Finding Lucy yesterday

Temporal dislocation via binaural sound in the
mobile opera, 'Fragments'

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The purpose of this talk is to align my opera for mobile media, called *Fragments*, with the provocation of 'elastic space'.

I'll very briefly discuss the features that might constitute an opera for mobile media, before discussing how Fragments deploys binaural sound to disrupt the listener's experience of time as they negotiate the work.
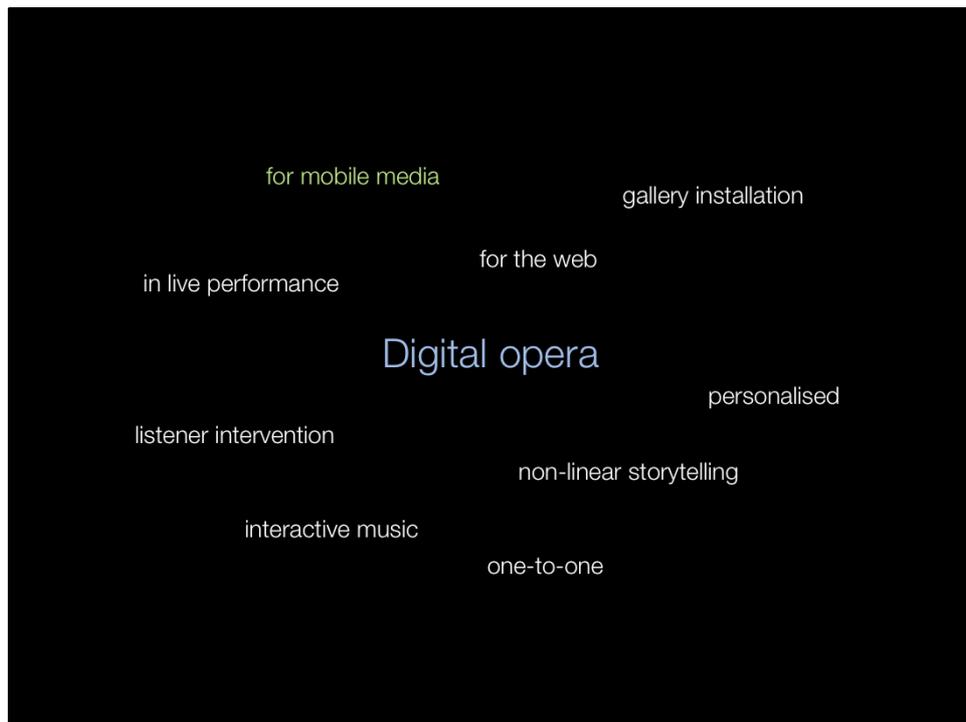
An opera for mobile media is a subgenre of what can be described as 'digital opera'.

A digital opera suggests a new operatic form that is "intrinsically digital from conception to finished outcome". Qualifying works reconfigure and reimagine typical features of opera, deploying concepts of digital storytelling and interactive music to enhance the splendor and evocative nature of the form.

The Imaginary Voyage (2013)

Screenshot from the 'Isle of Cack'
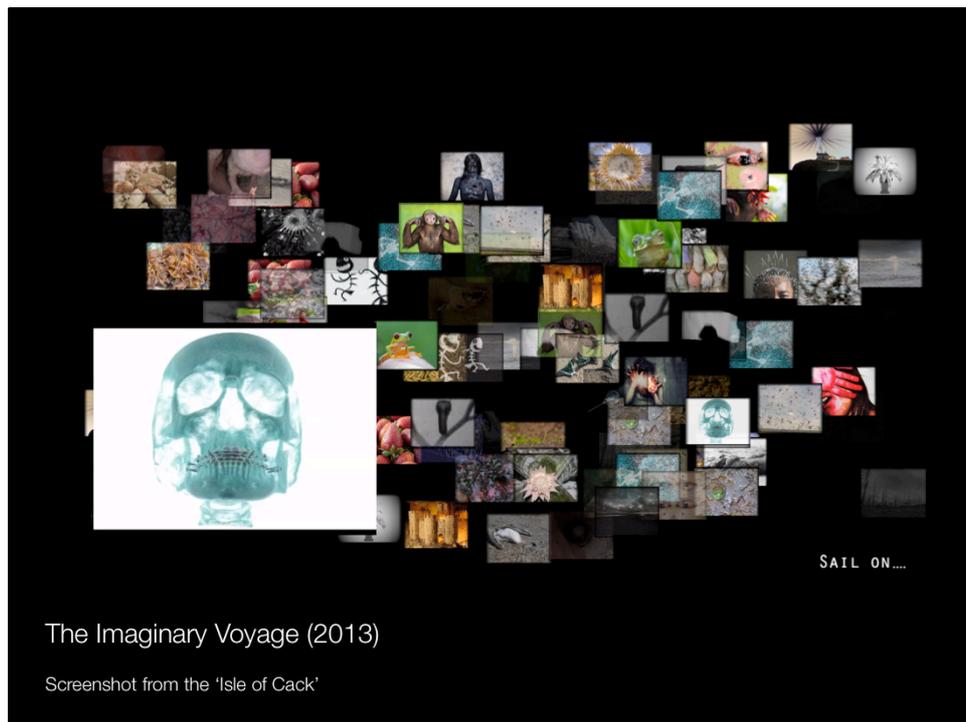
A digital opera might be presented on the web…

