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ANDREA VALLE and PAOLO ARMAO

Integrating Sound Design and Music Composition in the Interactive Play *Cotrone* by Marcel·lí Antúnez Roca

ABSTRACT

Marcel·lí Antúnez Roca is a well-known figure in the field of interactive multimedia performances. His latest work, Cotrone (2010), is an interactive play inspired by Luigi Pirandello's last, unfinished masterpiece I giganti della montagna (The Mountain Giants). In Cotrone, two performers on stage tell the many proliferating stories that were left unfinished in the original play. This work is done through the use of animated video clips that are controlled interactively by the performers wearing sensor-equipped exoskeletons. Through these means the performers can also trigger audio samples as well as record, process and play back their voices. A third interactive device is provided by six pressure-sensitive carpets on stage. In Cotrone there are three kinds of audio elements: background sounds for each scene of the play, interaction sounds, and sound for the animated clips. The authors of this article were responsible for the production of all the sound material (music and sound design). We discuss the main issues that emerged, in particular the absence of an established production model, and the need for developing a new one, tuned to Cotrone's technical and aesthetic features. Instead of considering sound design and music composition as

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1. For a resumé of Antúnez Roca's artistic career we rely in the following on the autobiographical considerations in Antúnez Roca (2011a) and on the interview/foreword by Mazzocchi in Antúnez Roca (2011b).
2. Premiered in Torino on 14 November 2011, within the Festival Prospettiva2, by the Teatro Stabile di Torino. It made its debut in Spain at Festival Temporada Alta, Girona.
3. For a general account of the work see Mazzocchi (2011), Pizzo (2011), Valle (2011).

two separate domains, the authors developed an integrated approach that included a customised workflow. The notion of 'computational primitivism' was formulated as a guideline for the work, with this term indicating the pervasive use of computational strategies for sound design/music composition and how this relates to an archaic, body-related, strictly acoustic sonic imagery. A second relevant issue is the integrated approach related to the metalinguistic tension present in the work.

I. THE BODIES OF COTRONE

Marcel·lí Antúnez Roca is a renowned Catalan artist, founder and for the first ten years (1979–1989), artistic director of the notorious La Fura dels Baus, a collective that since its inception has worked structurally with complex 'multimedia' set-ups.¹ Using different media, including music and sound, La Fura characteristically performs actions in public, non-theatrical spaces that involve (and shock) the audience. In his solo career (which began in 1990), Antúnez Roca immediately focused his artistic attention on technology and its social impact, starting from a deep relationship with the personal sphere of the body (including his own) that finally reaches society. As noted by Bosco and Caldana, 'Throughout his career, the body (almost always his body) has been the stage and the physical space of his performances'. (2009: 10)

A pioneering figure in the field of interactive performance, Antúnez Roca developed this approach from the early 90s, well before the so-called 'physical computing' approach – the idea that computation can be embedded into physical objects – became fashionable (see the seminal article by O'Sullivan and Igoe 2004). The artist refers to the general methodology that he developed in the last twenty years as 'Systematurgy'.

Antúnez Roca's most recent work, *Cotrone*², was inspired by the final masterpiece of the Nobel winning Italian playwright Luigi Pirandello, *I giganti della montagna* (*The Mountain Giants*, 1931–1933). The play focuses on a company of itinerant actors and a group of misfits who meet in a desolate villa, lead by the magician Cotrone. They try to stage a play for the wedding of the mysterious giants of the mountains. Unfinished at the time of Pirandello's death in 1936, the story ends just before a dramatic conclusion during which the main female character probably would have been killed and eaten (on his deathbed Pirandello is said to have revealed the ending to his son Stefano). Antúnez Roca's idea for the script of *Cotrone*, developed in collaboration with Antonio Pizzo and Pere Vilà Barceló³, was to take the baton from Pirandello and follow the stories of the many characters involved in the original play; it is no accident that the artist chose the name of the magician as the title of his work. This complex task is pursued by means of a theatrical stratagem: two of the actors claim that they have extorted a confession from Pirandello on his deathbed. From then on, they start a picaresque and grotesque tale, chasing the main characters through the proliferation of their ups and downs.

Two features emerge strongly in *Cotrone*. First of all, far from the cultivated contemporary theatrical models of the avant-garde, the thematic

and narrative articulation follows the model, ancient and popular at the same time, of a cycle of frescoes, 'The Stories of Cotrone', as it were: thus, the work unfolds through the Story of Ilse, the Story of Cromo, the Story of the Conte, and so on, combining, as usual for the artist, 'autobiographical elements with classical myth, moral fable, popular wisdom and a broad conceptual and ideological background' (Bosco and Caldana 2009: 10). A more proper theatrical model could be the series of heterogeneous numbers that compose the Variety shows (Pizzo 2011). Coherent with this observation, three scenes (the so-called Kung Fu numbers) define a sub-cycle that is substantially based on a dance mood instead of developing the story of a character. Secondly, since it overtly takes Pirandello's *Giants* as its starting point, *Cotrone* displays an explicit metalinguistic attitude. A metalinguistic interest has never been developed in such a deep way in Antúnez Roca's previous works, despite the dense intertextuality, for example, of the *Membrana* project.

