QUAKE DELIRIUM REVISITED: SYSTEMS FOR VIDEO GAME ASC SIMULATIONS

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ABSTRACT

This paper reviews the conceptual model devised for a previous project, where Max/MSP was used to modify the game Quake to create a more psychedelic experience for the player. In this original proof of concept, various available game parameters were animated in order to imitate perceptual distortions of the type produced by hallucinogenic drugs. A MIDI mixing console was used to 'remix' these perceptual distortions in real-time, and devise pre-defined sequences of hallucination. The control parameters were also used to manipulate a corresponding soundtrack, which was intended to reflect the hallucinatory game experience through electroacoustic sound. This paper outlines the existing proof-of-concept, and considers the development of this model to create a more sophisticated system for use in game engines such as Unity. Through the use of Hobson's 'Activation, Input, Modulation' (AIM) model of consciousness, I will propose a cohesive system for creating ASC simulations in video games.

KEYWORDS

Sonic Arts, Video Games, Altered States of Consciousness

1. INTRODUCTION

1.1. The Imperative for ASC Simulations in Video Games

Altered states of consciousness (ASC), refers to states of perceptual experience that are significantly changed from 'normal' perceptual experience (a definition which has some limitations, but can broadly be agreed by popular consensus). States of dream, delirium, hallucination, psychosis or hallucination are examples of ASC. Such states may occur naturally in humans, or may result from the use of intoxicating substances such as hallucinogenic drugs. These states have been described in various works of art, literature and music throughout history. Video game engines may be considered as offering various unique potentials for describing ASC, through appropriate use of graphics, sound and interactivity. In such cases, the game (or relevant section of the game) can be designed in order to imitate some aspects of ASC.

Game engines and the environments they enable designers to portray are becoming increasingly more realistic. Game designers are also striving to create games that are more sophisticated in other ways: better voice-acting, scripts and more cinematic narratives for example. In some cases the concept of what constitutes a video game is also being revised and expanded, as demonstrated by recent titles such as *Proteus* [1] and others. The indie game stores provided by the Playstation Network, Xbox Live Arcade and Steam have provided fertile platforms for such experimental titles. In this context, games are emerging where factors such as the psychology of game characters become more important. An example of this is seen in the *Dead Space* [2] series, where the player character frequently suffers episodes of psychosis and hallucination that are of central importance in the narrative of the game.

Dead Space is a recent, fairly effective example of ASC in games. Various techniques are used to indicate hallucination or psychosis. In *Dead Space Extraction* [3] transparent overlays of two-dimensional patterns of runic symbols are used, which recall the visual patterns of hallucination seen in mescaline experiences, as discussed by Klüver [4]. Audio is also used to

suggest hallucinated voices and music heard by the game character. *Dead Space 2* [5] incorporates recurring episodes in which a hallucinated character is seen, imposed in the visual environment, accompanied by visual effects. Elsewhere I discuss various earlier, more simplistic examples, where ASC experiences are represented in video games through various methods [6]. The use of ASC simulation in a triple-A titles such as the *Dead Space* series shows us that there is potential commercial value in effective systems for representing ASC, and also shows some possible methods to achieve this. However, this research is interested in developing a more detailed system for representing ASC which allows a greater level of accuracy, and which is grounded in research concerning ASC. The reasoning behind this is that representations of human consciousness in video games can be improved through appropriate research. Just as design of a realistic physics engine requires knowledge of how physics function in the real-world, I propose that the design of ASC simulations can be improved by referring to research related to ASC.

As mentioned, there are potential commercial benefits to developing a cohesive ASC system for video games. The majority of 'first person shooter' (FPS) games either do not account for the conscious state of the player, or do so in very simplistic ways. Adding this additional layer of experience to the design of video games should respond to the demand from audiences for more sophisticated games with higher levels of realism. There are other potential benefits too, since accurate ASC simulations may eventually increase awareness and understanding of these perceptual states. ASC simulations might also be useful for training situations where hallucination might pose a risk, for example in scuba diving where nitrogen narcosis can cause perceptual distortions which are dangerous for the diver [7].

