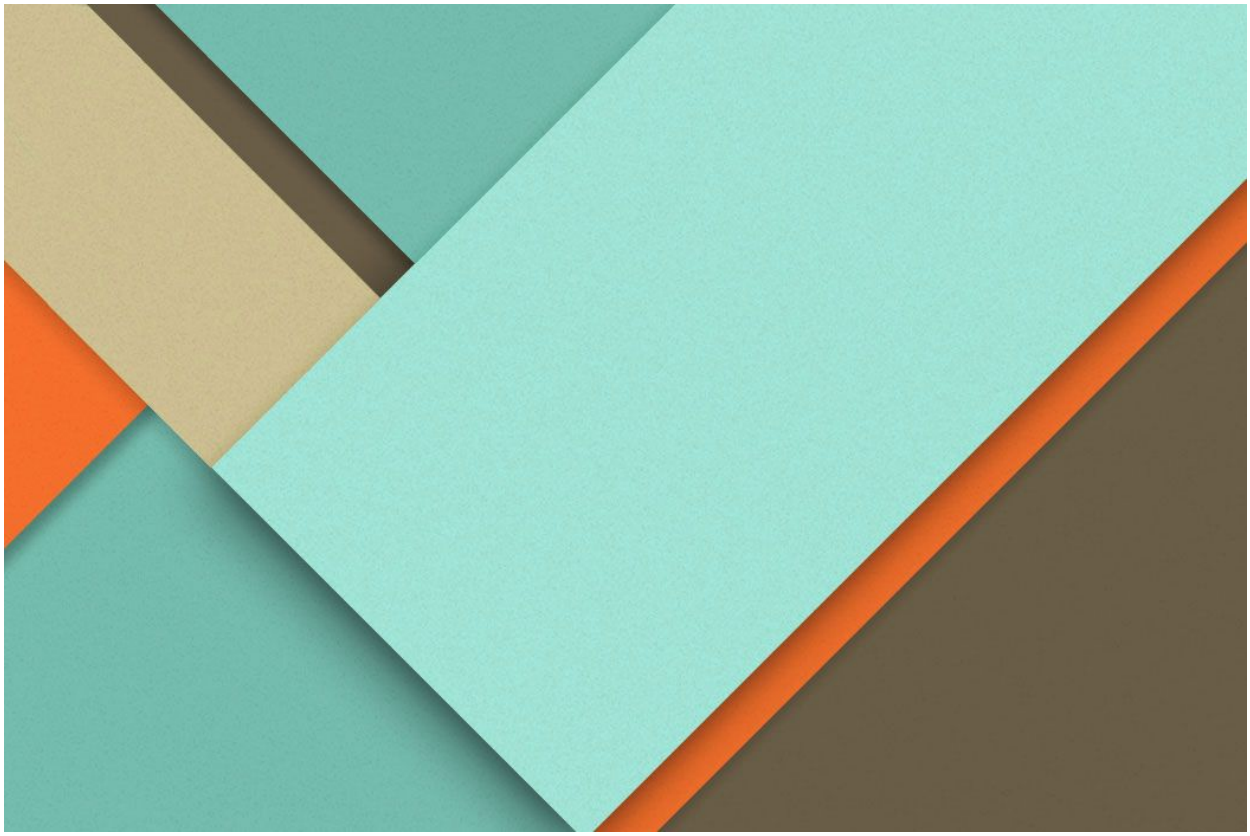

The Handy Handbook to N-VAE

A Simple Guide on the Do's and Don'ts of Developing Video Games without Graphical Interfaces

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Foreword and Contact

Hello, this little guide is to help you in your first foray into N-VAEs. What is an N-VAE? It is merely a game that features no graphical interface and relies entirely on sound or physical feedback (like vibrations), it stands for “Non-Visual Action Experience”.

There are many pitfalls and mistakes developers will make the first time they try something new or different, this booklet is to explain what is likely going to go wrong and options to remedy those situations. This guide speaks in broad terms and can be applied to any significant game engine as it is meant to point you in the direction, and show how you can approach issues.

This guide is meant to give you useful advice and areas to consider when trying to create an N-VAE; however, you are expected to understand the fundamentals of game development. This guide is just to help bridge the gap between standard game development and N-VAEs.

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Audio

Audio in an N-VAE game is obviously the most important aspects to get right to make a good game and will be one of the most iterated elements of the game from the beginning of development.

With such a vast and varied topic that depends heavily on the project at hand, however, there are some pointers on how to approach different issues:

- Footsteps are ever present in a game where the player is walking around (obviously), but it's important to remember how focused the player will be listening to anything out of the ordinary and footsteps that aren't right will be picked up instantly. These are the elements of what makes a proper footstep:
    - Volume
    - Reverberation
    - Frequency of steps
    - Distance from the centre of each step (steps are usually slightly forward and partially to either left or right)
    - Environmental factors (e.g. splashing water or creaking floorboards)
    - Changes based on movement speed (e.g. running or sneaking)
- Although the majority of headphones can provide a good level of accuracy in terms of representing where noises are found relative to the player's character, however, they are not perfect. There is roughly a 40° area where if a sound is coming from behind you, it will sound as if the noise is coming from in front, just quieter. While some players will notice the unusual effect and rotate themselves lightly, so the noise is no longer with the range of confusion, some may not release and make mistakes that can frustrate them (e.g. waste resources or running back to avoid the noise which just leads them straight to it). Since this is partially a hardware issue, solutions are hard to come by, but here are a few options for you to try out:
    - Orbiting noise (have the sound rotate around the position of the object slightly to make it less likely to be stuck in the confusing zone).
    - Higher reverberation effects can help distinguish the direction of sounds.
    - Avoiding long straight map sections and generating noises directly behind the user out of nowhere (because after users hear a sound before it entering the 160°-200° area, they can track its position far easier).