As a consequence of these two features, a form of hybrid imaginative world dwells in *Cotrone*. On the one hand, the somewhat archaic, Mediterranean, mythic dimension of the *Mountain Giants* ('myth' is the actual word that Pirandello uses in the script to describe the timeless dimension of his play, see Pirandello 1985) remains firmly active in *Cotrone*, first through the presence of the same characters, but also through the cruel reference to anthropophagous ingestion, whose presence in Pirandello's original play clearly attracted Antúnez Roca. In relation to the second feature, the metalinguistic dimension is already present in Pirandello's obsession for the discursive device, and the recurring, abysmal figure of the theatre in the theatre. In Antúnez Roca's version this theme reaches a hyperbolic projection: technology expands theatrical possibilities by building a form of cruel puppet show, taking shape through interactive multimedia. But in order to avoid the risk of staging a pure technological spectacle, Antúnez Roca opens *Cotrone* by immediately and explicitly showing the technology as the performers actually involve the audience in testing some of their devices. In Figure 1, one of the performers (Alessandro Lombardo) is rehearsing. He is looking at the screen of short video clips of the audience which he took with a 'gun cam' (not shown). The clips will be reused later.

From a technical point of view, *Cotrone* is organised into audiovisual, interactive scenes. In each scene, an animated video is projected on to a large background screen that operates also as saturated, colourful scenery. The screen projections are not only a visual contribution to the scenery, but they also display short animated films. The two actors in the scene are provided with an attached interactive technology worn as an extension of the body and referred to as a 'dreskeleton', an exoskeletal body interface. It was developed originally for the work *Afasia* (1998, Antúnez Roca 2011: 22), and can be used as a general controller, for example, tuned in order to trigger or modulate video or audio samples. An interactive audio application of the dreskeleton is the so-called 'scream machine'. The dreskeleton includes a lavalier microphone: thus, the performer can first record his/her voice and then manipulate the resulting sample

4. In Catalan, “stories told through pictures”, Antúnez Roca (2009: 71).

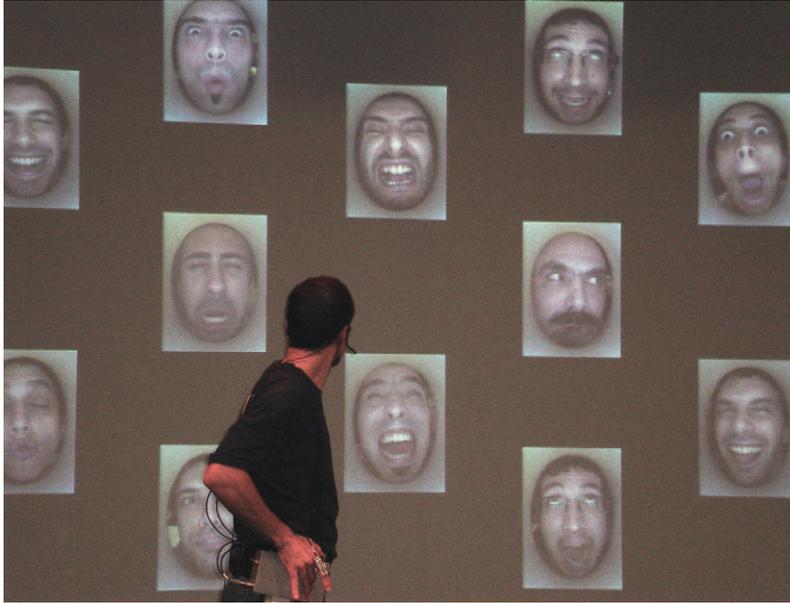


Figure 1. Testing the ‘guncam’ device that let the production insert video clips shot amidst the audience.

(for example, changing its pitch) by means of physical gestures (typically, arm movements). In Figure 1 the performer is wearing the dreskeleton: the lavalier microphone is visible, and the general controller is attached to his belt. In *Cotrone* the dreskeleton allows the performers to manipulate audio content (the aforementioned scream machine) but – above all – to trigger animated clips, thus defining in real-time the pace of the video sequencing. A second interactive device is provided by means of six sensor-equipped carpets placed on the stage floor: by strongly crushing the surfaces with their feet, the performers trigger video and audio samples (see Figure 2).