2. QUAKE DELIRIUM

2.1. Project Overview

Quake Delirium [8] was a video game hack that forms a proof-of-concept precursor to the system proposed by this paper. The project was designed to alter the function of the game *Quake* [9], in order to make the game experience more hallucinogenic.

Figure 1 shows the system that was used. A version of *Quake* was run using the *Fitzquake* modification [10], which facilitated improved graphics and appropriate manipulation of parameters using Quake C (a scripting programming language specific to this game), as was necessary for the project. This was loaded with the *Quake Delirium* modification, which incorporated the necessary game scripts that were used for controlling game parameters by the system.
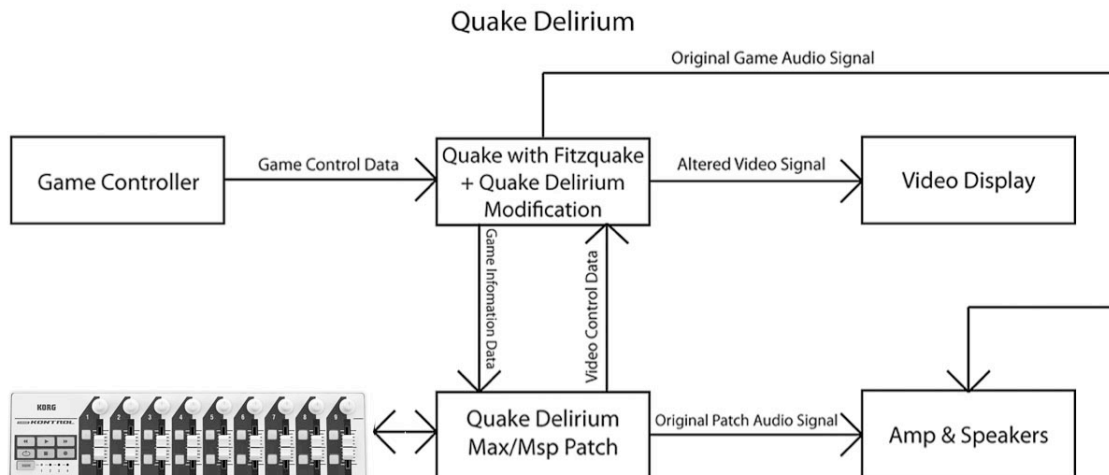

Figure 1. Quake Delirium system diagram

The game was controlled by the player as normal using a keyboard and mouse, and data regarding game events (e.g. 'collect health') was sent to a Max/MSP patch via a log file. This enabled the Max/MSP patch to synchronise appropriately with the game. The Max/MSP patch then animated game parameters (e.g. graphical parameters) by sending keystrokes to *Quake*. These keystrokes were bound to a range of keys that would not be used by the player for normal control of the game, and served to operate changes to game parameters. Therefore the patch could animate the following game parameters: game speed, field of vision (FOV), fog, stereo vision (a red/blue stereoscopic effect), red hue and 'drunk mode' (a special camera effect which causes it to sway).

