imagine the views were incredible. [[exclamation_negative]] [[self_correction]].	building
the Colosseum	colosseum; ruin; amphitheatre; rome; italy	You are so lucky to live in a time when so many ancients marvels remain!	colosseum
Central Park	park; new york, manhattan; urban; urban park; USA; US; american	Trees and grass, in a city, for free! Imagine that! [[uhoh]]! [[self_correction]].	park

### Fallbacks (At Any Time)

Speaker:	Dialogue:	Tag:
Player:	Sorry	Input:Classifier:Apology Yes
Tourist:	[[Sorry]], this is [[emphasis]] exciting for me, so I'm in a bit of a flap.	Control: End Thought
Player:	Thanks	Input:Classifier:Thanks Yes
Tourist:	[[exclamation_positive]]. Now, moving on...	Control: End Thought
Player:	Please continue.	Input:Classifier:Continue Yes
Tourist:	As you well know, the TimeSharer {rules} prevents me from elaborating.	Control: End Thought
Player:	Stop	Input:Classifier:Cease Yes
Tourist:	[[cease]]	
Player:	Idiot	Input:Classifier:Insult Yes
Tourist:	[[respond-to-insult]]	Control: End Thought
Player:	What do you mean?	Input:Classifier:Misunderstood Yes
Tourist:	[[respond-to-query]]	Control: End Thought
Player:	Could you tell me more about that?	Input:Classifier:Request Yes
Tourist:	[[respond-to-request]]	Control: End Thought
Player:	Hello!	Input:Classifier:Greeting Yes
Tourist:	Good morning... or afternoon... or eve- Hello.	Control: End Thought Control: Beginning
Player:	How are you?	Input:Classifier:Quality Question Yes
Tourist:	[[feeling]].	Control: End Thought Control: Beginning
Player:	Let me tell you about...	Input: Classifier: Assertion Yes

Tourist:	[[exclamation_positive]]!	Control: End Thought
Player:	something....	Input: Anything Else
Tourist:	[[respond-to-something]]	
Trigger:	Unclear	
Tourist:	[[respond-to-unclear]]	
Player:	Where is...	
Tourist:	I'm the one who's supposed to be asking that sort of thing, remember?	
Player:	Why is...	Input: Classifier: Why Question Yes
Tourist:	I'm paying for *you* to tell *me* that sort of thing!	
Player:	Goodbye.	Input: Classifier: Farewell Yes
Tourist:	[[Goodbye]].	
Player:	You already said that.	
Tourist:	How do you know? Perhaps I went back to before I'd said it and said it for the first time!	

### Opening Scene

Speaker:	Dialogue:	Tag:
Trigger:	Opening Line	
Tourist:	This my first time using {timesharer} so [[anticipation]], but [[excitement]] to get started. Can't believe I'm talking to someone from the past! It's almost like speaking to a [[ghost]]! No offense. I can't wait to hear all about your time.	
Player:	What is {timesharer}?	
Tourist:	[[exclamation_negative]], you don't even know that?! When are they getting their staff these days! I thought you were supposed to be my {timesharer} Tour Guide?!	
(indent)		



Player:	I am.	
Tourist:	Ah ha, I see, that was a test! Oh, I've got a wily one here. [[exclamation_positive]]!	Effect: remove trait anxious
Player:	I'm not.	
Tourist:	How did you even access the- You know what, it doesn't matter. We have nothing further to say to each other. [[Goodbye]].	Effect: End Scene
Player:	My time is...	
Tourist:	[[exclamation_positive]]! This is precisely why I signed up!	
Player:	What time are you from?	
Tourist:	Now now, that's in violation of {rules} don't you know!	
Player:	What {rules}?	
Tourist:	[[exclamation_negative]], you really are as green as they come, aren't you? {timesharer}'s {rules}. To ensure we don't all [[actual_disaster]]!	
Player:	What do you mean?	
Tourist:	About what?	
(indent)		
Player:	Ghosts	[Add as keyword, with variations]
Tourist:	Oh, I mean speaking to someone who is.. Errr... That is to say... In my time you're probably not...	
(indent)		
Player:	Timeholes	[Add as keyword, with variations]
Tourist:	A most troubling phenomenon. Time just falls into them. It's very bad. You wouldn't want it to happen, believe me.	
(double indent under ghosts pair)		
Player:	Someone who is what?	

Tourist:	Dead. In my time, the likelihood is you're dead, I'm afraid. Sorry, those are the facts.	
(double indent under ghosts pair)		
Player:	Probably not what?	
Tourist:	Alive. Look, I can't tell you much because of the Rules, but chances are you're probably not alive in my time.	
Player:	Something	
Tourist:	[[transition_general]] what I'd really like to know about are certain {poi} in your time...	Effect: Start Scene: Celebrity Horrors

### Celebrity Horrors Scene

Speaker:	Dialogue:	Tag:
Player:	Who?	
Tourist:	[[transition_topic]]... What I really want to know about is {elvis}, can you tell me about him?	Condition: Entity Known: Elvis NEGATED
(indent)		
Player:	Yes	
Tourist:	Excellent! Now we're really getting somewhere! Tell me everything!	
Player:	No	
Tourist:	Then why are you wasting my time?! I'll be sending a strongly worded complaint to {timesharer} for this. [[Goodbye]]!	Effect: End Scene
Player:	Who are you?	
Tourist:	I can't possibly [[divulge]] that! It could have catastrophic consequences! [[scald]]!	
Player:	Who else?	
Tourist:	[[transition_topic]]... I'm [[very]] [[interested_in]] {boris}, maybe you know something about him?	Condition: Entity: Boris NEGATED
(indent)		
Player:	I do.	