In relation to audio/music production, *Cotrone* required three types of material.

First, the animated clips include sound that is intended as traditional ‘film sound’, in that it is connected to environments and actions represented in each clip. Even though Antúnez Roca has experimented with the use of animated *aucas*⁴ this inclusion of sound design is quite new with respect to his previous works. To some extent, *Cotrone* can be seen as a sequence of cartoons edited interactively on stage by the performers. The presence of sound here must adequately fulfil a minimum fictional standard as defined by accepted film sound practice, otherwise the clips would become a purely visual kaleidoscope. Instead, they must guarantee an interaction between different narrative levels (the story of the performers, the stories told by the performers).

Secondly, some sounds depend on the interactive performance. In addition to the aforementioned scream machine, the interaction with



5. The music has been published in Andrea Valle, *Arsenale delle Apparizioni*, Nephogram, npg-013.

Figure 2. The two performers rehearsing one of the so-called Kung Fu numbers. Interactive carpets are visible on the ground.

carpets is emphasised with sounds thus creating a clear relationship between physical action and sound component.

Finally, as a third type of sound content, all the previous sounds have to be grafted onto a background layer that is all-pervasive: this layer was designed to have a musical nature, as Antúnez Roca had planned a specific musical characterisation for each scene. This, in turn, constitutes its soundscape, defines the general atmosphere, emphasises the figurative aspects and determines a specific rhythm.

We, the authors, were in charge of these three types of audio content. In particular Andrea Valle was initially involved as the composer⁵ and Paolo Armao as sound designer. Because this particular fusion of sound design and composition was a unique concept within the interactive arts dialogue, traditional frameworks used in film sound design and music composition were adapted for real-time interaction on stage. Moreover, we realised that these two praxeological domains, with their own specific practices and values, can both contribute to the definition of background layers, as the latter can be realised on the continuum from environmental sound to composed soundscape in the tradition of acousmatic soundscape composition (see, for example, Westerkamp 2002), to explicit musical composition. Finally, interactive sounds such as the ones in the Kung Fu numbers are indeed related to the actions in the scene (crushing the carpets), but these actions have an intrinsic musical effect, as they are placed over music that accompanies the performers' dance. As a consequence, the sound design for the animated clips had to be tailored so that it would not result in an autonomous and heterogeneous layer with respect to the other two.

6. We do not intend to enter into technical details; in any case, all the production and post-production work has been realised through the Avid Pro Tools Digital Audio Workstation. Algorithmic techniques have all been implemented using the SuperCollider environment and programming language for real time audio synthesis and algorithmic composition.
7. In order to ensure consistency throughout the work, we did not rely on pre-existing libraries: all the samples have been recorded anew.

In the remainder of this article, we discuss the specific strategies utilised to integrate all the components involved.⁶

2. COMPUTATIONAL PRIMITIVISM

In order to cope with all these issues we defined a general aesthetic principle under which we developed our work that can be termed *computational primitivism*. Primitivism refers to an archaic, timeless and body-centred dimension, indeed relevant in Antúnez Roca's *Cotrone* and in the text from which it has sprung, *The Mountain Giants*.

In *Cotrone* we tried to suggest with sound a world populated by acoustically interacting bodies by emphasizing the indexical dimension, that is, the origin of sound as the result of a mechanical gesture. The relevance of the body – and of the sonic traces the body leaves through the energy of its actions – also made less viable a second hypothesis that we had taken into account: to replace the music with a soundscape of assembled field recordings. In that case, even if the results had respected the 'acoustical principle', the risk was in fact to activate a distal listening perspective, unable to be interpreted as proximal, body-related, almost tactile, sound.

It must be emphasised that the idea of an acoustic principle does not imply the use of instrumental sounds: rather, it aims to define a 'proto-instrumental' regime, so to speak, in which the idea of the instrument, as an amplification of the body exploiting its mechanics, is brought back to its roots; the mechanical vibration of the string, the shot on percussion, the breath in a pipe, or the voice resonating in the head/chest. This constitutive relationship between the body and the instrument has been largely investigated by André Schaeffner (1994), but it is also present in the considerations developed by Pierre Schaeffer (1966) on the relation between the sound object (the phenomenological presence of sound) and the sound body (the acoustic source).

One of the consequences of this regime of 'proto-instrumentality' is that we worked exclusively with close-miked samples of acoustic sources to try to create a sonic continuum between the two poles of music and sound design, instead of pursuing a clear differentiation between the two approaches to sound.⁷ For our goal the role of percussion was crucial, as impulsive sounds specifically capture the nature of sound as the signal of an energetic event, of a rupture of the air pressure equilibrium. A second dominant sonic feature lies in the use of metallic sounds. Metal sounds, vibrant and resonant, are intended as a stark contrast to the imagery of meat; soft, organic and sound-absorbing. The metal acts as a counterpart to the flesh.