This is a screenshot from the online opera, The Imaginary Voyage, which is based on Alfred Jarry's text 'The Exploits and Opinions of Dr. Faustrol, Pataphysician'. The narrative features Faustrol, a lawyer and a dog faced baboon who sail the 'squitty sea', encountering a number of strange and unique islands on the way – this particular islet is the 'Isle of Cack'.

Secret Garden (2012)

Images from MOCA installation in Taipei

A digital opera may also be presentated as an installation.

This is an opera/ballet called Secret Garden where users use iPads to peer into virtual peepholes which collectively tell the story of The Fall.

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The End (2013) - Live performance

Libertaria (2013) - Machinima

The Village (2014) - Web, social media
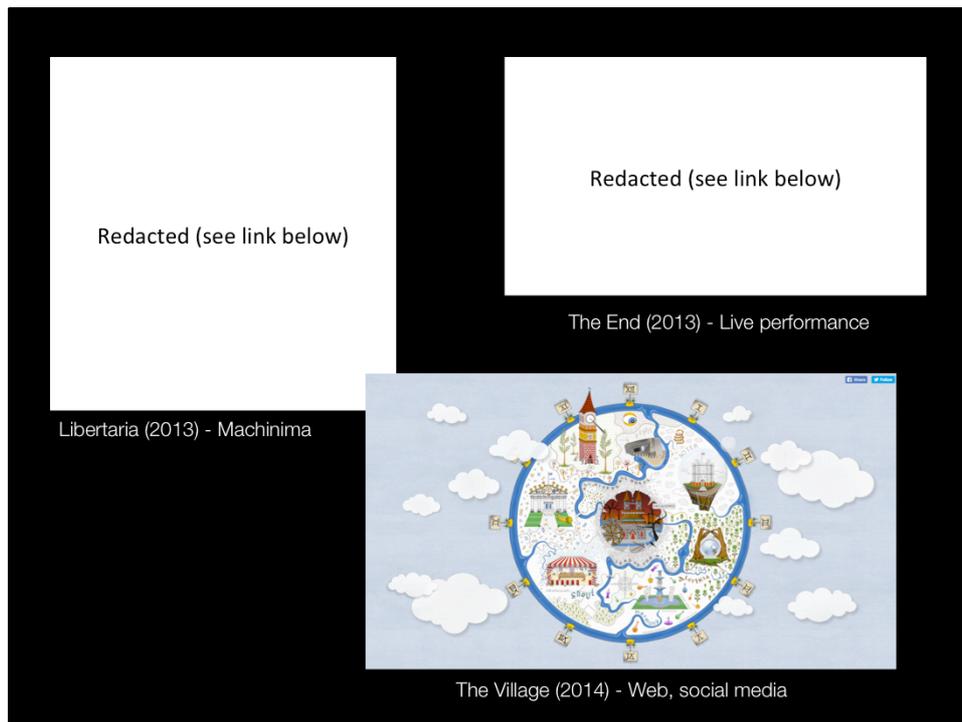
But digital opera comes in many flavours, and there are surprisingly a lot of them; from machinima operas, live staged works with entirely computer generated performers, to animated, social media inspired operas that encourage interaction with and even intervention of the core components of opera, such as text, sound and image.