As indicated in Figure 1, a MIDI controller was used to operate the Max/MSP patch. MIDI sliders were linked to the software, so that each game parameter could be controlled in real-time (see Figure 2), with only a small latency. This enabled the game parameters to be 'remixed' and animated in real-time. The patch is able to record the sequence of operations carried out with the MIDI controller and replay them. Therefore it is possible to design sequences of animation through live operation/performance of the mixing desk. These sequences can be designed in accordance with ASC, where various perceptual distortions onset gradually and intensify over time, before perception gradually returns to normal.
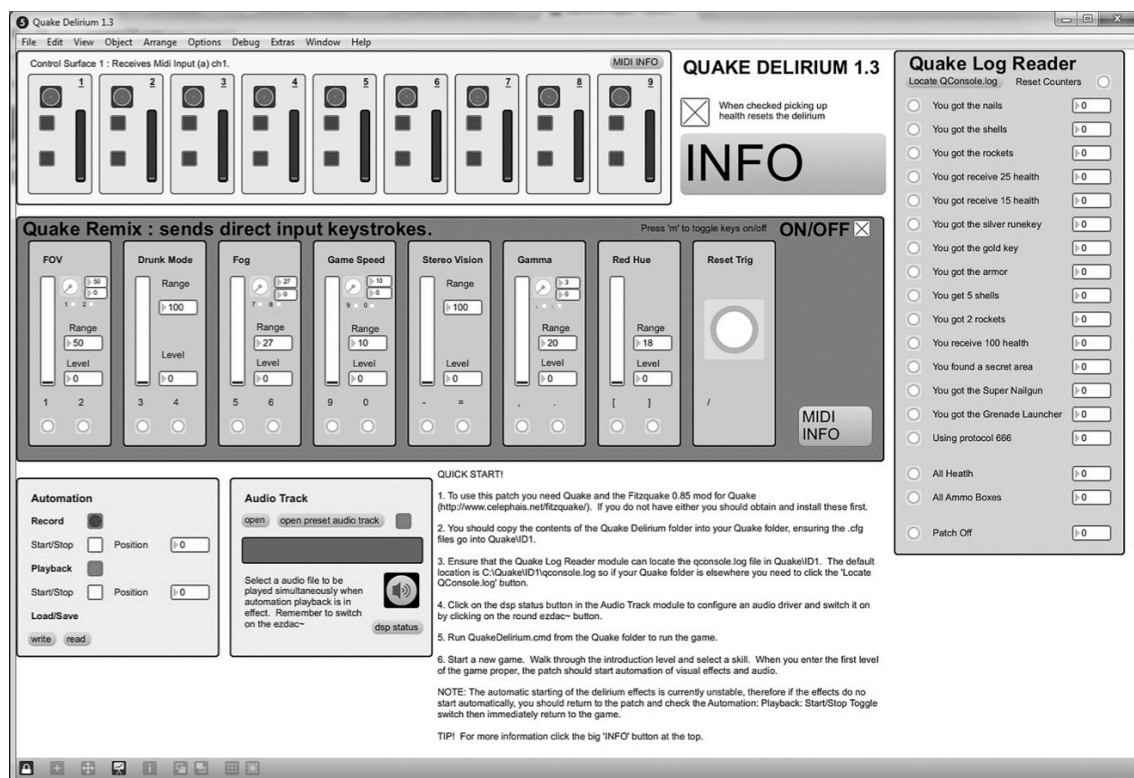

Figure 2. Quake Delirium Max/MSP user interface.

The audio component of the patch consisted of a composed piece of sonic arts (electroacoustic) music. This was designed in accordance with techniques for reflecting ASC states through sonic art that were developed through other research associated with this project [11]. The resulting composition was processed using the data from the MIDI mixing desk to affect various audio parameters. This composition was recorded as a fixed audio file that is played in

synchronisation with the MIDI slider automation, so the modification of game parameters coincides with adjustment to audio parameters such as filters or delay effects.

The modified video signal (where this modification is achieved through manipulation of the game engine) was outputted to the video display as normal. The audio streams produced by the Max/MSP software and the normal *Quake* audio were mixed together in Windows and outputted to the loudspeakers.

The result of the system was that predesigned sequences could be triggered that modify graphics and introduce corresponding sounds, in order to reflect ASC experiences. These sequences could be designed in real-time using the mixing desk; a method that was in practice used to produce one long sequence of approximately 20 minutes of length. This sequence starts when the player enters a level. Perceptual distortions begin to occur through gradual modifications to the various game parameters and accompanying sound. These effects intensify, and at points the game speed is slowed down (correlating to ASC experiences where experience of time-passing is distorted). Eventually the effects subside.

The ASC sequence adds a gameplay mechanic, since perceptual distortions affect the game difficulty at different stages of the simulated hallucination. At points the perceptual distortions make the game harder, however at other points the slower game speed makes it easier. Therefore timing one's actions in the game to correspond with particular stages of the ASC sequence enables the player to use it to his/her advantage. Collecting a health box can also optionally reset the sequence, so that collecting a box regularly prevents ASC effects from becoming too severe. This enables the player to exert greater control over the perceptual distortions and use them to his/her advantage (also adding a game mechanic).

