

Music for Large Enclosed Space, Loudspeakers and Musicians

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Overview

This piece explores how a listener's positionality affects the sound that they perceive when samples are emitted into a large resonant enclosure from fixed positions. Over the course of the piece, loudspeakers emit samples with different frequency content at varying tempi to excite the space, producing a multitude of acoustic phenomena, such as standing waves, interference, and complex patterns of sonic diffraction. Loudspeakers emit the same samples but are spatially separated and face reflective surfaces at different angles, producing rhythmically interacting patterns of sound emission.

The piece consists of two parts, each lasting 12'. Each part contains three different audio samples, each emitted at a different tempo.

In Part A, audience members are instructed to explore the space through sound by carefully observing the sound emitted from a loudspeaker when a new sample is heard, before intuitively locating positions in the space which sound distinctly different from the original sound due to the way the direct sound source has been altered by the acoustic qualities of the space.

In Part B, audience members are seated in positions spread around the space. Up to four musicians then move around the space in a similar way to above, picking out prominent rhythms and pitches and accentuating them on their respective instruments.

Setup

Equipment

Laptop (capable of running Max/MSP files)

Interface compatible with laptop

Loudspeakers (2), with a relatively constant power output across the entire frequency spectrum and powerful enough to excite the chosen space.

Cabling

Loudspeaker Stands

Chairs (quantity equal to c.1.5 times the number of audience members)

Printed scores for audience members

Instrumentation

Portable percussive instruments of different timbres, playable with two sticks. (e.g. snare drum, woodblock, roto toms)

Portable melodic instruments (if spatial qualities are appropriate, see below)

Selection of a space

This piece should be performed in a large, enclosed space with predominantly reflective surfaces. The space should be no smaller than 20x40m. The space must have one set of perpendicular walls but can be any shape, with ceilings of any height.

This piece requires all of the floor area of a space, so it is important that this can be cleared. Medium sized concert halls (with seating that can be removed), churches, sports halls, and warehouses would all be suitable.

Preparation of the space

Firstly the entire floor area of the space should be cleared. Secondly, a decision should be taken to decide the maximum number of audience members for each performance (as the piece requires audience members to move around the space in the first half, and sit down on chairs spread across the entirety of the space, an audience of too many people would limit free movement in part A and cause the space to be too densely populated with chairs for musicians to move freely in part B). Chairs should be made easily accessible.

The laptop and interface should be set up in a location that will not interfere with movement of audience members. The locations of the loudspeakers should be well separated. Loudspeakers should be placed in the space to achieve two highly contrasting patterns of sound diffraction. It is recommended, but not imperative that one speaker be placed to bounce sound between a set of perpendicular walls (see loudspeaker 1 on page 3 diagram), and achieve a high likelihood of creating standing waves. It is recommended, but not imperative that the second speaker emit sound into a corner of the space, creating more complex patterns of sonic diffraction and diffused sound. The loudspeakers should be set at around head height. Various combinations of speaker placement may be tried to find the most effective for the chosen space.

Rehearsal / Instrumentation

No more than four musicians should be used for any performance. Before the performance, section B should be rehearsed by musicians, in order to hone their abilities to play the sounds created by the space on their instruments. Before rehearsing, all musicians should listen to the chosen section B samples through headphones, to provide a reference against which to compare the sounds heard in the space.

Samples and Max/MSP Patch

A selection of six samples should be selected for the piece that meet the criteria below, but that also frame the resonant properties of the space in contrasting ways. Experiment with different waveforms, such as sine, sawtooth, and squarewave. Experiment with different quantities of enharmonic content, such as white or pink noise. Experiment with sounds containing natural overtones.

-All samples should be the same length and shorter than 100ms.

-Each sample chosen for section A should excite multiple resonant frequencies of the space, as well as having focused enough sound to create a clear variance in rhythm with movement around the space.