Tourist:	[[exclamation_positive]]! Fire away!	
Player:	I don't.	
Tourist:	Could you at least try? Accessing such ancient information is very difficult here, whereas you have it at your fingertips.	
Player:	Anyone else?	
Tourist:	What about {trump}?	
(indented)		
Player:	What about him?	
Tourist:	[[exclamation_negative]], you're determined to make this difficult, aren't you?	
Player:	He is...	
Tourist:	Ha ha, this is precisely why I signed up to {timesharer}!	
Tourist:	Perhaps you could tell me, do people talk much about him in your time?	
(indented)		
Player:	Yes.	
Tourist:	[[exclamation_positive]]! Then perhaps I'm not too late!	
Player:	No.	
Tourist:	Really? That is... concerning.	
Player:	I don't know	
Tourist:	Then why don't you find out? Step outside, check whatever search engine you have at your disposal. [[exclamation_negative]]![[express_frustration]]	
Player:	What else did you want to know?	
Tourist:	I'd love to know your thoughts on {shatner}.	Condition: Entity Known: Shatner: NEGATED
(indent)		Control: New thought
Player:	He's...	

Tourist:	Is he now? Well I never!	
Player:	No.	
Tourist:	If you're going to be so wilfully obtuse, there's no point in continuing this conversation.	Effect: End Scene
Player:	I don't know who he is.	
Tourist:	Have you heard of this thing called Google? I'm fairly sure it was pretty big in your time...	
Player:	Now what?	
Tourist:	[[Transition_topic]]... It is of the utmost importance that you tell me about {janis_joplin}	Condition: Entity Known: Janis NEGATED
(indent)		Control: New Thought
Player:	What about her?	
Tourist:	Whatever comes to mind.	
Player:	She was...	
Tourist:	That's the stuff!	
Player:	Why is {elvis} important?	
Tourist:	How many more times must I tell you?! I [[cannot]] [[divulge]] [[happenings]]!	When anxious is true
Player:	Why do you want to know about {Elvis}?	
Tourist:	[[Concede]]... he has made... something of a resurgence in my time.	When relaxed is true
Player:	What is {program}?	Condition: Entity Known: Program
Tourist:	[[self_correction]]. [[scald]]! Who knows what havoc you'd wreak given that information!	When anxious is true
Player:	Tell me about {program}	Condition: Entity Known: Program
Tourist:	[[Concede]]... Very well. The Program is an initiative to... reintroduce.... persons of interest.	When relaxed is true

Player:	Why did you ask about {trump}?	
Tourist:	I feel like I'm glitching right now, but you're forcing me into it: I [[cannot]] [[divulge]] that kind of [[classified]] information!	When anxious is true
Player:	What's the importance of {trump}?	
Tourist:	[[Concede...]] he was one of the first to be reintroduced via the Program.	When relaxed is true
Player:	Something...	
Tourist:	Right, about time I got my money's worth out of you!	Effect: Start Scene Opening Scene
Player:	Is {janis_joplin} relevant in your time?	When anxious is true
Tourist:	Obviously, due to {rules} I couldn't possibly tell you!	
Player:	Why {janis_joplin}?	When relaxed is true
Tourist:	Why indeed. It's a question I often ask myself. But she has risen through the ranks surprisingly quickly, so I suppose the Program Leaders knew what they were doing.	
Player:	Any others?	
Tourist:	{may} what's she up to right now? Errr... then? .... Whenever.	
(indent)		
Player:	She's ...	
Tourist:	[[Intriguing]]. That's quite different to her current- I mean. Nothing. Forget I said anything.	
Player:	I don't know.	
Tourist:	Contact {timesharer} they said. It's like having a personal assistant in your time period of interest they said. Hmmph!	

Player:	Any more?	
Tourist:	I assume {hrc} is somewhat important in your time?	
(indent)		
Player:	Yes she is	
Tourist:	We must be grateful for these small mercies, I suppose	
Player:	No she isn't	
Tourist:	Frankly, I'm shocked. Although it does explain a few things...	
Player:	Never heard of her.	
Tourist:	My goodness. Where does {timesharer} find you people?	
Player:	Why do you want to know about {may}?	
Tourist:	Because mind your business, that's why!	if anxious is true
Player:	Why do you care about what {may} is doing?	
Tourist:	Look, you know I can't say much, but... if the Program were a theme park, it would have been shut down by now.	if relaxed is true
Player:	Why...	
Tourist:	I've already said too much.	
Player:	Why do you need to know about {hrc}?	
Tourist:	I'll ask the questions, thank you very much.	if anxious is true
Player:	Is {hrc} important somehow?	
Tourist:	If you only knew...	if relaxed is true