An example of this primitivistic attitude can be seen in the three interactive Kung Fu numbers. When the performers simulate a fight by jumping rhythmically on the six carpets equipped with pressure sensors, these actions trigger sounds and video clips. The music for these three scenes is based on three different sets of impulsive samples that come from 'domestic' percussion (metal, wooden, plastic boxes and containers or

glasses, of different dimensions). This incongruous musical material is organised in a rhythmically strict sense, leading to a cartoon-like exoticism. The evident proto-instrumental percussive nature of the sound is in this case further emphasised by interactivity. In terms of sonic interaction design (see Rocchesso 2011 for an overview), the design of the sound is crucial in this case, as the sound is relevant both for the relationship between audience and performers and in the relationship between the performer and the carpet. In addition, the performer must also be confident that the acoustic result of their jumping action will have a positive feedback related to the interaction between the body and the ground surface. There were two constraints: first, the sounds triggered by the six carpets had to be different so the performers and audience could easily recognise each carpet and secondly, in order to be sonically isolated against the thick percussion layer they had to be homogeneous enough among themselves to be perceptually separated from the background sounds. We eventually solved this problem by adding a pitched percussion layer. The basic sound is percussive, and the clear attack is fundamental to marking its relationship with the jumping action. We then created a basic bright, reverberating and long-decaying sound. These three features define a phenomenological opposition to the less spectrally rich, very dry and short sound materials used in the background music. Such an opposition is intended to provide cues to the listener in order to facilitate auditory streaming (Bregman 1990). The basic sound is then carefully transposed in order to assign each carpet a tone. As a result, each Kung Fu number is provided with a specific 6-tone mode, that allows one to distinguish one number from the other. In this way, the performers, through their actions on the carpet, can create different pitch sequences from each mode, their dance becoming a real-time, interactive instrumental gesture performed on the carpet instrument.

Another relevant example of primitivism can be found in the scene of Patuqueo telling a fable-like story of two bizarre characters, Patufet and Quaqueo, who in the end become the same person. Our sound design needed to echo the specific dramatic-cartoonish style exhibited throughout Cotrone's visual components. Pulling sounds from a pre-existing library provided a mood that was too dramatic and less on par with the cartoonish, slightly surreal nature of this show. Using the human voice as a modelling device, we created a library of the necessary sounds during a session with the actors (for example, a crow cawing). This common technique in sound design enabled us to give an expressive and stylistic colour to our sound library (see Viers 2008). The voice, by its dominant usage, becomes the way in which the sound is represented by the body.⁸ The tale is told by the voices of the performers that are commenting on the images. But at the internal level of the animated clip, this voice is no longer capable of articulating a known language: there are no spoken words by Patufet and Quaqueo, only growls, sobs, sighs and screams. The voice, far from being the signal that conveys the language, is brought back to a pre-articulate 'degree zero' but at the same time it becomes the sound of all the natural events (animals, objects and atmospheric events).

8. The relevance of voice as a general "modelling device" as already been noted by Chion. (1990) discussing Delalande's observations on vocal imitations of sounds by the children.

9. For a computer-based approach to sound design, in particular focused on sound modelling, see Farnell (2010).

In relation to the adjectival side of computational primitivism, the computational dimension is at the core of Antúnez Roca's approach to dramaturgy, his *Systematurgy*. The presence of the body and its performing role on stage has its counterpart in a complex formal organization of the performance, where the body is a source of information. In the musical composition, this aspect has led to the pervasive use of algorithmic composition techniques (Roads 1996, Reck Miranda 2001), that is, the use of formalised models and methods to control the sequencing of sound objects, and to a lesser extent in our case, sound processing. But this attitude has revealed interesting applications also at the boundaries between music and sound design.⁹

A first example was the sound background that is introduced to the audience as they enter the theatre, house lights on. Antúnez Roca always considers this moment important because it prepares the general mood of the show. Since it depends on the audience taking their seats, this section of the work has an undefined duration.

