Shai Cohen

A Butterfly Flaps its Wings...

composition for String trio Arabic ud and Live Electronics

Introduction

A Butterfly Flaps its Wings... designed to be performed as a string trio, Arabic ud and computer.

The computer realized the music live on stage, with performer foot- pedal triggering system and
Max/Msp environment, and create a new musical gestures.

The computer voice is manipulate with the two dimensional Phase-driven oscillator that using a buffer~ as a Wavetable.
The idea is similar to wave~, but with an additional axis. A given ms range of an audio file will be divided into n rows.
The Y phase input will determine which row(s) will be used for playback.

The pictslider is a slider with the usual one-dimensional ranges of movement, for emulating hardware sliders
Its knob can also can move both horizontally and vertically, to represent a two-dimensional
Controller such as a joystick to control the X phase of the 2d.wave~.

In addition the effect section including comb~ object implements a comb filter, in which a slightly delayed version
of a signal is added to itself, causing phase cancellations and a spectrum that looks like a comb.

The vst~ object loads a real-time VST plug-in and uses its audio processing in MSP. Some plug-ins has their own
Editing window, which is visible when you double-click on the object. Otherwise, double-clicking on the object displays a
Default parameter editing window.

The user can view a Spectrogram or Sonogram Display and a A Signal Level Meter with Optional Ballistics.
The buffer can be played forward and backward at any given time.
The output can be recorded to the hard disk and Levels can be control including fade in and out.

Minimum/Recommended hardware and software configuration

Computer: Max/Msp software application and Microsoft Windows 2000/xp operating system.

Multi-channel Audio Interface:
A multi cannel digital I/O interface for the computer allowing at least 2 discrete channel input and 4 discrete channel output.

4 matched speakers.

4 microphones:
2 condensers for the string trio and 2 dynamic for the Ud.
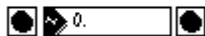
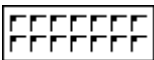Mixing Board:
multi-channel mixing console.

special graphic notation

buffer~ recme 10000 2 — - buffer and size

fade Out   fade in
— - fade in and out
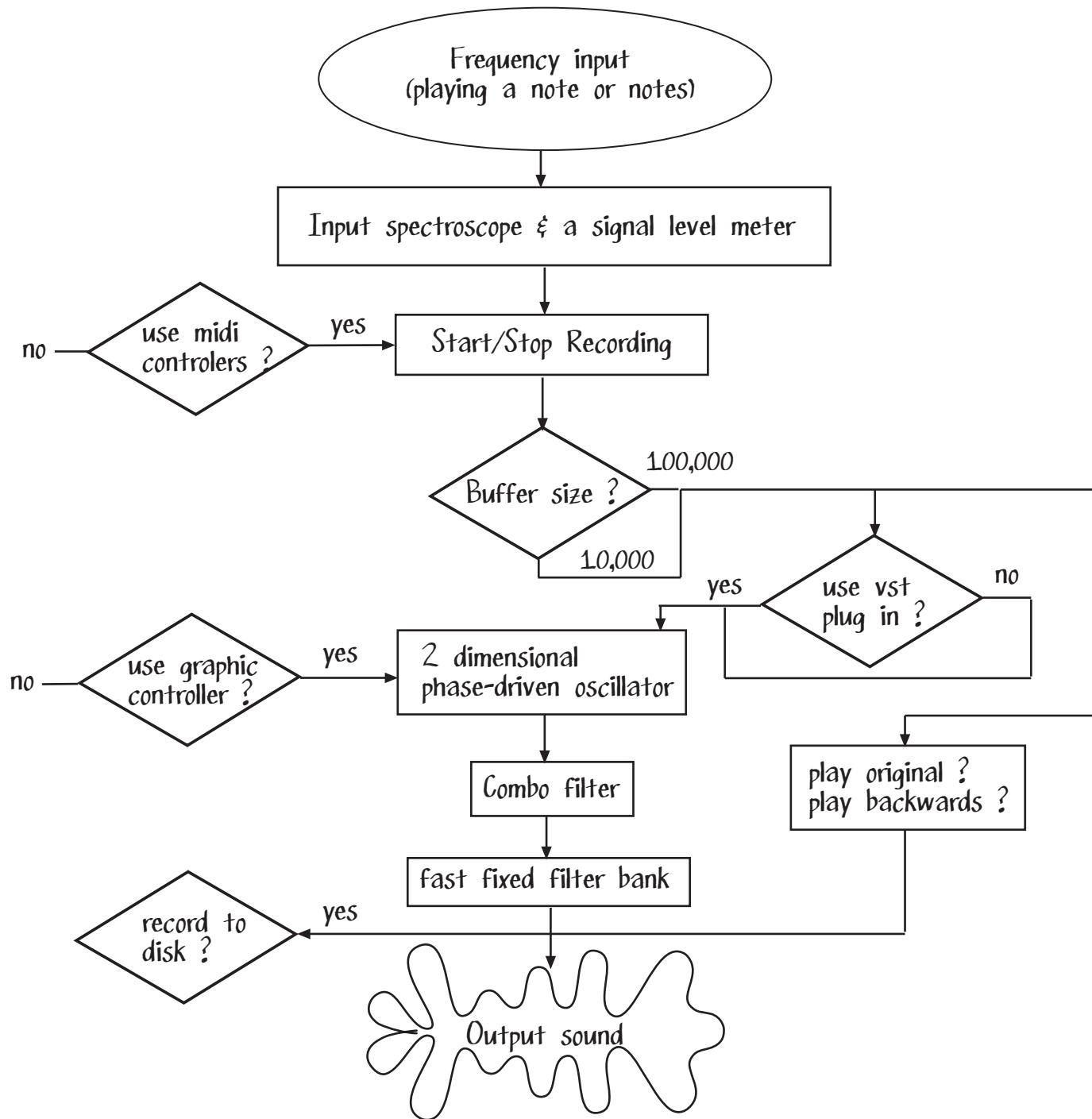
— - preset
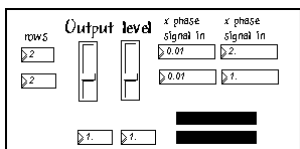
— - two dimensional phaze-driven oscillator