Music

Music during gameplay has always been a staple in gaming, however, during N-VAE games the addition of music could cause the player to miss important audio cues which is a problem.

You will need to decide whether or not your game as music during gameplay and it's volume, if it's a game about stealth, little to no music is often appropriate, but if it's a game about going fast (either running to or away from something) music can add to the experience.

Character Representation

In many first-person, all you see of your character is their arms, what they are carrying and occasional their legs. In an N-VAE game, they see none of those things, all they have to go on is what they say, and what noises they make, this means you need to pay extra attention on how the sounds portray the protagonist:

- The most obvious representation is the voice, this can range from any age, background or body type, however, which you pick could have an effect on how effectively you tell your story (for instance, a child's voice does not do well to represent a grizzled veteran, extreme example I know, but you get the point).
- Injury sounds have been a staple of gaming since the beginning; however, you can use these to represent information of the character or their situation.
    - A strong character could shrug off the pain of injury with a minor grunt while a more frail character can have a more exaggerated noise with each attack.
    - They can also be used as an indicator of the scale of damage the character took, so if they get hit with a light attack, they make a quite pain noise meanwhile if they take heavy damage they make a louder noise.
- Even subtle things like the footsteps of a character can affect how the player sees different character; heavy steps for those with a broader frame, the tapping of smart shoes or the clicking of high heels can paint the player a better picture.

Ai

It would give the AI to much of an advantage to allow them to see when the player cant, so to counteract this here are several options:

- Players, objects and interactions could cause noise, by comparing the distance of the sound, the type of noise and how loud it, the AI may be able to detect it and respond to appropriately. An example would be hearing a footstep and then turning to attack where the noise was heard from.
- If the AI can see the player, then they will likely be able to attack first, as such, if you increase the player health that they can survive several hits easily this can balance out the difficulty of each encounter.
- In games where combat is not a primary aspect, the AI could only respond to specific events, such as doors opening or stepping on particular objects, inciting the play to react rapidly to deal with the approaching threat.

Player Interactions

Informing the player of what they can do isn't even part of some games; instead, they just let the player walk over to something, and it seems self-explanatory. In an N-VAE you need to make an effort to convey what anything does, for instance:

- Doors: like anything interactable, you want the user to have some way of distinguishing what is openable or not. But if your game has a way of informing the player about the location of walls, you can modify it slightly (such as changing pitch if it's a continuous sound) when approaching certain parts of walls to act as hidden areas. The player must be informed then an area has opened up.
- Pickups should be collected upon walking over them or be notified that one is in reach.

Picking up tools or weapons must be conveyed, either through exposition or instantly equipping the item and using the unique equip sound/effect inform the play that something is new. Equip sounds must be distinctive and convey the purpose with ease. It is acceptable to exaggerate these noises or have them not make perfect logical sense as to they your character is making any noise with it when they pull it out. For instance, if the player pulled out a rifle, they would load it, even if it should have been loaded, to begin with, it's okay to sacrifice realism for gameplay occasionally.

Environment

Given the users limited understanding of their environment, a focus must be put to convey the aesthetic of the environment as well as ways to direct the player towards the objective, for instance:

- Walls and other boundaries responding to the players' approach, examples include humming, an alarm sounds that represent threats like enemy noises or using the controller to vibrate increasingly as they get closer.
- Items to be interacted with must have a distinct method of notifying the user, this can be a noise to represent finding something or have the player character say some like “hmm, this feels like a key, the must be a door nearby.” or “nice, so ammo!”.
- As the user walks around, you can represent their progression through an area by changing how their footsteps sound or how the player responds to it.
    - For instance, if the player is walking through a facility that falling apart (and the further in they go the worse of a state it is in), the player could have an increasing amount of rubble that the player kicks over with each step (you can do this with just audio, no actual debris needs in be in the scene).
- The player character can mention how the floor changes from area to area, such as saying “Few, I nearly went through this floor, I better take it slow.” It is important to remember to ‘show not tell’ when possible, so avoid explicitly telling the player what's going on unless the information is vital, or it fits with the current situation/character story-wise.
- One way to get away with giving the player story or environmental exposition is to have a voice provide the player information from a third person perspective, such as a radio operator or finding audio logs as they go along. If you use this technique, have an option to skip through the audio clip and to use them sparingly, as they will distract from the actual gameplay and can be a nuisance to players.