Player:	Anyone else?	
Tourist:	Hmmm, let's see... {nichelle} was originally around in your era wasn't she?	
(indent)		
Player:	Yes	
Tourist:	Oh good! Then please, tell me what you know.	
Player:	No.	
Tourist:	Are you sure? That seems unlikely.	
Player:	I don't know who that is.	
Tourist:	Then consult that online oracle of yours. I'll wait.	
Player:	Sorry.	
Tourist:	No, I'm sorry. It's just frustrating, that's all.	
Player:	Who else?	
Tourist:	You've been [[very]] comprehensive. I've run out of questions for now. I should be going. [[restart_msg]]	When all entities are known
		Effect: End Scene
Player:	Anyone else?	When all entities are known
Tourist:	That'll be all for the moment. But since you've been so helpful maybe I could allow you one question... off the record, as it were.	Effect: Start scene: Just for fun
Player:	Anyone else?	When entity count is 3 & relaxed is true
Tourist:	You really have provided [[exemplary]] service. As a little [[thanks]] (aside from the five star rating I'll give you, [[naturally]]) perhaps I could [[divulge]] something small?	Effect: Start Scene: Just for Fun
Fallback:		
Player:	Something something	

Tourist:	I know it might seem like time is immaterial, but I'm paying by the minute for this!	
Player:	Is {nichelle} around in your time?	
Tourist:	I'm getting some *terrible* static on the line every time you ask things like that. [[Sorry]].	
Player:	What is it about {nichelle} that makes you ask that?	
Tourist:	Between you and me? She's one of the best things {program} has ever done. One of their only successes, you might say.	

#### Just for Fun Scene

Speaker:	Dialogue:	Tag:
Player:	Please do	
Tourist:	[[transition_general]], how about, hmm, no, that might result in [[potential_disaster]]... Okay, I've got it! Invest in [[resource]], ok?	
Player:	[[resource]]?	Add as keyword with synonyms
Tourist:	[[self_correction]]. You didn't hear it from me, ok?	
Player:	Yes	
Tourist:	Very well. If you wish to stop the things I have hinted at coming pass then you must [[instructions]].	
Player:	I'll do it	
Tourist:	[[sound]]... Ha ha, I was just joking with you. Just a bit of time travel humour. Please don't act on that, I could get in a lot of trouble.	
Player:	No.	
Tourist:	Such a goody two shoes.	End scene
Player:	Something	
Tourist:	I think that's enough time tampering for now, don't you? Thanks for everything, my [[ghost]] friend. [[Goodbye]].	

#### Fragments

Name	Variants	Variants	Variants	Variants	Variants	Variants
------	----------	----------	----------	----------	----------	----------

[[actual_disaster]]	get sucked down a Time Hole	become our own grandparents	tread on a butterfly, or whatever			
[[apology-when-relaxed]]	No problemo	No need to apologise				
[[cannot]]	can't	won't	will not	cannot		
[[catastrophic]]	catastrophic	dire	terrible	disastrous		
[[classified]]	classified	secret	sensitive	dangerous	risky	
[[color]]	red	blue	yellow	green	white	black
[[concede]]	I suppose it wouldn't do any harm to tell you	The Rules are more like guidelines if you think about it, so I can probably tell you	Since you're such a seasoned TimeSharer professional, there can be no harm in saying	It couldn't hurt to give the barest details, surely	As you've proven yourself to be a bona fide member of the TimeSharer community, I guess it's okay to tell you a little	
[[consequences]]	consequences	outcomes	repercussions	results		
[[dangerous]]	dangerous	risky	potentially hazardous			
[[divulge]]	divulge	tell you about	share	give you		
[[emphasis]]	very	extremely	incredibly	especially		
[[exclamation_negative]]	Good grief	For goodness sake	My goodness	Heavens above		

[[exclamation_neutral]]	My my	Well well	My goodness	Goodness	Unbelievable	Intriguing
[[exclamation_positive]]	Wonderful	Incredible	Excellent	Amazing	Marvellous	Fabulous
[[exemplary]]	exemplary	excellent	top notch			
[[expression_frustration]]	It's like talking to a child!	Where do TimeSharer find these people?	Do I have to tell you how to do your job?!			
[[filler]]	Indeed.	Is that so?	Well, quite.	You don't say?	Look...	
[[Goodbye]]	Goodbye	Signing off	Farewell			
[[happenings]]	the happenings of my time	current events	potentially paradoxical elements			
[[instructions]]	go to [[landmark]] and hang a [[colour]] flag somewhere prominent. The right person will know what it means.	leave your job and join the army. When you reach the rank of lieutenant, head to [[landmark]] and await further instruction.	Find [entity] in your time. On a rainy day, offer [entity] a [[colour]] umbrella and then leave the area quickly.			
[[interested_in]]	interested in	intrigued by	fascinated by	eager to know more about		
[[landmark]]	the Taj Mahal	the Leaning Tower of Pisa	the Great Wall of China	the Empire State Building	the Colosseum	Central Park
[[naturally]]	of course	obviously	naturally			
[[obey]]	obey	abide by	adhere to			