— - pictslider to control x,y phase
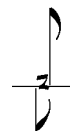
— - triger on-off recording using midi controller

Description of the algorithm

Frequency input
(playing a note or notes)

Input spectroscope & a signal level meter

use midi controlers ?   no / yes

Start/Stop Recording

Buffer size ?   100,000 / 10,000

use vst plug in ?   yes / no

use graphic controller ?   no / yes

2 dimensional phase-driven oscillator

play original ?
play backwards ?

Combo filter

fast fixed filter bank

record to disk ?   yes

Output sound

User interface

knob can also can move both horizontally and vertically, to represent a two-dimensional controller such as a joystick.

Two dimensional Phase-driven oscillator using a buffer~ as a wavetable Similar to wave~, but with an additional axis. A given ms range of an audio file will be divided into n rows. Y phase input will determine which row(s) will be used for playback.

send messages to a dac~ to start and stop the audio.

Multichannel sample buffer & Sample playback based on position within a buffer~

Record signals to soundfiles on disk

record~ records a signal into a buffer~ object. Record stops when it has filled up the buffer~

on-off recording useing midi. When using a specific control number as an argument, you can send the set message to change the controller number whose value is output

A Signal Level Meter

REAL-TIME INTERACTIVE environment 2

start/stop recording
reset | | 0.

start audio
startwindow | stop

Output level

rows
3
4

x phase signal in
0.03
0.06

x phase signal in
8.
6.

record to disk
open
0.

Frequencies:

Record On/Off use midi pedal
set 64
ctlin 33 1
0

size 100000
size 10000
clear | read | replace
buffer~ recme 10000 2

Play
Play backwards
dont Play
0, 10000 10000
10000, 0 10000

1. | 1.

Qs:

effects

Gains:

fade Out | fade In
-18 | 0.5

Vst plug in | on-off
open | read | plug

save default settings

Input spectroscope

RealTime Music Environment Create By: Shai Cohen 21/9/04

Delay Time | Direct Gain | Delay Gain | Feedback Gain
0. | 0. | 0. | 0.