Our choice was to define a generative strategy for background creation, so that we were able to avoid looping sounds while also having an undefined time piece. The resulting soundscape can be played in real time for any duration and is made up of six layers. Two of them are very long loops, with a raindrop sound and a quiet metallic percussion improvisation. The idea was to create a natural external space as opposed to the interior of the theatre while also introducing metallic percussion sounds that would be exploited later in the show. On this background, three layers are superimposed algorithmically in the form of randomly parametrised routines, involving metallic and harmonically resonant percussive sound, isolated bird cries and finally barking dogs. While the first layer contributes to the metallic sound atmosphere of the whole work, the last two are intended as natural figures of violence through predation (that is, the threat for the body to be torn to pieces and eaten) that will be explicitly addressed later in the play. The last layer occurs in alternation (controlled again by random factors) with the three previous ones. It features vocal and typing sounds, mixed as in a whispering crowd, emerging from the background. Again, this kind of sound material anticipates its usage in two scenes of the performance. The result is an algorithmically generated *musique concrète* that can act both as a music background and as a soundscape. Indeed, the boundary between the two notions is blurred, and such a form of algorithmic sound design was intended to be placed exactly in between them.

An explicit progression from sound design to music is at the core of the so-called kitchen scene, where a Frankenstein-like ritual takes place, the body of the female main character, Countess Ilse, first being reassembled from foods found in the kitchen and finally brought back to life through a form of necromantic invocation.

An algorithmically generated sequence of sound samples recorded from a Foley session creates a background for the performers and the video actions. This background, whose density is progressively increased, is made of mostly metallic sounds related to kitchen tools (mainly cutlery), and

provides a context for the sounds in the animated clip that are traditionally synchronised to the contents. At the same time, the background sounds are sequenced by algorithmically placing them on a quantised metric grid. As already noted by Pierre Schaeffer (1952: 20 and 34), once filled with sound samples, a predetermined rhythmic organization seems no longer to be perceptually recognizable. Reconsidering the experience, Schaeffer noted that in this kind of operation there is a possible clash between a double determination of time, on one side related to the micro level (that is, depending on each sample's temporal structure) and the other side on the macro level (that is, related to the rhythmic organization of the samples). Working on the boundary between these two listening perspectives we tried to devise a progression between the two temporal poles by superimposing onto the micro/macro opposition a second level of tension, respectively between environment- and music-focused sound material based on 'wind instruments' (toy or extra-European flutes and winds), revealing an anthem-like nature, required by Antúnez Roca as a way to emphasise the moment of the invocation in the resurrection ritual. At the end, the musical (even if still eccentric) material provides a clear context for the prevalence of the external, 'syntactical' time.

A computational approach is also at the basis of a parametric variation of a classic film music technique, the *leitmotif*. This technique has proven to be useful in order to individuate clearly the presence of the Giantess. In *Cotrone*, at the very end of their story, all the characters are eaten by this mysterious figure, which acts as a *deus ex-machina*, a reference both to the power of imagination that creates and destroys and to the metalinguistic device that re-absorbs the stories after having created them.¹⁰ As the Giantess returns seven times to ingest all the characters, we devised a sonification strategy in order to avoid the mere repetition of a unique *leitmotif*.

All the short motifs are constructed as a sequence of well-articulated sound objects. These objects in turn result from the superimposition of multiple samples. The sound objects are then combined with a fixed background that ends in an elephant-like bellow obtained during the Foley session by screaming into a 2.5-meter, strongly resonant metallic pipe (Figure 3).

In each motif, the sequencing of the sound objects is handled by a routine that scans, character by character, a fragment of the original text of Pirandello's *Giganti*, and associates a sample to each character. Each arrival of the Giantess is then encoded by 'reading' a different short fragment from Pirandello's masterpiece. This mechanism determines a family resemblance between the leitmotifs while avoiding a repetitive effect. In *Cotrone*, the procedure introduces an additional, if hidden, Pirandellian subtext.

The use of formalised procedures was also mandatory in order to solve some issues related to interactivity. In the scene dedicated to the character Mara Mara, the performers improvise on the music background with the scream machine, but at the same time they are responsible for triggering four other musical layers (two for each performer) that are progressively

10. Not by chance, Antúnez Roca considers the Giantess his alter ego (Pizzo 2011: 55).



Figure 3. A Foley session, Andrea Valle screaming into the pipe to obtain the Giantess' bellow.

superimposed over the background. As it is not known in advance when the triggers begin, a system of metric/pitch constraints has been developed to create the five music layers in order to ensure their mutual compatibility.

3. THE METALINGUISTIC ASPECT

Together with the idea of computational primitivism, there is another aspect of great importance in the aesthetics of *Cotrone* which concerns the metalinguistic dimension. As already discussed, this dimension runs through Antúnez Roca's entire work: the presence of a dense undergrowth of reference texts is a constant in the Catalan artist's opus. For example, there is a continuous reference to Dante's *Divine Comedy* in *Hipermembrana* (2006). But this metalinguistic dimension is much more explicit in *Cotrone* since the latter is designed exactly as if it were the imaginary finale of Pirandello's last masterpiece. As we have seen, the audio material does not aim to rebuild or to refer to some kind of historical reality, but rather points to the definition of an archaic dimension, contradicted and complemented at the same time by the strong sense of organization of sound material that emerges from the computational structure.