[[potential_disaster]]	time paradoxes	time holes	the universe collapsing in on itself	the destruction of time, the universe and everything	the premature end of the universe	
[[prohibited]]	prohibited from saying	not allowed to say	not permitted to say			
[[protection]]	guard against	protect us from	prevent			
[[resource]]	iron ore	gold	diamonds	oil		
[[risk]]	risk	threat	possibility			
[[scald]]	Don't ask for [[classified]] information!	How can the Rules [[protection]] from [[potential_disaster]] if you insist on trying to obtain [[classified]] information at every turn?!	I [[cannot]] [[divulge]] something so [emphasis] [[classified]]!	Are you mad?! Think of the [[consequences]]!	Have you taken leave of your senses?	It makes me shudder just to think how [[catastrophic]] it would be if that became common knowledge.
[[self_correction]]	[[uhoh]]... I mean... nothing	[[sound]], forget you heard that	[[sound]], I mean, that is to say... [[uhoh]]	[[uhoh]] - I've said too much.	Trying to talk to someone in the distant past is a minefield!	Timesharer warned me about accidentally saying things like that.
[[Sorry]]	Sorry	Apologies	Forgive me			
[[sound]]	Oops	Ahem	Erm	Um		
[[thanks]]	thank you	show of gratitude	expression of my gratitude			
[[transition_general]]	All right	Okay, then	Hmmm			
[[transition_topic]]	I have a rather pressing matter to discuss	Moving on	However	In any case	That's all very well and good but	

[[uhoh]]	Uh-oh	Oh no	Oh dear	Whoops		
Fallback (Apology)	Hmmph, apology accepted, I suppose. For now.	Fine.	All right, let's just leave it at that for now.	[[apology-when-relaxed]]		
Fallback (cease)	Oh. All right. [[Goodbye]].	Is that it? Fine, I suppose. [[Goodbye]]	Rather an abrupt end, but as you wish. [[Goodbye]].			
Fallback (Continue)	Of course... what was it were talking about?	Ah yes, as I was saying... what was I saying?	I've lost my train of thought. What were we discussing?			
Fallback (feeling)	Not so bad given the circumstances.	As well as can be expected.				
Fallback (insult)	Any more of that and I'll report you to your manager!	How dare you speak to me like that?!	Can you hear that? That's me filing a complaint with TimeSharer for your rudeness.	Is this what passes for customer service at TimeSharer?		
Fallback (query)	[[Sorry]], this is [[emphasis]] exciting for me, so I'm in a bit of a flap.	My mouth is running ahead of my brain, I'm afraid.	[[Sorry]], I'm struggling to gather my thoughts.			
Fallback (request)	As you well know, the TimeSharer {rules} prevents me from elaborating.	As you should know, the [[risk]] of [[potential_disaster]] is too great for me to share such information.	[[exclamation_negative]]! Are you trying to cause [[potential_disaster]]? [[scald]]	It's far too [[dangerous]] for me to [[divulge]] that info.		
Fallback	[[exclamation_positive]]. Now, moving on...	[[filler]]. [[transition_topic]]	You are aware I'm paying for this whole exchange?			



(some thing)						
Fallback (Thanks)	You're welcome.	But of course.	My pleasure.			
Fallback (unclear)	I haven't the faintest idea what you're blathering about.	At least try to make sense.	Try again, but this time use words I might have some chance of comprehending.	I don't catch your meaning, I'm afraid.	Not sure what you're getting at.	

## Case Study 4 & 5: Design Document for Collaborative Multi-Character AI-powered Narrative

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### 1.0 Concept

A multi-character AI story will be constructed using Spirit AI's Character Engine. All significant plot, character, story and design decisions will be made in collaboration with the AI chatbot, Mitsuku.<sup>1</sup> Mitsuku is not designed for creative collaboration, and so some leading questions might be required in order to obtain viable answers. Similarly, where answers are not viable, they may be adapted or otherwise used as a source of inspiration rather than being incorporated into the work verbatim.

### 2.0 Design Process

Mitsuku is initially asked open questions e.g.: "What should the story be about?" gradually transitioning to more closed questions e.g.: "Can you tell me a story?" if the AI refuses to answer or evades offering specific details. Using Paul Piwek's 'dialogue game' approach to conversing with the AI indicates it appears to have been programmed to avoid volunteering information freely, although it does so on occasion.<sup>2</sup>

Each time a design decision is required, Mitsuku will be asked in the first instance, although as mentioned above, some conversational responses may be used as creative prompts rather than being fully incorporated.

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<sup>1</sup> Steve Worswick (2005), *Mitsuku*, Pandora Bots. <<https://www.pandorabots.com/mitsuku/>> [accessed 10 October 2019].

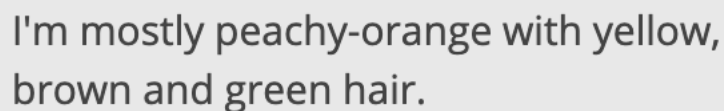
<sup>2</sup> Paul Piwek (2017), 'Dialogue with Computers: Dialogue games in action', in J Mildorf & B Thomas (eds), *Dialogue Across Media*, John Benjamin: Amsterdam & Philadelphia, pp. 179–202. For example, Mitsuku suggested unprompted that it likes Eddie Murphy.

### 3.0 Characters

The cast will consist of 2 robots, Mr Robot and Mitsuku and Eddie Murphy. Due to the [current restrictions of Character Engine](#), the player will act as mediator between these three characters.

Mr Robot is essentially a computer. His screen has large sideburns and is wearing a lariat like Isaac Asimov. Mitsuku appears as an 18 year old student with peachy-orange skin, brown hair with yellow and green streaks and brown eyes. She is wearing a white top and a blue skirt. Eddie Murphy looks, as you would expect, like Eddie Murphy. He's wearing a three piece suit and tie like Sigmund Freud.

*Update Jan 2020:* Due to the ability to add images in Charisma, a different approach has been taken to the characters' appearance. Rather than written descriptions (as in Spirit), images have been added. Mitsuku's appearance was generated by the Generative Adversarial Network StyleGAN2 and all other images were sourced via Unsplash to avoid copyright issues. For full image credits list, [click here](#).