Delay Time | Direct Gain | Delay Gain | Feedback Gain
0. | 0. | 0. | 0.

filter

Audio fade in & out

Store and recall settings of objects

Hosts VST plug-ins

The comb~ object implements a comb filter, in which a slightly delayed version of a signal is added to itself, causing phase cancellations and a spectrum that looks like a comb. The filter implements the following formula: $y[n] = a * x[n] + b * x[n - delay] + c * y[n - delay]$
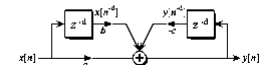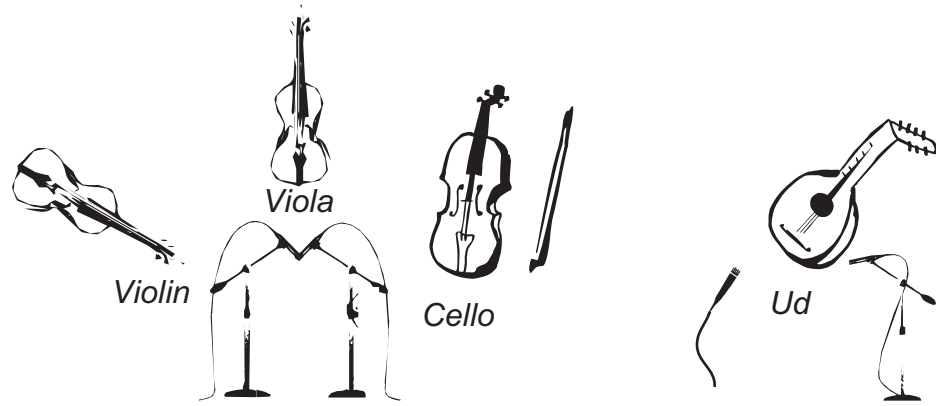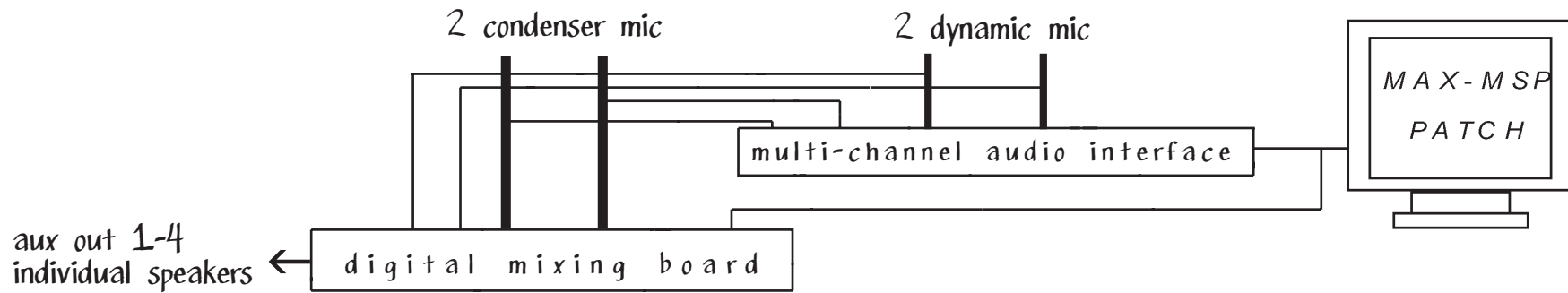
Fast fixed filter bank with scrolling multislider display