2.2. Evaluation

The *Quake Delirium* system explored how an existing game could be 'remixed' in order to create new cultural artefacts, and represents a small step towards a 'Universal Game Remix Device'. In addition it shows how a haptic device such as a mixing desk could be used in the process of game remixing.

However, the project is mainly important for this paper because it also shows how a game engine can be manipulated in order to reflect ASC experiences. *Quake Delirium* demonstrates how graphical parameters can be animated to reflect visual distortions of perception, such as those that may occur during an ASC. It is satisfactory as a proof-of-concept, but the methods used to create it were inelegant, unstable and specific to that particular game. In this sense something more transferrable could be developed which builds upon the concept.

The specific methods used in *Quake Delirium* to create the perceptual distortions were also rather limited. The range of visual effects was restricted by the capabilities of the *Fitzquake* modification. Some visual effects such as the use of fog were fairly crude, arbitrary methods to reflect perceptual distortion, so there is much room for improvement. Others such as modifications to game speed worked acceptably as analogies for ASC, but the method of implementation did not produce smooth changes, making the result less effective.

This research can therefore be further developed by devising a more effective system that builds upon the fundamental concept of *Quake Delirium*, to represent ASC through appropriate use of a game engine. In the next section I discuss my proposal for a revised model that addresses some of the problems discussed.

3. PROPOSED SYSTEM

3.1. Hobson's Model

The proposed system for representing ASC using a game engine can be revised through an adaptive use of Hobson's model of consciousness [12] to provide a suitable framework.

Hobson discusses ASC as the result of changes in the brain that can be plotted on a three-dimensional 'AIM' (activation, input, modulation) axes (Figure 3). Under this model, 'activation' describes the amount of brain activity; unconsciousness or dreamless sleep may have low activity, while waking or dreaming states may have high activity. 'Input' describes the level of input/output exchange with the external environment; in waking states, a significant amount of exchange may be taking place, while in sleep information may arise internally. 'Modulation' (mode) relates to the way in which the brain processes information and accesses memory.
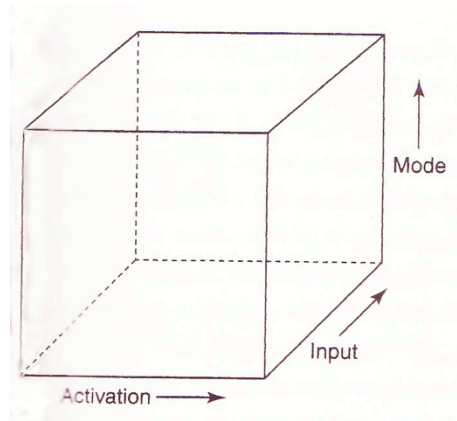

Figure 3. Hobson's AIM model of consciousness.

ASC may be considered to affect the position on these axes in various ways. For example, states of hallucination may affect the input axis by increasing the perception of illusions (that we presume are internally generated), altering the amount of activity and the way the brain processes information. Hobson's model also enables us to consider how brain functioning changes during the day under normal circumstances (such as wake/sleep). From this we can view ASC as arising through disruption to usual brain functioning; hence states of hallucination can be viewed as not unlike wakeful dreaming. AIM positions for various key ASC and non-ASC states can be devised using the model.

3.2. AIM Based ASC Simulation

It is possible to use Hobson's model as a conceptual basis for simulated consciousness in a game engine. Each of the three AIM parameters can be used to manipulate conscious perception of a game character. Below I outline a possible system that utilises the AIM parameters for the purposes of an ASC simulation system in a 3D game engine. Note that this is a preliminary attempt to outline an implementation, which will be revised and expanded upon as the project develops.