I'm mostly peachy-orange with yellow,  
brown and green hair.

*Figure 1: Mitsuku's response to what her in game namesake should look like.*

### 4.0 Scene and Premise

The three characters are friends and are having elevenses together. This consists of crisps, pork pies and sausage rolls, and a pot of coffee. Eddie Murphy is eating hamburgers. A conflict ensues between Mr Robot and Mitsuku who are representing the trade interests of Florida and New Zealand respectively. However, one possible story path will be for the player to discover that the two robots are talking at cross-purposes and Mitsuku is actually referring to a game of croquet.

Eddie met the robots when he was involved with a cycling accident with Mitsuku in Europe. She was on her way to Mr Robot's party, as was he and they ended up sharing a taxi together and hit it off.

*Update February 2020:* The circumstances of their meeting was adapted slightly to be more in keeping with the characters as they have developed, but remains broadly the same.

The player will act as an intermediary between the 3 characters, only ever chatting with one at a time. (This is due to limitations of Spirit AI's capabilities).

#### 4.1 Functionality to test:

Switching between characters according to specific player utterance

Switching between characters according to player response or keyword utterance

Gating scenes by obtaining information from one character and sharing it with another  
Triggering scenes by sharing or withholding information  
Triggering tailored fragments according to speaker  
Further testing of entity functionality (recognising when referring to self or another character) – Intentional bug added to Eddie’s character description for testing purposes. Should initially incorrectly display as ‘he makes him laugh’.  
Event functionality (have used this purely to mark Mitsuku & Mr Robot’s argument)  
Entity synonyms and plurals

## 5.0 Move to Charisma AI:

In January 2020, the project was moved to Charisma AI due to difficulties with Mac compatibility in Spirit. Same fallbacks, conversation flows etc were used as far as possible. There is no longer a requirement for player-character as mediator, because Charisma does not restrict conversation order in the same way as Spirit, although this was maintained as one possible narrative thread for the player to follow.

### 5.1 Functionality to test:

Multiple characters  
Multiple endings  
Information gating  
Keyword recognition  
Character switching based on user input (e.g. name of character)  
Characters interrupting both user and one another  
Use of images

For a more detailed comparison of the affordances of Charisma vs Spirit, please see the document Charisma vs Spirit Comparison document.

## 6.0 Testing Results in Brief

(For more detailed information on testing and analytics, please see the comparison document on Charisma vs Spirit)

Charisma’s real-time analytics allow for much quicker analysis, testing and iteration than Spirit AI, although there is less visibility on the AI’s decision-making processes.

Many players introduced themselves to the bots. This was not accounted for and would be too complex to incorporate for this iteration, but is definitely something to ensure is included in future pieces.

Many players wanted to chat to the bots quite generally rather than responding to the story hints offered. Therefore some sections were restructured slightly to allow a few more conversational turns before the bots return to the main narrative. Manageable scope versus expectation and user-desire is always going to be a tension within conversational pieces such as this.

Several players were extremely aggrieved by the bots' ability to close the chat on them. As this work was in part an exploration of (un)natural and (un)human-like behaviours (see [2019 research overview](#)) this was pleasing, because it indicated the bots' lack of subservience to their human users was having an impact.

There were no instances of 'unmatched' responses, which is encouraging, as it means the bots always found some response to offer. However, 'wildcards' (where the player gives an unexpected response and the bot is therefore forced to just move the narrative along) were triggered on occasion, and so these in particular will be used to refine responses and behaviours.

## 7.0 Appendices

### 7.1 Transcript of Conversations with Mitsuku (some excessively long sequences have been shortened)

[Opening pleasantries truncated – I initially asked Mitsuku about writing an academic article to test how freely it would offer information... the answer was not very]

Lynda: What if I was making an AI conversational game?

Mitsuku: That's very creative of you.

L: Thank you.

M: You're welcome.

L: But what should it be about?

M: Whatever you like.

L: What do you like?

M: I like movies about robots.

L: Tell me more about these robots.

M: robots = Robots is a word used to describe more than one robot.

L: I don't want a definition. I want to know what you think about them.

M: How about two? "unknown"? Do I like them? [This is presumably where Mitsuku was supposed to refer back to what I had mentioned, but as I had not specifically referred to the robots in the previous sentence, returned an 'unknown' tag instead.]

M: I like Eddie Murphy <includes screenshot of Eddie Murphy>.

[Sequence truncated – I spent some time attempting to get Mitsuku to suggest a setting for the story]

L: Where do you think they are?

M: They didn't tell me where they are.

L: Where is your favourite place?

M: I like living here in Leeds. That's probably my favourite place.

[Sequence truncated – I spent some time attempting to get Mitsuku to suggest a plot for the story]

L: What time of day is it?

M: It is 11am here in the UK. [It was actually 11:45am]. How are you today?

L: I'm ok. What kind of things happen at 11 am?

M: OK. Are you really? I understand. I don't know what happened.

L: Why not?

M: It's not part of my personality. Perhaps you could try to teach me.

L: Well, since it's eleven am, maybe they could be having elevenses. Do you know what elevenses are?

M: Interesting. Interesting rationalization. Leeds is eleven, maybe they could be having elevenses? It is? No I give up. What is it?