The End: https://www.youtube.com/watch?v=Ey8oj8S-j3U
Libertaria: https://www.youtube.com/watch?v=lB5SItVSliw

Opera for Mobile Media

You Are Here (2014)
(left)

The interior spaces of Glyndebourne Opera are linked to impromptu performances filmed outside several Berlin opera houses. By scanning QR codes, UK participants access virtual 'peepholes' that serve as a bridge between Glyndebourne and Berlin.

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Omnivore (2012)
(right)

An opera about Finish culinary habits. Deploys a reconfigurable 'media manuscript' to serve short filmic episodes to users once per day at varying meal times.

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There is nevertheless a lack of opera for mobile media, with the two more visible examples advanced by Finish theatre director Jaakko Nousiainen.

Nousianen's work encourages us to consider what opportunities mobile media can offer to the opera form.

One unique feature of mobile devices of course is that they are location aware – this leads to idea of city-wide operas, and the incorporation of journey and discovery into the tone of the work.

The mobile experience is also a rather individual one – so arises the idea of personal opera's that can be steered by the user.

And how about how we experience music on the move? Mobile media prompts us to reimagine how we encounter music, and consider the creative possibilities of music written specifically for headphone presentation.

My prototype opera for mobile media, *Fragments* explores these possibilities as creative research.
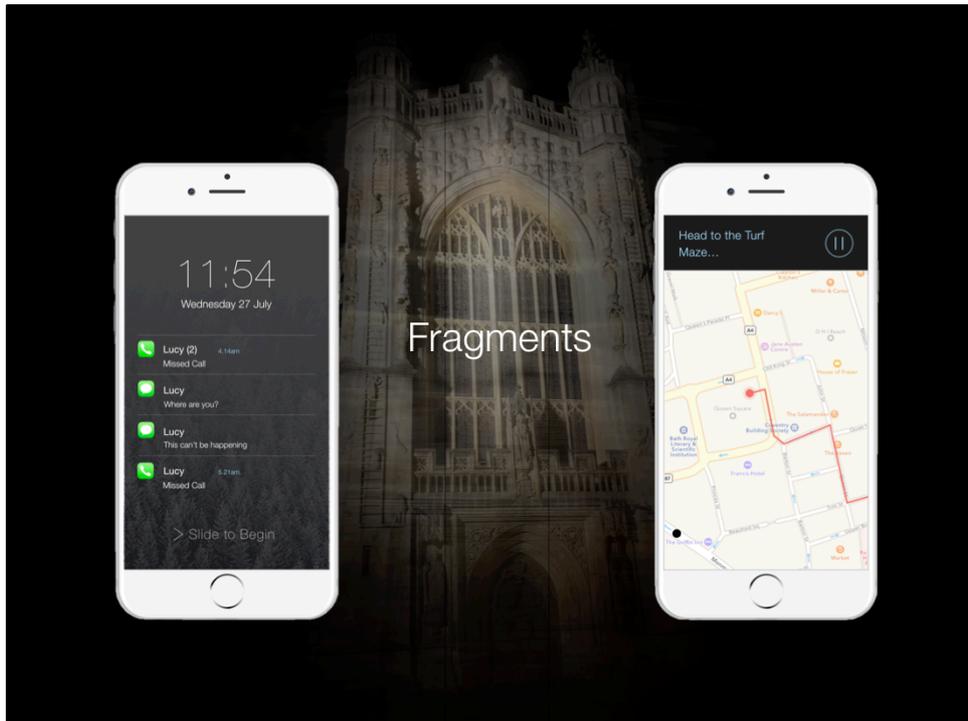
Fragments is a personal operatic experience, set and delivered in the city of Bath.

It tells the story of an unnamed male protagonist who wakes early in the morning under the shadow of the Beau Nash obelisk in Queen's Square. Dazed and confused, he reaches for his iPhone to find several missed calls and frantic text messages from his partner, Lucy. He remembers relaxing in the city with her several hours earlier yet has no recollection of subsequent events. Lucy is nowhere to be seen, cannot be reached, and may well still be in distress. The player enters the opera at this point, and is hurriedly encouraged to take responsibility for the protagonist's wellbeing. With only an onscreen map marked with two waypoints for guidance, the player proceeds to lead the unnamed, helpless figure across the city in search of lost memories.