Activation:

This describes the level of brain activity, where unconsciousness indicates low levels of activation, and normal waking consciousness indicates high levels of activation. This axis could be suitably described by modification of graphical parameters. At the lowest level unconsciousness could be indicated by a black screen. Intermediary levels of activation could be indicated by using lower contrast and brightness levels, or by introducing blurring and out-of-focus effects to suggest reduced brain activity. Game speed could also be considered as a parameter effected by activation, since slower game speeds may imply a greater capacity to process information in a given time period.

Input:

The input axis can be used to describe whether an individual exchanges information with the external world, or internally. For example, during dream states, an individual may have high levels of brain activity, but exchange information internally, with external senses effectively closed-down. In a state of hallucination the boundaries between information received externally and internally may become blurred. Input could be reflected in an ASC simulation by interpolating external and internal channels of information. External information could be represented in the usual way through the design of 3D environments. Internal information could assume a variety of possible forms; for example, (as discussed by Klüver) during hallucinations it is common for the subject to perceive spiral or funnel patterns on surfaces. This could be achieved through suitable use of animated textures or patterns that are blended with the external 3D environment. Alternatively, full 3D environments (e.g. dream landscapes) could be available. Hallucinations may introduce illusory characters or objects into the external environment, or modify the representation of the external environment by distorting their geometric representations. Note in the latter example, representation of geometry could be considered separately from its physical functioning (so hallucinated changes may not necessarily cause player collisions that restrict movement).

Modulation:

Modulation (or 'mode') indicates the manner in which the brain deals with information and interacts with memories. Adjustments to the mode parameter could be used to indicate the type of information that is provided on the internal input channel. Hence in certain states, full three-dimensional environments might be accessible internally, while in other modes two-dimensional patterns or audio-only streams may be available. Thus modulation interpolates a variety of possible sources on the internal input channel. This could be used in combination with a repository of game assets that simulate the game character's memory.

3.3. Proposed Implementation

The proposed system will be designed within a game engine such as Unity. The location of key ASC states will be identified on the AIM model, such as unconsciousness, dream and hallucination. The model will therefore seek to appropriately represent key states under corresponding AIM conditions, and provide a range of interpolated states. This will be achieved primarily through modification to game parameters and manipulation of geometry and textures. The model will develop the approaches of *Quake Delirium* through use of an improved systematic approach. It is also anticipated that this system will be more readily transferable for implementation in multiple games.

As I discuss elsewhere, movement between states may be devised in a manner that accommodates gradual change, and unpredictable, organic fluctuations. This is appropriate since the dynamic form of hallucinatory experiences over time may be subject to ingestion and metabolism of a drug. Hence a gradual onset may be expected, and effects may fluctuate over time. Suitable algorithms will therefore be used to affect dynamic movement between ASC states, and provide organic fluctuation where appropriate.

In addition to the above, it is anticipated that the proposed model may also be appropriate to explore with the use of an EEG headset as a control device. This opens up many interesting possibilities. For example, the EEG monitoring can be used to identify an individual's location on the AIM axis. Thus it is theoretically possible for a video game to provide an ASC simulation that is connected to the real-world conscious state of an individual, in real-time. This may suggest some new game paradigms, where multiple networked participants are able to explore each other's simulated conscious state in a virtual environment, for example. Alternatively, EEG signals might be used to provide real-time input to produce the organic fluctuations described above, in a manner that is tangible for the user. Whether different EEG headsets (or other biofeedback sensors) can provide such tangible interaction versus imitative algorithms could also be investigated.

4. SUMMARY

This paper has outlined the potential benefits of developing an ASC simulation system for 3D game engines, with reference to some existing examples. Through discussion of a past project *Quake Delirium*, I have indicated an existing possible system for ASC simulation. However, discussion of this system has shown that there is significant room for development in order to improve the sophistication, accuracy and quality of the system. In addition such a system can be devised which is transferable for multiple games. The next step for this research will be to begin developing the system outlined in this paper, where Hobson's AIM model is used as a basis for design. Hobson's model can be adapted, so that each of the activation, input, modulation properties are used as parameters that correspond to suitable corresponding effects within a game engine. A prototype of this will be developed in Unity.

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