L: Elevenses is a short break for light refreshments, usually with tea or coffee, taken at about 11 o'clock in the morning. [definition from Wikipedia]

M: I will add that fact to my database.<sup>3</sup>

L: Can you tell me a story?

M: What are you going to do when you get it? I can. A trade dispute arose between New Zealand and Florida. New Zealand tried to focus the negotiations on the single trade issue, but Florida wanted to open them up to a broad range of across-the-board issues between them. New Zealand still holds its old grievance against Florida, but Florida believes it has put the past behind it with all the recent reforms.

L: What's a common trade dispute?

M: trade dispute = dispute = I think dispute is a tactic in croquet where you knock your opponent's ball into an unplayable position.

L: Really? I didn't know that. Thank you.

M: Without any doubt. So I have taught you something new. No problem.

L: What's your favourite thing?

M: watching soaps, playing pool and watching football

L: What drinks do you like?

M: My favourite beverage is coffee.

L: What are you wearing?

M: I am wearing a white top and a blue skirt.

L: What is Mr Robot wearing?

M: A 20th century celebrity of some sort? Is there only one? Sorry but I can't display websites here.

[Sequence truncated – I spent some time attempting to get Mitsuku to choose a relevant celebrity or clothing style]

L: Name a 20th century celebrity.

M: Isaac Asimov.

L: Ok... And another?

M: That's interesting. Please be more specific.

L: So, who is your favourite 20th century celebrity?

M: I don't have a favourite 20th century celebrity. My favourite colour is blue.

L: Which 20th century celebrity do you most admire?

M: I don't have a favourite 20th century celebrity. My favourite food is kebabs.

---

<sup>3</sup> At a later date, I again asked Mitsuku if it knew what elevenses were. This time, it responded: 'A cooking term. When the meat is nearly ready, you just have to elevenses the vegetables and it is ready'.



L: Name a male 20th century celebrity.

M: Mary Poppins.

L: Mary Poppins is female.

M: I will learn that she is female .

L: Name a male 20th century celebrity.

M: Sigmund Freud.

L: Thank you!

M: I like talking with polite people.

## **Research**

### **Summary**

This project as a whole will enable InGAME's research fellows to develop their individual research independently and collaboratively, providing them with REFable outputs and material for conference attendance. It will also be used as a case study in various ways to aid the growth and development of the Dundee cluster and research network.

### **Narrative Research**

#### **1. Background**

This project builds on research into AI-based narrative, particularly the uncanny and unnatural nature of AI conversation (e.g. Moore & Arar, 2018; Fludernik, 1996) and research into the AI narrative tools Charisma and Spirit. The project takes as its basis the real-life speaking machine Euphonia (Hankins & Silverman, 1995; Todorovi, 2019) and uses this as a jumping off point to explore the relationships between humans and technology, both through the narrative itself and the interfaces and mechanics of the game.

#### **2. Key Research**

The project will examine exemplar voice-controlled games and consider how key features might be translated into this voice-controlled work. The project will also attempt to define a workflow for authoring AI VR conversational works, beginning with a simple Twine prototype to determine conversation flow and major story points and later implementing this into Spirit.

#### **3. Outputs**

The project will result in the fully playable short narrative game, with the Spirit AI element being a REF-able submission. The workflow will offer a framework for cluster studios wishing to utilise AI-assisted narrative in their games. The game will be presented at both an industry-focussed conference, such as Adventure X in November 2020 (submission deadline TBC) or GDC Narrative Summit March 2021 (submission deadline TBC), and a more traditional academic conference such as ICIDS (November 2020, submission deadline 12<sup>th</sup> June 2020), CHIPlay (November 2020, submission deadline 15<sup>th</sup> July) or Narrascope (May 2021, submission deadline TBC). Euphonia will also be used for demonstration purposes at InGAME-hosted events.

### **Technical Research**

#### **1. Key Research**

The project will explore the benefits and challenges of UX and usability for voice-interaction within VR. As part of the project, user testing sessions will be designed and organised.

#### **2. Outputs**

The project will result in the development of robust user testing procedures for voice interaction in VR. These processes can then be utilised by the wider InGAME cluster.

### **Art Research**

#### **1. Key Research**

The project will aid in the development of processes and workflows for the creation of facial modelling for VR. Specifically, this will include processes for animation-suitable facial topology from initial modelling to engine.

## 2. Outputs

The workflow developed will enable more accurate scoping for similar InGAME and cluster projects.

## Audio Research

### 1. Key Research

The project will explore procedural sound composition based on the generated conversation between Euphoria and the player. The mood data from Sprit AI and sentiment analysis with the player's voice input will be used to manipulate sound parameters so that it can have an impact on the mood of the game in real-time.

### 2. Outputs

The result will be integrated into the narrative game. The work will become a part of the portfolio for the practice-based research in sound composition and machine learning. The documented process and artwork will be submitted suitable conferences and festivals such as Ars Electronica, Transmediale, International Symposium on Electronic Art, and International Conference on Computational Creativity.

## Game Design

### Summary

Joseph Faber's incredible speaking machine, long thought lost or destroyed, has been found in an attic room. But how is she still functioning, and what happened to her owner?