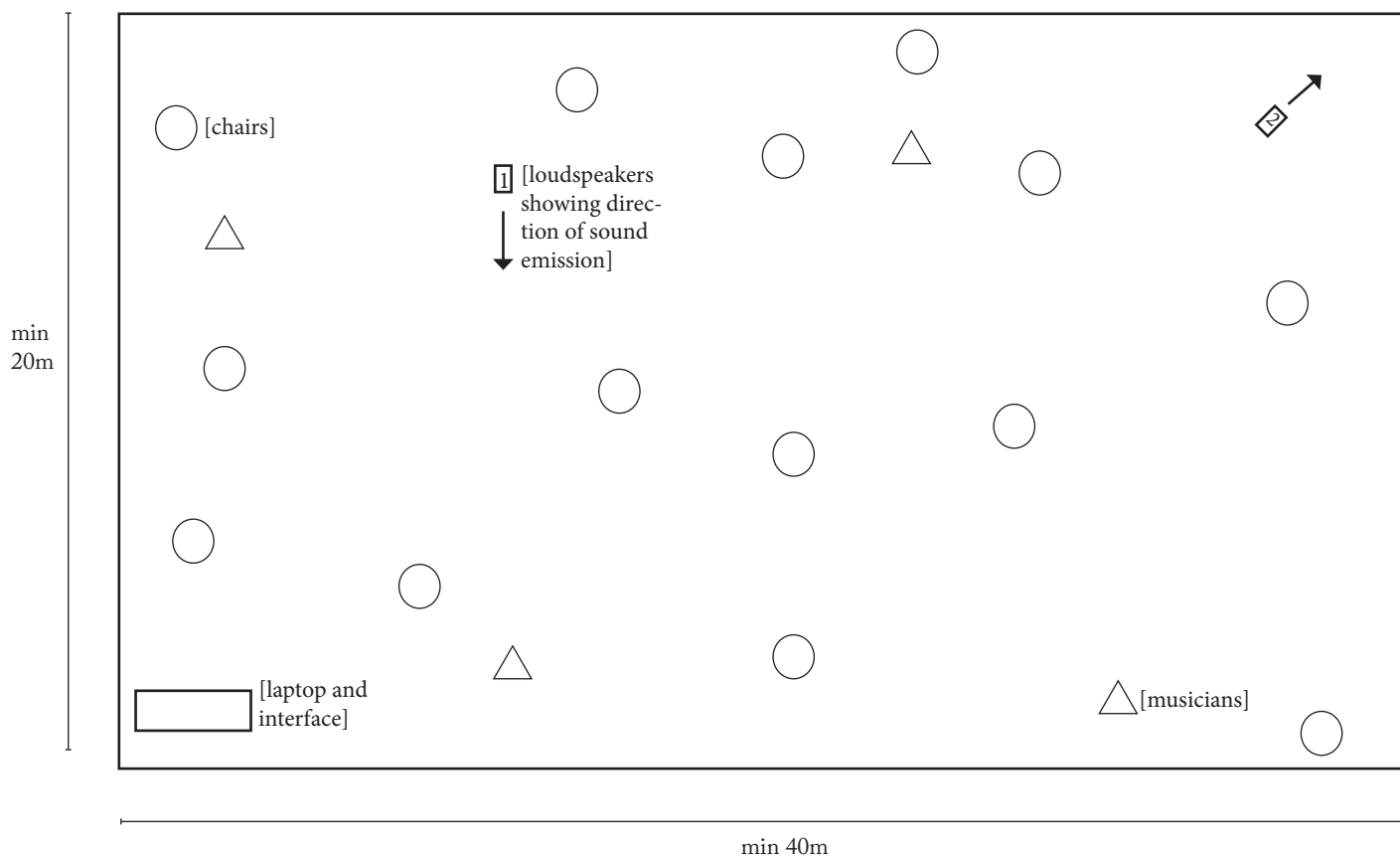
-If it is desired that melodic instruments be included in part B, then part B samples should excite the space to produce standing waves within the playing range of the available instruments.

Section A tempi should be adjusted to provoke three contrasting rhythmic phenomena. Section B tempi may be adjusted, however these must remain between 300 and 100ms in order to remain playable by the musicians. All six tempi and samples must be different (instructions for tempo adjustment and loading samples can be found inside the patch).

The max patch triggers each sample in turn for four minutes at a new tempo. Parts A and B are triggered individually, and stop automatically after 12'. Samples are loaded into the patch manually.

Soundcheck

When appropriate samples and tempi have been selected, the space should be explored with the patch running and the the gain should be adjusted to find the level that provokes the widest range of acoustic phenomena most clearly. The gain on both of the speakers should be set to the same level.



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Score for Musicians and Laptop operator

Before the Piece Starts

Each audience member should be handed a copy of the score on page three and be given sufficient time to digest the information. Samples should be loaded into the Max patch. All equipment should be powered on.

Part A (12')

The part A section of the patch should be started (the patch will automatically stop after 12').

Interval (c.4')

Chairs should be distributed evenly throughout the space (see p.4 diagram).

Part B (12')

The part B section of the patch should be started (the patch will automatically stop after 12').

Musicians should begin at four different locations in the space. Keeping the sound of samples heard through headphones as a reference, move extremely slowly around the space. When a significant new rhythm or pitch becomes apparent, musicians should pause and understand it, before performing it on their instruments:

Percussionists

Rhythms should be imitated as closely to what is heard as possible. Played articulation should match that of the rhythms heard. If a rhythm is too complex to play in its entirety, then percussionists should perform an element of it that is playable. Percussionists should use a different timbre of their instrument with each new entry. Players should adopt a dynamic with each entry that 'brings out' the heard rhythm but that is not overpowering.

Melodic instruments

Played intonation should match the pitches heard as closely as possible. If numerous pitches are heard simultaneously, musicians should play as many of them as is possible on their instrument. If a melodic musician hears a pitch associated with a rhythm, and it is technically possible to play that rhythm, then they should. Pitches should be played plainly with no vibrato at a dynamic that 'brings out' the heard pitch but is not overpowering.

Aim never to 'play' the same location twice.

Aim to cover the whole space.

Players should play for a maximum of 30" at a time.

Minimum gaps of 10" should be left between entries.

For the majority of the entries, only one musician should play.

Sometimes two may play at once.

Make movement as silent as possible.

Never play whilst moving.

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Score for Audience Members

Part A (12')

When the loudspeakers begin emitting sound, start to follow the instructions below. Repeat the following instructions each time a new sound is emitted from the loudspeakers.

Move close to loudspeaker and listen carefully to the direct sound emitted from it.

Following this, move extremely slowly around the space. When a significant rhythm or pitch becomes apparent that is different to the pure signal heard near the loudspeaker, pause. Focus on this new aspect of the sound and consider its relationship with the direct sound. Move extremely slowly away from and back to this point and find the point where the sonic phenomena starts and stops. Always move at the slowest pace possible. Experiment with shutting your eyes when stood still to reduce visual distraction and consider the sound that you are experiencing.

Find the sound in the space most dissimilar to that experienced when standing ear the loudspeaker.
Find as many pitches as possible that differ from the sound emitted from the loudspeaker.
Find as many rhythms as possible that are different from that emitted by the loudspeaker.

Complete the below movements in no particular order:

Move from more diffused sound to more direct sound.
Move from stronger sound to weaker sound.
Move from syncopated rhythms to straighter rhythms.
Move from a space with a stronger pitch to a space with a weaker pitch.
Move from a space with more homogenous sounds to a space with less homogenous sounds.

Interval (c.4')

Part B (12')

Find a chair to sit on. Every time the sample changes move to a new chair.