Along the way, the player must choose which locations to next visit, guided by the app, where each new location reveals information about what really happened the night before. The player however must make rationale interpretations of what they have learnt, as ill-judged decisions on what to believe and where to go next may lead to an unfavorable conclusions to the drama.
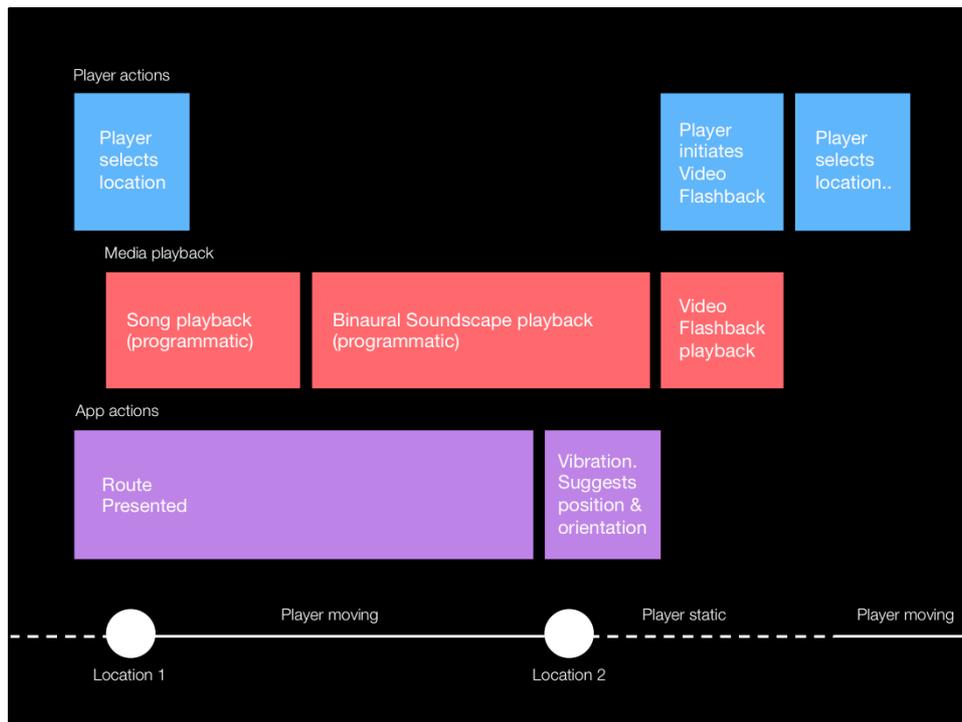
Fragments is told through video, binaural soundscapes and music in the singer songwriter tradition.

The key mechanism I use to tell the story is the 'audio or visual flashback'. The protagonist, and by extension the player, at times is transported back to the events of the previous evening. Visual flashback events are presented via video as the player enters an area of Bath that has significance to the story, yet there are many other more subtle audio events that occur on the way to flashback sites. These audio events take the form of binaural soundscapes, which I'll discuss in a moment.

The function of video flashbacks, however, is to help the player piece together the events of the previous evening. They are essential a depiction of the protagonists memory. These videos are often turbulent, presenting scenes in the wrong order or containing conflicting versions of the same event – the point here is to suggest that the protagonist is misremembering what took place or is incorrectly interpreting his memories. The songs act as the 'voice' of the protagonist, and provide a character-driven, emotive response to the events unfolding around him.

This example I'm about to play is triggered when the player visits St John's Church on South Parade.

On approach, the app will alert the player that a flashback is imminent by vibrating the device, before suggesting that they stand in a particular place. To achieve a feeling that the protagonist's memory is triggered by his surroundings, it is important to try and position the player in such a way that the objects and perspectives in front of them also appear in the flashback videos.

Binaural Sound

So back to binaural soundscapes. A key device used in *Fragments* to disrupt the players perception of time is binaural sound, or 3D sound.

Binaural sound is used to temporarily, and unexpectedly present the sound of the city at night to players roaming the streets during the day. The intended result is a feeling of disorientation as the player encounters sound events that are related to, yet disconnected from what they see around them.