However, a deep metalinguistic tension is apparent in some of *Cotrone's* scenes, forcing the sound designer/composer to take this aspect into account. In her dedicated scene, the female character of Diamante tells how she tried to break into the entertainment world: the scene explicitly refers to songs performed by Diamante, and her singing is the only sound that could function in a diegetic context. Similarly, the scene dedicated to

the Conte is built around 13 postcards that he sends to his mates to show the different stages of his journey. Each postcard, read aloud by the actors, is displayed on the screen (sometimes animated) and refers to a specific place (a seaside resort, a glacier, Paris, a laboratory for genetic research, etc.) that the Conte has visited. Here, the background audio is crucial for the audience to determine the geographic and emotional atmosphere of each card.

Finally, two scenes without actors on stage are presented through mockumentary-style video clips (that include digitally composited actors on an illustrated background). It portrays Pirandello (played by Antúnez Roca) on his deathbed confiding the missing ending of the *Giants* to the two performers. Although the documentary is shot and drawn in very saturated colours (in typical *Cotrone* style), the acting and editing style explicitly refer to silent films. Pirandello died in 1936, and his artistic life developed in tandem with the birth and the end of silent cinema, for which he was very passionate.¹¹

While in other scenes the music is usually a background for the performers' actions, in all these ones it must effectively describe the historical, geographical and emotional atmosphere. In order to accomplish this task, the idea was to use pre-existing music. However, such a solution would have been not only very alien to the rest of the sound design but also not consistent with the overall visual aesthetics of *Cotrone*, which is highly stylised and cohesive.

From his previous experiences, Antúnez Roca suggested as a possible solution playing pre-existing sound material in reverse, following the model of magnetic tapes run backwards. However, the resulting 'aspirated' sound would have been easily recognizable as the technique was once very common. We then reformulated Antúnez Roca's proposal by redefining the notion of 'inversion': the result is a 'mood preservation' technique. The technique features a two-step process based on sample extraction and recombination. In the first step, the system receives as its input a 'song' (indeed, the term refers generally to any previously existing music material). The song is played by a low-fidelity player (Lo-Fi Player). This condition is not relevant from a technical point of view, but rather from a semiotic one. That is, the resulting sound gets acoustically marked by the player and in this way it is differentiated in terms of sound quality from the other sound materials. Thus, the Lo-Fi Player can be an old turntable, a tape cassette deck, a noisy radio, a low quality internet streaming, and so on. An algorithm based on onset detection allows extraction from the song a sequence of non-overlapping samples. The rationale behind onset detection is to implement a fast, approximate yet viable auditory event recognition. The idea is that chaining sound events, instead of arbitrary audio chunks, should result in a more 'natural' perceptual organization. The second step is dedicated to reassembling the sequence of samples by reading it in a reverse fashion, that is, starting from sample n , then playing sample $n-1$, and so on, until sample 1. The order of the sample sequence is thus reverted, while the internal time of each sample is preserved: this approach avoids the aspiration effect. The resulting chain is reverberated in

11. In 1916 Pirandello dedicated a novel, *Quaderni di Serafino Gubbio operatore*, to cinema.

12. La voce del padrone/EMI QALP 10181. The cover specifies that it is a "technical reconstruction" from 1958 (the original recording should be from 1951).

order to add both a very specific sonic feature opposed to the brightness presence of 'primitivistic' music and sound design, and to further smooth the occasional excessive steepness in sound chaining. This newly generated song maintains a relationship, sometimes mysterious and often disturbing, with the original one as the rearrangement preserves the original 'sound mood' without necessarily inviting recognition. The results are particularly noteworthy with sung pieces, because the technique mostly preserves syllabic organization: syllables, at least in the consonant-vowel pattern, are characterised by energetic disruption provided by the consonantal attack followed by a sustained phase resulting from vowels. Syllables are the main conscious linguistic perceptual units, and are the linguistic equivalent of auditory events (Handel 1987). Thus the technique preserves language recognition while obfuscating linguistic comprehension by means of syllabic permutation.

