

Title: Carpet Entanglement

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1. PROGRAM NOTES

Carpet Entanglement is a performative installation that draws on the long-standing interaction between textile arts and musical practice, and explores this context through the carpet tufting gun as a novel electroacoustic interface. Underlining this historical connection is the dynamic interplay between materials, forces, and human agency in shaping the world, or “textility” as proposed by anthropologist Tim Ingold.[1] This performative installation emphasises the ongoing generative interplay between media and mediums highlighting the tufting gun as a site of embodied, material engagement.



Fig. 1. AK-1 carpet tufting gun

This work leverages the tufting gun’s distinctive acoustic properties and electromechanical kinetics, to reimagine the industrial tool as a vehicle for structured musical composition and improvisation. The performance transforms the gun’s utilitarian form and mechanical expressive qualities—such as its rhythmic firing, material resonance, and tactile feedback—into a dynamic palette of itinerant musical gestures. The tufting gun serves a dual role: as an acoustic

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sound source and as an interactive performance interface, bridging textile craft and experimental sound art.



Fig. 2. Carpet Entanglement Study

Carpet Entanglement reinforces the existing connection between textiles, technology, and music, highlighting the tufting gun's potential as a tool for artistic expression while situating it within a broader historical and technological narrative. Through this performance, the tufting gun becomes a mediator between the tactile, material world of textile production and the ephemeral, sonic world of music, embodying the interwoven processes of making and performing.

This performative installation is a durational work which unfolds over the duration of the conference and will be activated in 30-45 minute sessions during the poster sessions and throughout the conference.

2. PROJECT DESCRIPTION

Carpet Entanglement is presented as a theatre-in-the-round installation, with 360° viewing. The choreography of the performance mirrors the carpet-making process, alternating between periods of threading the needle and bursts of rhythmic tufting. The compression of the trigger activates sequenced vocal

samples and projections, which evoke the historical practice of encoding design information into rhythmic vocal motifs—a tradition common to ancient textile production and working songs. The resultant pattern reflects the rhythmic nature of the tufting process. This performance features a solo performer interacting with a modified carpet tufting gun suspended by an exoskeletal tool balancer.



Fig. 3 Carpet making exoskeleton

3. TECHNICAL IMPLEMENTATION

The bodily actions and sensorial feedback involved in tufting are opportunities for expression which are harnessed in the performance setting. A piezo sensor mounted to the motor housing serves as the first point of contact for interfacing between the performer and software. The piezo harnesses the kinetic potential of the gun for processing with real time audio and audio-to-MIDI processing. The primary components of this processing are envelope followers tracking input amplitude and audio-to-MIDI Max4Live devices, allowing the motor to trigger

on/off events for MIDI instruments and sequencers. The primary voices are: vocal chops, an electronic kick drum, and an electronic hi-hat.

These percussive sources operate in a one-gesture-one-sound mode [2] emphasising the immediacy of the performance, with envelope followers modulating the sounds to provide more temporally extended gestural interaction. Further audio processing of the piezo input provides the basis for mapping on/off states within the broader system.

A lapel microphone is mounted to the gun which amplifies the acoustic sounds of cutting with scissors and various subtle actions involved in preparing the tufting setup. Through processing these sounds the tufting activity becomes an electroacoustic landscape where the large-scale carpet scissors are the primary instrument. These alternating audio sources incorporate side-chain compression and gates to further differentiate the performative states.

The third mapping point involves mounting piezo sensors to the carpet-backing material. These audio inputs are routed to a physically modelled ‘sympathetic string’ using the Corpus effect in Ableton Live which excites the subtle and dramatic interactions between the carpet-back material and the tufting gun. Whilst activated these sound sources create a binding drone which bridges between the alternating states of the tufting performance. The intention of this mapping is to reference a common design motif where one “soft” string is mounted to one “hard” frame; a construction style common to lyres and looms.

To further instigate an expressive connection between the performance actor and musical system this project employs facial tracking via mediapipe and a wide angle webcam. MediaPipe is an open source framework which incorporates machine learning and computer vision to process and analyse visual data for performing tasks such as object detection and facial recognition.[3] Throughout the tufting process the facial gesture of the performer provides a site of interest for mapping parameters in the performance software. The face is segmented into three distinct groups: the brows, eyes, and mouth where floating point values are generative from fluctuations in facial gestures. The values are mapped to melodic and harmonic parameters modifying the pitch, octave and pattern of the vocal chops within ableton via midi over IAC driver.

In the performance the endoscopic camera feed of the working surface is reprojected back onto the carpet as the trigger of the tufting gun is compressed. The colour data of the camera feed is additionally processed with Max4Live RGB Mappers which outputs data to PaulXStretch for modulation of stretch amount and FFT size. The RGB parameters are further mapped to other post processing effects which are modified as the performance progresses to account for the colour of thread that is in use at the time.

When not engaged in performance the installation recalls latent recordings of the electroacoustic landscape. The result is a performance that bridges the material world of textile production with the inherent musicality embedded in the process as a work that is perpetually activated throughout the conference resulting in a final carpet-based work which embodies this process.

4. PERFORMANCE REQUIREMENTS

The Carpet Entanglement performance requires 4m x 4m square and a 2.1 channel sound system. The project runs via ableton live over a 4 channel audio interface (UAD476p) and HDMI over ethernet to the projector positioned facing the tufted surface of the carpet. The installation requires 2 x 240 Volt power points.

5. MEDIA LINK

- Video: <https://tinyurl.com/CarpetEntanglementSample>

6. ETHICAL STATEMENT

No substantial ethical issues have arisen from the conduct of this research.

7. REFERENCES

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