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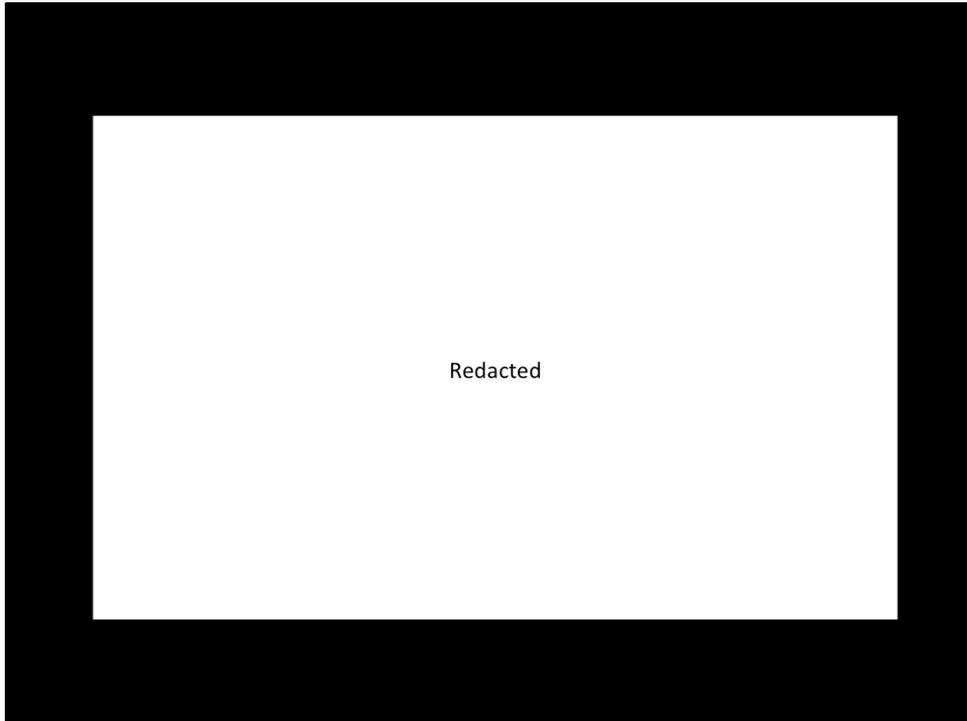
Binaural sound is a form of headphone-targeted audio that aims to reproduce accurately the acoustic properties of the space in which it was recorded, therefore situating the listener at the site of audio capture.

Without getting too technical, binaural recording systems do this by simulating the way that the ears capture sound. If, for instance, a sound source is located at the front-right of the listener, that sound will take a little longer to reach the left ear than the right. This is called *Interaural time difference*

Because the ears and head have mass and shape, we find also that there is a difference in both volume and frequency content at each ear. This is called *interaural level difference*.

Our ears interpret these two phenomena to locate sound sources accurately. This is also why we struggle to tell where sounds originate from when we have a cold – pressure and blockages disrupt the normally function our ears.

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3Dio Free Space binaural microphone

Binaural microphones work by preserving the interaural time and level differences experienced by our ears. In other words, they simulate the human ear and head. On screen is the binaural microphone used to capture city sounds in *Fragments.* You'll notice a couple of important features, such as:

a) The microphone capsules are inside a silicon mold of a real ear, and
b) The mass between the ears is preserved - which in effect simulates the head. Other binaural microphones look more like a human head for this reason, however the one I used provides a reasonable simulation and costs about £5000 less!

The interesting thing about binaural sound recordings is that they are often unconvincing. I think the reason for this is usually because the recordings are rarely experienced at the site of capture. For instance, listening to a binaural recording of a concert hall in a cupboard is going to present a mismatch between what the ear hears and the eye sees. The brain often rejects the illusion because the audio and visual environments clearly do not correlate.

