SuperCollider Synth: *The Silk Road Fantasia: Desert*

YouTube Link: *https://youtu.be/4WqupbVmJCo?si=bxbe10B1WK5EDo6Q*

The Silk Road Fantasia: Desert is a piece of live coding music. It is a derivative work

developed from *The Silk Road Fantasia: Journey,* using SuperCollider for live coding.

It primarily uses atmospheric synthesizers defined by the "SynthDef" module to

evoke the vastness and mystique of the Silk Road desert landscape (Fig. 1).

Fig. 1

1. Technology & Music Documentation:

In *The Silk Road Fantasia: Desert*, I used SuperCollider live coding techniques to

create a soundscape that evokes the desolation and profound atmosphere of the desert.

The entire piece lasts for 3 minutes and 56 seconds and utilizes two distinct sound

elements—desert winds and an organ-like background—to illustrate a desert filled with life and mystery through their continuous changes and progression.

1.1 Desert Winds:

The desert winds are produced through the "dpad" synthesizer, which employs components such as "Sweep", "Hasher", and a bandpass filter, "BPF" (Fig. 2). The use of "Env.perc(4, 7)" plays a key role in ensuring the wind sound transitions naturally during live coding. With an attack of 4 seconds and a release of 7 seconds, the gradual fade-in and fade-out of the sound avoids abrupt changes, creating a natural decay and flow. This results in a wind effect that shifts smoothly, evoking a sense of movement and space, and effectively capturing the essence of desert winds.

```
7  (
8  SynthDef(\dpad,{
9   var asd;
10  asd = BPF.ar(Hasher.ar(Sweep.ar), 500, 0.1) * 10.dbamp;
11  asd = asd * Env.perc(4, 7).ar(Done.freeSelf);
12  asd = asd ! 2;
13  asd = asd *\amp.kr(-30.dbamp);
14  Out.ar(\out.kr(2), asd);
15  }).add;
16  )
17
```

Fig. 2

```
18
19 Pdef(\dpad, Pbind(\instrument, \dpad,\degree, Pbrown(100, 1, 0.3,inf), \dur, 6 ));
```

Fig. 3

To achieve sustained wind sounds, I used a combination of "\dur" and "inf" in "Pbind" and "Pbrown" respectively, allowing the wind sound to continuously hover and loop throughout the piece, adding to the immersive experience and a sense of continuity (Fig. 3).

During the live coding, I adjusted the frequency parameter of the "BPF" filter in real time, the parameter was alternated between high and low values to mimic the effect of the wind gently across the desert. This creates a natural wind sound that seems to

change direction and intensity smoothly, giving a strong sense of space and movement—capturing the shape of desert winds.

1.2. Organ-Like Background:

The organ-like background was generated using the "Pad" synthesizer. This synthesizer starts with a "Saw" waveform, modulated with "LFNoise2" (low-frequency noise) to add a slightly wavering and unpredictable quality, much like the shimmering mirages in the desert. I also used "Env.asr(1, 1, 8)" to ensure the wind sound transitions naturally during live coding. Additionally, effects like "DelayC", "Splay" (stereo spread), "LPF" (low-pass filtering), and peaking "BPeakEQ" (EQ) were applied to create a wide and rich atmosphere (Fig. 4).

```
29 (
30 SynthDef(\Pad, {
31   var pad;
32   pad = Saw.ar(\freq.kr(440) * ({ LFNoise2.kr(8) } ! 16 * 0.1).midiratio * [1, 2, 1, 2, 1, 2, 1, 2, 2, 1, 2, 1, 2, 1, 2, 1]);
33   pad = DelayC.ar(pad, 0.01, { Rand(0, 0.01) } ! pad.size);
34   pad = Splay.ar(pad);
35   pad = LPF.ar(pad, \freq.kr(440) * 4);
36   pad = BPeakEQ.ar(pad, \freq.kr(440) * 8, 0.1, 8);
37   pad = pad * Env.asr(1, 1, 8).ar(Done.freeSelf, \gate.kr(1));
38   pad = pad * \amp.kr(-100.dbamp);
39   pad = pad ! 2;
40   Out.ar(\out.kr(0), pad);
41 }).add;
42 )
43
```