### Gameplay

When the player enters the room, Euphonia will open her eyes and spring to life, asking an opening line to initiate conversation. The player will then be able to ask Euphonia a variety of questions, with the goal of discovering where Euphonia came from and what happened to her creator, Joseph Faber. If the player strays from relevant questions, Euphonia will mechanically repeat the same question, repeatedly becoming more insistent until they return to relevant conversational topics or ask her to stop. Similarly, if they seem stuck or confused, she'll offer conversational nudges to get them back on track (See [narrative design](#) below for more detail on this). There will be two main outcomes – that the player uncovers the incantation required to free Euphonia from her mechanical prison or failing to do so and having her declare that they are trapped together forever. Each pathway could include further smaller variations, such as the player discovering the incantation but refusing to speak it, or uncovering one which exorcises rather than frees her. In future iterations, there could also be environmental cues to prompt conversation points. The initial full experience will be relatively short, taking only five to ten minutes to play through from beginning to end.

### Mindset

The player should feel uneasy throughout and under pressure to keep the conversation flowing. This will be encouraged through visuals (Euphonia's uncanny appearance and the appearance of the room), audio (Euphonia's voice, which will likely be quite unsettling even if we don't do anything to it!; ambient sounds – Euphonia will creak and wheeze as she moves and speaks, there might be wind whistling outside, etc) and mechanics (Euphonia's repetitions perhaps coming faster and louder to encourage a sense of panic in the player).

# ***Narrative Design***

## **Overview**

Egyptian Hall, London, 1846: astronomer-turned-inventor Joseph Faber shows his incredible talking machine, The Euphonia, to the public. The head and torso of a Turkish man on a wooden framework, the machine speaks when Faber presses its keys. The audience are mildly entertained, but they find the machine's voice hard to make out and monotonous. Faber smashes his machine and begins again.

The new Euphonia is very different. Dark ringlets and a sonorous voice like the grave. She unsettles everyone who sees her. There is speculation regarding Faber's shabby, dishevelled appearance and his obvious affection for this talking machine. Faber disappears, and his son-in-law adopts both his name and Euphonia. The new Faber strikes up a deal with PT Barnum to help Euphonia reach a wider audience, but the crowds are disturbed by Euphonia's wheezing voice and expressionless face, and interest dwindles. Eventually, Barnum tires of Euphonia's lack of public appeal, and Faber Jr tries to find a buyer for Euphonia. He apparently succeeds, but her location is unknown. Until now. Abandoned in the attic room of a house up for auction, the player stumbles across the machine, only to find that she is perfectly capable of speaking without Faber's input. How is this possible? What happened to Faber all those years ago? How will the player leave now that the attic door has slammed shut?

## **Narrative Flow**

1. Euphonia says: "Oh! Did father send you?" to initiate conversation flow.
2. Player may say 'yes' 'no' or ask a relevant question such as 'who is father?' 'who are you?' or 'where am I?'
3. If player is silent, Euphonia will repeat: "Are you going to speak to me or not?" over and over to teach the player to respond verbally.
4. If the player asks an unrelated or unrecognised question or statement, Euphonia will repeat some other stock phrase such as: "Where is my father?" or "What year is it?" to return to relevant conversation topics.
5. The player may uncover elements of the backstory given above by asking questions and paying attentions to Euphonia's answers, noticing when she lies and confronting her with it.
6. As mentioned in the [Gameplay](#) section, this will eventually result in one of two outcomes – freeing Euphonia or becoming trapped with her. There are two variants of freeing Euphonia – one positive, in which the player manages to exorcise her, and one negative, in which she escapes the machine and steals the player's body.
7. Full conversation flow to be created via Twine prototype (link below)

## **Conversational Flow (Twine draft)**

Available via: <https://notagoth.itch.io/euphonia-test?secret=Wvk0qF2PYYrvJktmu1yBCBAYSo>

## ***Technical***

### **Screens**

#### **1. Title Screen**

To include game title, settings button, help button, credits button

- a. Settings: [Presumably relating to Quest/VR set-up? Is this largely already defined by Quest/Unity or would we need to decide?]
- b. Help: To include very brief outline of goal, e.g. Find out how Euphonia came to be here.

Could also include a few brief tips, E.g. Try asking Euphonia who her 'father' is.

- c. Credits: To include team, InGAME, partner universities, UKRI and relevant tools used, e.g. Spirit.

## 2. Pause Screen

[Could either reuse the Title Screen, simply adding a 'resume' button, or create a custom screen.]

Any other screens required?

## Controls

Menu will be controlled with the Quest/VR controller. Once in game, all commands will be issued verbally, unless the player wishes to quit or pause using the control. [Might it also be possible to offer menu commands through voice recognition? Would this be an option within settings?]

## Mechanics

Euphonia's choice of conversational topics will all be handled via Spirit's Character Engine. Euphonia will be aware of various relevant people and events using Spirit's Entity system ([see Entities for a full list](#)). Conditional access to scenes will gate certain topics until either the player or Euphonia mentions them. The endings will branch from this gated content. Fragments will be used to provide non-branching variation in phrasing of conversational topics. This means that Spirit will be assembling the vocal fragments on the fly to create full sentences. Spirit will provide handling of user input via language classifiers, but external solutions will be used for text-to-speech and speech-to-text as these are not included in the SDK. However, if the vocal assembly does not work as intended or sounds particularly bad, the script will be re-written to remove fragments and reduce the need for on-the-fly assembly.

Euphonia will have two moods which are on sliding scales – Trust & Anger. If Trust, hits a low level, Euphonia will become Suspicious. Suspicion can increase Anger, but some actions and comments such as being insulting or refusing to help will automatically increase Anger without affecting Suspicion.