However, I've found that when you replay binaural recordings in the same place in which they were captured, the results are very compelling – eerie in fact.
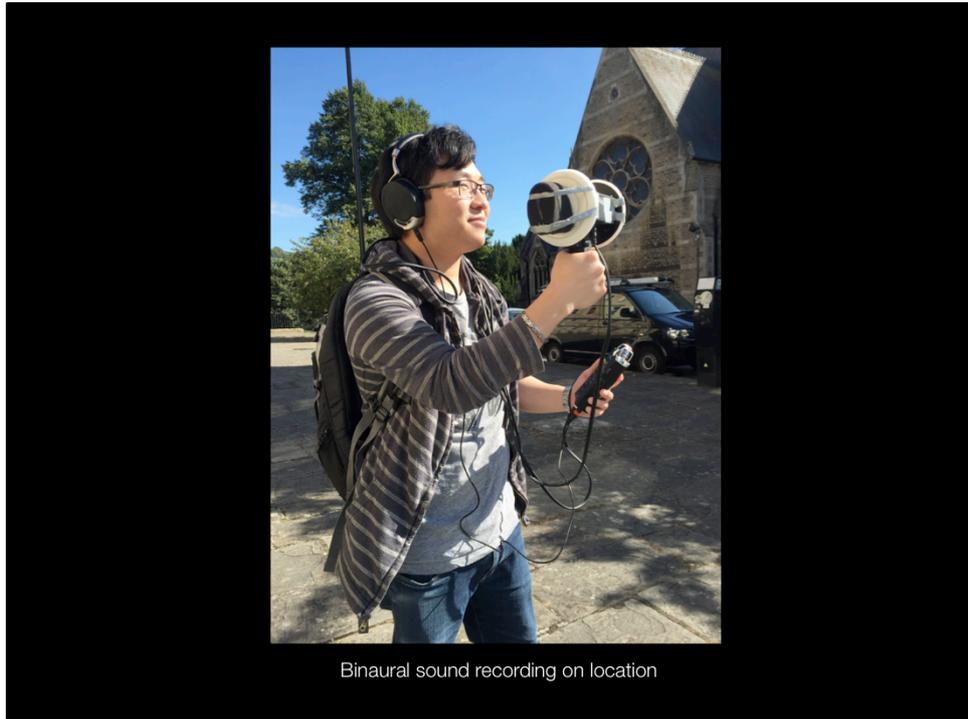
Binaural sound recording on location

Here's a good friend Yans Lee helping me record the bells of the church seen in the video you just saw. We recorded the bells, sat on a bench near the church and replayed the sound. What we experience was ghostly, and in fact, we had to remove the headphones at times to check that the sounds were actually appearing on the recordings and not from the church itself.

Major sound events

Set pieces
Evolve over time

Minor sound events

Incidental
Temporary disruptions
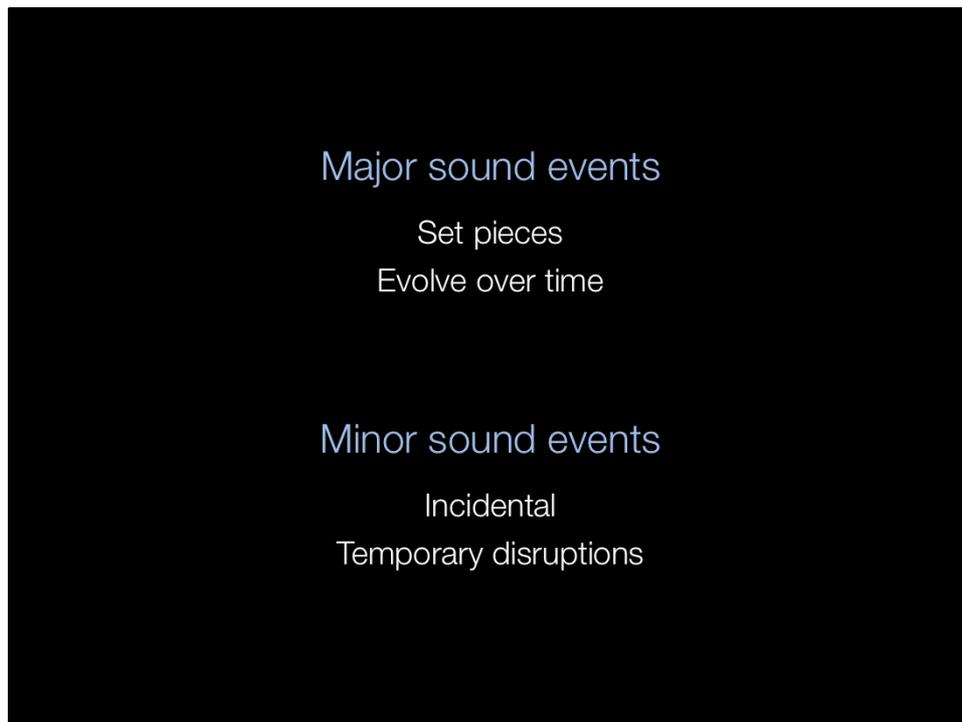
I use binaural sound in *Fragments* to superimpose the past on to the present – the city becomes an elastic space in a sense, as the player is transported back and forth through time via what they hear. This is done is two ways: through major audio flashback events, and more coincidental, minor sound events.