Fig. 4

During the live coding, I used "Ndef" to dynamically adjust parameters and switched between different "Ndef" configurations in real time, giving the organ sound a flowing and organic quality (Fig. 5). These dynamic adjustments allowed the background to shift continuously, adding changes to the chords and painting a sonic picture of the vast desert, filled with untold stories and legends.

```
43
44 (
45 ~wrr = Scale.new([5, 7, 11, 13, 2, 3, 5, 7], 24, tuning:\et24, name:\wrr);
46 ~www = Scale.new([4, 6, 8, 9, 10, 12, 10, 9, 8], 24, tuning:\et24, name:\www);
47 )
48
49
50 Ndef(\Pad).play;
51 Ndef(\Pad).free;
52 Ndef(\Pad).set
53
54 Ndef(\Pad, Pbind(\instrument, \Pad,\scale, ~www, \degree, [0,4,6],\dur, 0.4, \attt, 0,\octave, Pseq([1, 2, 1, 1],inf)))
55
56 Ndef(\Pad, Pbind(\instrument, \Pad,\scale, ~www, \degree, [0,4,6],\dur, 0.4, \attt, 0,\octave, Pseq([1, 2, 5],inf)))
57
58 Ndef(\Pad, Pbind(\instrument, \Pad,\scale, ~wrr, \degree, [0,4,6],\dur, 0.4, \attt, 0,\octave, Pseq([8,5,3,4,7,6,2],inf)))
59
60 Ndef(\Pad, Pbind(\instrument, \Pad,\scale, ~wr, \degree, [0,4,6],\dur, 0.4, \attt, 0,\octave, Pseq([8,5,3,4,7,6,2,8],inf)))
61
```

Fig. 5

Together, these sounds achieved a constantly evolving atmosphere through real-time parameter adjustments. Particularly with the organ background, the adaptive changes during live performance allowed it to seamlessly fit the musical flow, creating an ethereal and profound musical experience.

1.3. Natural Ending Transition:

At the midpoint of the performance (01: 48), I began altering the value of 0.1 in "pad = Saw.ar(\freq.kr(440) * ({ LFNoise2.kr(8) } ! 16 * 0.1))". I gradually increased it to modify the influence of "LFNoise2" on the base frequency modulation. As the performance progressed, the sound became increasingly unstable, conveying a sense of growing unpredictability. Towards the end, I slowly decreased the value again, allowing the pad's sound to transition back to a stable state. This dynamic progression—from stability to intense instability and then returning to tranquillity—served to symbolize the mystery and danger of the desert along the Silk Road.

In the final part of the piece, both the wind and organ sounds faded out naturally. As shown in the area highlighted by the red box in Fig. 6, the organ background sound faded out by running a line of code with an undefined global variable, "~wr", which could not make sound, allowing the sound to decay naturally. The wind sound gradually disappeared by using the "paus" (pause) function in "Pdef (\dpad).gui", much like the wind slowly dying down, returning the desert to silence, like the last sigh of the desert, leaving the listeners with a lingering sense of wonder.

```
43
44  (
45  ~wrr = Scale.new([5, 7, 11, 13, 2, 3, 5, 7], 24, tuning:\et24, name:\wrr);
46  ~www = Scale.new([4, 6, 8, 9, 10, 12, 10, 9, 8], 24, tuning:\et24, name:\www);
47  )
48
49
50  Ndef(\Pad).play;
51  Ndef(\Pad).free;
52  Ndef(\Pad).set
53
54  Ndef(\Pad, Pbind(\instrument, \Pad,\scale, ~www, \degree, [0,4,6],\dur, 0.4, \attt, 0,\octave, Pseq([1, 2, 1, 1],inf)))
55
56  Ndef(\Pad, Pbind(\instrument, \Pad,\scale, ~www, \degree, [0,4,6],\dur, 0.4, \attt, 0,\octave, Pseq([1, 2, 5],inf)))
57
58  Ndef(\Pad, Pbind(\instrument, \Pad,\scale, ~wrr, \degree, [0,4,6],\dur, 0.4, \attt, 0,\octave, Pseq([8,5,3,4,7,6,2],inf)))
59
60  Ndef(\Pad, Pbind(\instrument, \Pad,\scale, ~wr, \degree, [0,4,6],\dur, 0.4, \attt, 0,\octave, Pseq([8,5,3,4,7,6,2,8],inf)))
61
```

Fig. 6

2. Summary:

The Silk Road Fantasia: Desert is a derivative piece from *The Silk Road Fantasia: Journey*. It is crafted with SuperCollider live coding and features two distinct sounds: desert winds and an organ-like background sound. The winds evolve smoothly, capturing the feeling of the breeze across dunes, while the organ sound brings a layered, dreamy quality to the atmosphere. Both sounds are adjusted in real time, giving the music a fluid, organic character that mirrors the expansive and mysterious nature of the desert. The piece gently fades away, like the wind dying down and the desert returning to stillness.