We applied this procedure to different music. In all cases, the lo-fi, smoothed, reverberated sound has a quite distinctive perceptual quality, that clearly specifies the 'remoteness' of this sound layer if compared with the other ones. This remoteness was useful to define a spatial metaphor of distance (see Wishart 1987 for a phenomenological typology of sound spaces) in order to convey the idea of narrative layer disjunction. For the Diamante scene, we chose a corpus of songs from female Italian Beat singers from the Sixties; this was consistent with the idea that the female character of Diamante aims at being a kind of 'chanteuse fatale'. In the case of the Conte's scene, most postcards are associated to a specific 'recombined' music background, ranging from the Cello Concerto no. 2 by Boccherini to Tyrolean folk music, from Chopin's Nocturnes to a mariachi song. Each time a performer switches to a new postcard, a new audio is loaded and played. As the story is told by actually reading each postcard's content as written by the Conte, in order to convey the sense of writing we added other three layers based on voice samples with their relative phonetic sound, typing sounds, and notes played in pizzicato by a double bass, differently mixed.

The case for Pirandello's deathbed is different. As discussed, in this case the audio is related to a fake silent documentary. The music for this apparently solemn moment (even if mocked by the grotesque style of acting) has been recombined starting from a historical recording¹² by tenor Mario Del Monaco performing the aria 'Dio mi potevi scagliar ...' from Verdi's *Otello*. During the sampling phase, this old recording from an intensely used vinyl disc is played through a buzzing, irregularly rotating, turntable. This recombined operatic layer provides a sort of reference to the dramatic rhetoric of the narrative stereotype of the deathbed confession and to the silent movie era (both in terms of music selection and of acoustic quality). But a second layer is added, based on the exploitation of electric noises (amplified by feedback) resulting from an audio cassette multitrack player. A microphone is put almost in contact with the uncovered tape mechanism and is given a very high, saturating gain. The resulting harsh, noisy layer features mechanical sounds related to tape manipulation and electric ones related to internal functionality of the

device, to which exacerbated performing gestures on buttons, knobs and sliders have been added. This layer provides a further metalinguistic reference, in this case not referring to the semiotic content (as in the case of the Verdi's recombination) but to the semiotic operation: that is, the noise of the playback device becomes a reference to culture intended as a set of practices for the reactivation, reinterpretation and distortion of social memory.

The Pirandello 'mockumentary' is split into two parts, the first one anticipating the stories about the characters that will be told later, the second one concluding the show. The sound design for both scenes is the same, but differently mixed. While in the first part the prevailing layer is music (as a reference to the genre and a focus on the content), in the second part the emphasis is given to the noise layer, as a reference to the complex narrative/figurative device that Antúnez Roca has built starting from Pirandello's play.

CONCLUSIONS

Cotrone's aesthetic and technological uniqueness required a specific approach, oriented towards an integrated audio production that forced us to coordinate music composition and sound design, thus blurring their mutual boundaries. From this project we have learned an important lesson. Working in a domain with pre-existing structures (from a technological, aesthetic, socio-cultural point of view) is radically different from working in a domain which is still emerging.

In the first case, innovative solutions must be compared with a background of established expectations about the final result – for example, film genre – and with best practices in relation to production processes.

In the second case – that of *Cotrone* – expectations are undefined and fuzzy because one of the aims of this pioneering work is to define its own, idiosyncratic language as a novel performance genre; correspondingly, there are no established frameworks, best production practices, or workflow pipelines to reference. Instead, we must rely on an accumulation of principles and methodologies from heterogeneous fields, offering temporary and context-sensitive solutions that are radical and innovative.

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SOURCES

- Antúnez Roca, Marcel-lí (2009), 'Membrana. Genesis, satellites, and episodes', in VV. AA. (2009), pp. 70–81.
- Antúnez Roca, Marcel-lí (2011a), 'Materia sistematurgica', in Mazali, Mazzocchi and Pizzo (2011), pp. 13–31.
- Antúnez Roca, Marcel-lí (2011b), 'L'attore, dall'animazione teatrale alla scena digitale. Intervista e nota introduttiva di Federica Mazzocchi', *Acting Archives Review*, I:1, pp. 229–266.