Major audio-based memory events are 'set pieces' that present at several points during the opera, with one of the more critical instances occurring on the route to the nightclub Komedia. When approaching from the east side of the city, the player first hears the dull thud of club music in the distance. They continue towards Komedia, eventually entering a sound world that is vibrant with the bustle of a busy Saturday evening. The kineticism of the aural environment contradicts the lazier daytime scene that surrounds the player visually, forwarding a sense of confusion and temporal dislocation.

Minor sound events occur more transiently, and serve to temporarily disrupt the player's understanding of the city. An example of this might be a walk down a quiet alleyway, which day or night, will sound pretty similar. Binaural sound here may, for instance, present the sound of a bicycle bell ringing as it passes the player, or people talking in close proximity when they are in fact not there. These minor events put the player on edge – which again serves to help them relate to the mental state of the protagonist.
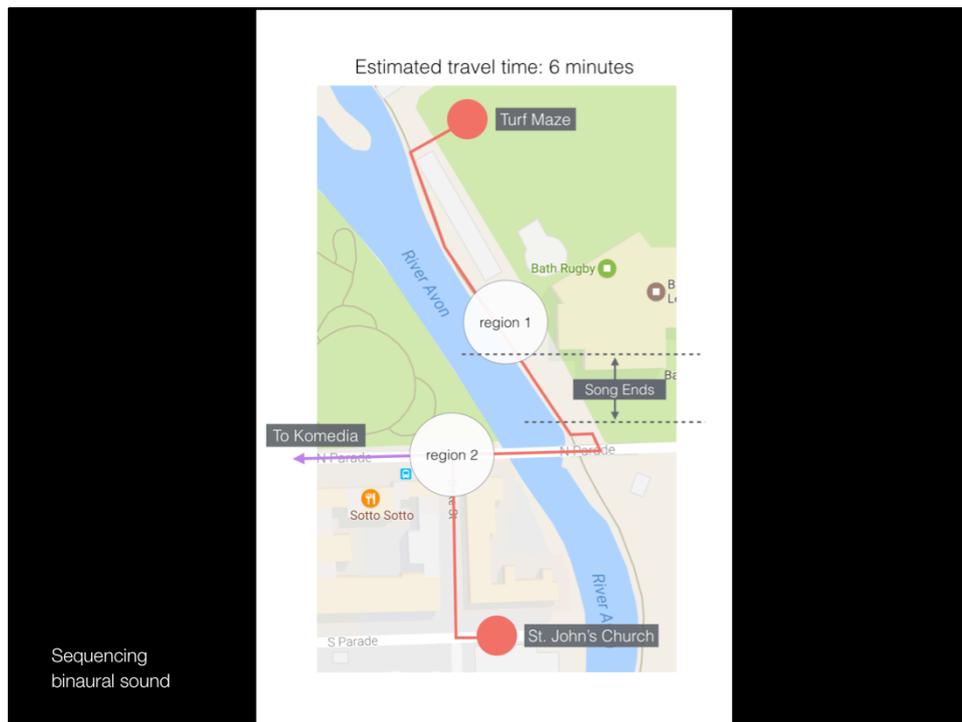
All routes between flashback locations were walked and recorded on a busy Saturday night – the time in which the flashback world is set. This made for some very interesting moments when semi-intoxicated people mistook the microphone for a video camera...

As player walking paces vary, it made sense to divide the binaural audio into 'blocks' that could be organised and triggered as required during the opera. The consequence of not doing this is running the risk of presenting binaural soundscapes to the player that do not correlate with physical environment around them.

Here is an example of how binaural sound blocks are organised in the walk away from the Turf Maze scene.

When exiting the Turf Maze, the player choses whether they wish to next visit Komedia or St John's Church. At this point, the protagonist's song beings playback – it is expected to conclude at the point marked 'SONG ENDS'.

There are three binaural tracks for the route away from the Turf Maze: one that presents the sound of the river, one that describes the route from REGION 2 to Komedia and one that describes the route from REGION 2 to St John's Church.

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There is of course much more to say about how *Fragments* uses binaural sound and video to advance a feeling of temporal dislocation, and how these mechanisms position the city as an elastic space that fluxes between the past and present. One example, is how binaural sound recordings were on occasion dilated or compressed to disrupt the normal passage of time.

END OF PRESENTATION