UI

There is no UI, so you need to get creative on how you would represent the information that would be part of the UI:

- Health can be denoted in several ways
    - Physical cues (such as having your controller vibrate
    - Having the player character give noise prompts (such as heavy breathing)
    - Audio warping effects (the lower the health, the less clear sounds are)
    - The player character or another character can describe the player's condition (e.g. “according to our scans, you don’t look so good, are you okay?”
    - Ammo/reloads is a tricky matter, but can be most easily fixed by picking what weapons you use:
    - Futuristic settings can have laser weapons, these can fire making a constant sound, but as the gun is fired, you can modify the sound to show that the weapon needs to reload or cool down.
    - Weapons like shotgun can fire a single shot before needing to reload and a simple, so knowing when to reload/recharge is not an issue.
    - Ammo pickups can be annoying to find, so consider limiting ammo per level or to give the user unlimited ammo.
- Locating objective is best solved via some prompt, from a hot or cold system by pressing a button (informing the user through vibrations, beeping or being told via by a character) can help point players in the direction you want them to go.

Level Design

When building levels, you must take into account that the player will not be able to notice anything you do not inform them about, so each item of importance and each area they can explore must be considered carefully. Tips include:

- Deadends should be avoided when possible, as the player will need to reorient themselves and try to remember where they have once been and figure where they have not. Deadends can be used as places to store collectables or pickups, so the player feels rewarded for taking the wrong path, rather than frustrated.
- Essential items should be placed in areas that players are guaranteed to pass by, such as area entrance/exit or in areas where multiple routes converge. If an item can be easily missed, it will be.
- Place enemy spawns a reasonable distance from the player spawn, as it may take a few moments for the player to get there bearing when they respawn or load an area. Also, you want the player to be able to hear the threat from the furthest distance as it will allow them plenty of time to consider how to approach the situation.
- Having clear identifies to show the players progression, so they understand that they are pushing forward rather than going in a loop or heading back down. Adding areas like staircase or elevators can be a good way of showing that the player is going to the next level, as well as an opportunity to give the system some time to load the next stage.

Controls and Platforms

The quality of the controls can make or break a game, while many things go into making a game control well, and they vary on different platforms and genres, here are several thoughts to consider when making an N-VAE:

- When using touch controls for mobiles and tablets:
    - Give the user option on where the buttons are, so when if the user needs to respond to a situation quickly, they will be able to respond more instinctively instead then trying to find/remember where the button is supposed to be.
    - Using the inbuilt motion trackers can be fun, but don't make it a primary feature in the game, use it to slightly rotate the characters head so they can better gauge where a noise is coming from. If you make it essential, you will make the game hard to play in certain real-life situations, and that's never good for the user.
    - Careful with volume settings, you don't want the user to their volume to make to hear what's going on, to then receive a call and blow out their eardrums.
- For Controllers on PC and Console:
    - During the introductory level, have the player rotate 180° with three different rotation speeds (slow medium and fast, then you can ask whether to invert the controls or not) and allow them to choose their preference. It seems obvious, but it will really help.
- For Keyboard and Mouse on the PC:
    - When the user is playing, they will likely have their fingers the left side of the keyboard, so the only keys you should use are shift/esc/space/ q/w/e/r/a/s/d/f/z/x/c. This is not a strict rule, and there are plenty of valid exceptions, but it's just a good rule of thumb with N-VAE games.

Important: If your game is built in a 3d environment, disable horizontal rotation of the character's perspective, as it will just make looking around far more complicated and can lead to situations where the player is staring straight up in the air will trying to aim at an enemy.

Accessibility

One of the significant benefits of an N-VAE is that it can be played by people with any level of visual ability, in fact, this is the reason why the N-VAE exploration project was started.

Of course, there are more disabilities than visual impairment:

- Individuals with hearing disabilities will likely not be able to N-VAE games due to the premise being based around audio cues.
- Individuals with motor disabilities will struggle in a similar way to regular games of whichever genre your game will be. This means you should consider options for one-handed controls or a difficulty scale that gives users more room for error when playing.

As some voice acting is required for the menus at a minimum, the game will require some localisation when being sold in no native speaking countries, the amount of voice acting in the game will affect how much resources are needed to do this.

Multiplayer

Multiplayer is possible in audio-only games; however, you must remember to not include voice chat, as when audio is the primary means for the player to understand what is going on. Having voice chat enabled will cause all kinds of problems such as playing music so you can't hear what is going on during the game.

You can get around a lot of these issues with adding a button that allows the player character to give a set response, as well as limiting how often they are allowed to use it.

Conclusion

Making N-VAE games were never going to be easy, but where there are restrictions, there is ingenuity. The three most important things to remember when making a game with visual elements are:

1. The player must remain informed about their character and objective; otherwise, they will get lost.
2. Audio clips can be subtle, but they must be distinctive, or else they get lost in the action.
3. Don’t make life for your players too hard, ease them into it and don’t add overly complicated elements that overwhelm their senses or can easily be missed.

Thank you for taking the time to check out my work! If this helped you in the slightest way or gave you a single idea on your next project, then I couldn’t be happier.

With appreciation; Jordan Wright