- Bosco, Roberta and Caldana, Stefano (2009), 'The Artist as interface and Marcell-lí Antúnez as membrane', in VV. AA (2009), pp. 9–30.
- Bregman, Albert (1990), *Auditory Scene Analysis. The Perceptual Organization of Sound*, Cambridge, Mass. and London: The MIT Press.
- Chion, Michel (1990), *L'audiovision. Son et image au cinéma*, Paris: Nathan.
- Farnell, Andy (2010), *Designing Sound*, Cambridge, Mass. and London: The MIT Press.
- Handel, Stephen (1989), *Listening. An Introduction to the Perception of Auditory Events*, Cambridge (Mass.)-London: The MIT Press.
- O' Sullivan, Dan and Igoe, Tom (2004), *Physical Computing. Sensing and Controlling the Physical World with Computers*, Boston, Mass.: Course Technology.
- Mazali, Tatiana, Mazzocchi, Federica and Pizzo, Antonio (2011, eds.), *Marcel-lí Antúnez Roca e la performatività digitale*, Acireale-Roma: Bonanno.
- Mazzocchi, Federica (2011), 'Gli attori: 'recitare' per Marcel-lí', in Mazali, Mazzocchi and Pizzo (2011), pp. 59–68.
- Pirandello, Luigi (1985), *I Giganti della montagna* in *Maschere nude*, II, (I ed. 1958), pp. 1305–1376, Milano: Mondadori.
- Pizzo, Antonio (2011), 'La drammaturgia in Cotrone: scrittura e interattività', in Mazali, Mazzocchi and Pizzo (2011), pp. 47–57.
- Reck Miranda, Eduardo (2001), *Composing Music with Computers*. London: Focal Press.
- Roads, Curtis (1996), *The computer music tutorial*, Cambridge, Mass: The MIT Press.
- Rocchesso, Davide (2011), *Explorations in Sonic Interaction Design*, Berlin: Logos Verlag.
- Schaeffer, Pierre (1952), *A la recherche d'une musique concrète*, Paris: Seuil.
- Schaeffer, Pierre (1966), *Traité des objets musicaux*, Paris: Seuil.
- Schaeffner, André (1994), *Origine des instruments de musique. Introduction ethnologique à l'histoire de la musique instrumentale* (or. 1936), Paris: EHESS.
- Valle, Andrea (2011), 'La musica: modi di un primitivismo computazionale', in Mazali, Mazzocchi and Pizzo (2011), pp. 69–78.
- Viers, Ric (2008), *The Sound Effects Bible*, Studio City: Michael Wiese Productions.
- VV. AA. (2009), *Metamembrana. A project by Marcel-lí Antúnez Roca*, Barcelona: ACTAR, Centre de Cultura Contemporània de Barcelona, Panspermia SL, Transversal, Anella Cultural, Centre d'Art Cal Massó, Espai Zero 1.
- Wishart, Trevor (1986) 'Sound Symbols and Landscapes', in Emmerson, Simon (ed.), *The Language of Electroacoustic Music*, London: Mac-Millan, pp. 41–60.
- Westerkamp, Hildegard (2002), 'Linking soundscape composition and acoustic ecology', *Organised Sound*, 7:1, pp. 51–56.

CONTRIBUTOR DETAILS

Andrea Valle is Researcher at the DAMS (Department of Fine Arts, Music and Performative Arts) of the University of Torino, where he teaches Theory of Audiovision and Computer music at the School of Multimedia. He earned a degree in Sciences of Communications at the University of Torino and a PhD in Semiotics at the University of Bologna. He is a founding member of CIRMA (Interdepartmental Centre for Multimedia and Audiovisual) of the University of Torino. He has participated in the EU-funded project VEP, that has reconstructed in Virtual Reality the Philips Pavilions by Le Corbusier, Varèse and Xenakis and he has been associated with the EU-funded action SID (Sonic Interaction Design). He is a member of the Board of the Italian Music Informatics Association (AIMI). He has published in many international conferences dedicated to multimedia, computer music and semiotics.

As a musician, he has studied musical composition with Alessandro Ruo Rui, Azio Corghi, Marco Stroppa, Trevor Wishart and he is active both as a composer (for acoustic instruments, theatre, multimedia installations) and as a performer/improviser.

Andrea Valle DAMS

Università di Torino via Sant'Ottavio 20, 10124 – Torino
ITALY

andrea.valle@unito.it valle@di.unito.it +39 349 55 47 343

Paolo Armao is a Sound Designer with experience in producing audio contents for movies, documentaries, TV series as well as for real-time audio engines. He currently works at the multi-company organization Virtual Reality and Multi Media Park (VR&MMP) in Turin, Italy where he is the Sound Editor for Lumiq Studios and Audio Researcher at ASA (Allied Sciences Arts) Lab, developing real-time audio systems and creating contents for multimedia and audiovisual projects. He teaches “Sound Editing and Sound Effects Design” at VR&MMP and was a lab instructor from 2007–2009 at University of Turin and Polytechnic of Turin. His work, “Il Naturalista”, was recently selected for the 2009 Cannes Festival and “Virtual Electronic Poem” premiered in 2010 as a production of New York’s Electronic Music Foundation.

He studied at the University of Turin, the School of Sound workshop (London), and seminars held by David Sonnenschein.

Paolo Armao

Virtual Reality & Multi Media Park Spa Corso Lombardia 190, 10149 –
Torino
ITALY

paolo.armao@vrmmp.it paolo.armao@gmail.com +39 347 45 46 893