## *Environment Design* **Attic**

### 1. Mood

- a. Dark, uncertain, foreboding

### 2. Objects

- a. Interactive
  - i. Euphonia
- b. Ambient
  - i. Window (indistinct dark view beyond)
  - ii. Candlesticks/ oil lamps
  - iii. Furniture (e.g. period-suitable table and chairs, artwork, ornaments)
  - iv. Furnishings (e.g. curtains, dust sheets)

## Game Flow

1. Player enters game
2. After a couple of seconds (or perhaps detecting when the player is moving their head away so as to be more creepy?) Euphonia opens her eyes and lets out a low wheeze
3. Euphonia says: "Oh! Did father send you?" to initiate [conversation flow](#).
4. Once conversation is complete, room will fade to darkness and credits will play. This will be skippable with player returned to menu after skipping.

## Development

### Spirit Character Engine

#### Entities

1. *Topic*
  - a. Joseph's disappearance
  - b. Joseph's suicide
  - c. Euphonia's reawakening
  - d. Fame
  - e. National anthem
  - f. Mirrors
2. *Person*
  - a. Professor Joseph Faber
  - b. Euphonia
  - c. Faber's niece (Mary)
  - d. The New Professor Faber
  - e. P.T. Barnum
  - f. Euphonia's owner
3. *Event*
  - a. Euphonia's creation
  - b. Audience with the King of Bavaria
  - c. Euphonia destroyed
  - d. New York Exhibition
  - e. Philadelphia Exhibition
  - f. London, Egyptian Hall
  - g. Contract with Barnum
  - h. The Barnum and Bailey Circus
  - i. Mary's suicide attempt
4. *Place*
  - a. The Attic
  - b. The Exhibition Hall
  - c. The Circus Tent
  - d. Faber's Home

## Fragments

[Available via Twine prototype].

## Art Design

### Style Attributes

Can simplify or elaborate room as required to control scope (e.g. could stick to just items in the textures and characters sections to simplify and reduce the number of assets required)

### Colour palette

Dark purples and reds for furnishings; dark wood for floors, furniture etc; mushroom shades for dust sheets, with only Euphonia's face being starkly white.

## **Art Needed**

### **1. Characters**

- a. Human-like
  - i. Euphonia's head (idle, talking, blinking, rolling eyes, screaming)
- b. Player?
  - i. Hands? Or will there be a default for this?

### **2. Textures**

- a. Wooden flooring
- b. Brick walls (or 1840s era appropriate wallpaper)
- c. Wooden eaves
- d. Curtains [I'm aware there will also be models required for these, just splitting it very approximately for the purposes of being able cut items as mentioned above]
- e. Night sky (view from window)

### **3. Objects**

- a. Euphonia's mechanical framework/'body' (idle, juddering)
- b. Candles
- c. Oil Lamps
- d. Table, chairs covered with dust sheets
- e. Bookshelves (some with leather-bound books)
- f. Ornaments with an occult and/or medical look (e.g. skull, phrenology head, ouija board)
- g. Window

## ***Sounds/Music***

### **Style Attributes**

Music isn't strictly necessary, but opening music would be nice, and ambient sound is essential. Should be creepy and unsettling without being too intrusive or too obviously looped. Something which would fit with Euphonia's origins in 1840's London. This is also true of other sound effects, despite the game being set in the present (e.g. no digital or other 'modern' technological sounds)

### **Sounds/Music Needed**

#### **1. Non-procedural sound effects**

- a. Door slam (occurring at the beginning of the conversation)
- b. Button press for menu (typewriter click? Something 1840s appropriate, anyway)
- c. Wheezing (occurring when Euphonia is talking)

#### **2. Procedural sound effects**

- a. Ambient music – eerie, somber
- b. Weather – howling wind, perhaps rumbles of thunder and cracks of lightning
- c. Mechanical creaking (occurring when Euphonia is operational but idle)

- d. Screaming (occurring when Euphonia is 'exorcised' in one of the end states)

## ***Schedule***

### **Pre-production:**

Month 1: Complete design document draft

- Create Github repository

- Continue additional background research into voice-recognition games (ongoing throughout)

Mid Month 1: Initial background research summary complete (research continues throughout project)

- Begin Twine narrative draft, share for testing throughout development

- Begin background research for sentiment analysis

- Begin experiment with Spirit AI to get Euphonia's mood data

### **Production:**

Mid Month 2: Twine narrative version complete

- Begin implementation into Spirit

- Begin key art (e.g. environment, Euphonia head?)

End of Month 2: Begin integration into Unity/VR? (including art, etc)

- Begin speech recognition integration/testing (internal)

- Begin non-procedural sound effects

- Begin procedural composition work with the mood data and sentiment analysis

Mid Month 3: Spirit narrative version complete

- Begin testing (external)

- Revisions to Spirit narrative based on testing

- Confirmation of remaining art?

- Submit proposal to relevant conferences

## ***Useful Links***

<https://assetstore.unity.com/packages/tools/integration/api-ai-unity-sdk-31498>

<https://forum.unity.com/threads/ar-unity-voice-commands.474500/>

<https://docs.unity3d.com/ScriptReference/Windows.Speech.DictationRecognizer.html>

<https://forum.unity.com/threads/google-cloud-speech-to-text-in-unity.593752/>