Edit Screen
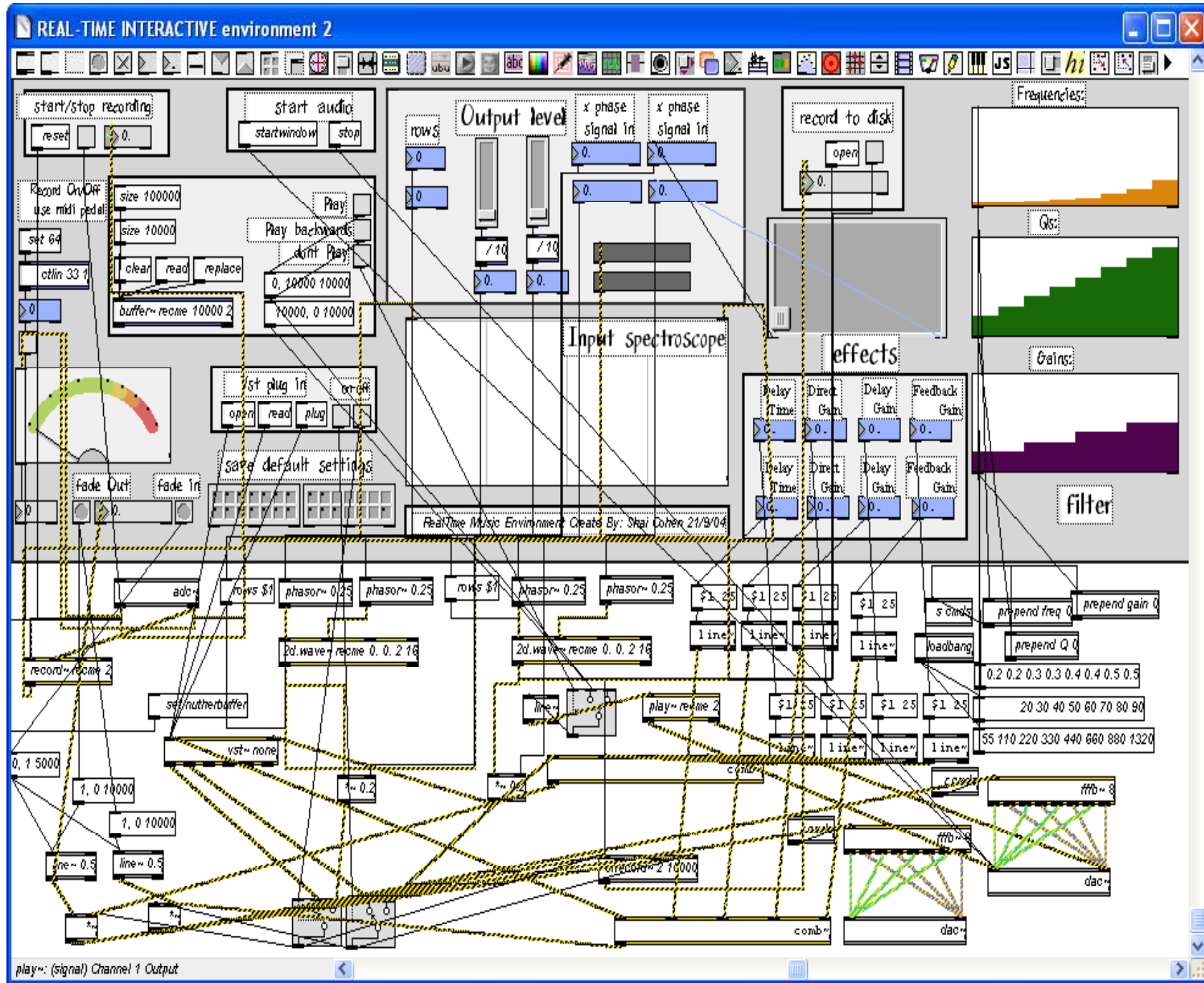
Stage positioning and technical setup

Viola

Violin

Cello

Ud

Loudspeaker

Loudspeaker

front of stage

2 condenser mic

2 dynamic mic

MAX-MSP
PATCH

multi-channel audio interface

aux out 1-4
individual speakers

digital mixing board

Loudspeaker

Loudspeaker

A Butterfly Flaps its Wings...

Composed by : Shai Cohen

"The flapping of a single butterfly's wing today produces a tiny change in the state of the atmosphere. Over a period of time, what the atmosphere actually does diverges from what it would have done. So, in a month's time, a tornado that would have devastated the Indonesian coast doesn't happen. Or maybe one that wasn't going to happen, does." -Ian Stewart

A Butterfly Flaps its Wings...

shai Cohen

"Clouds are not spheres, mountains are not cones,
coastlines are not circles, and bark is not smooth,
nor does lightning travel in a straight line." -Benoit Mandelbrot

maybe one that wasn't going to happen, does.

✳) All Ud notes (including hrmonics) sound 8vb lower than written.

*) unmeasured bars, of indefinite length. music is timed by the preformers.
2 times approximate 40".
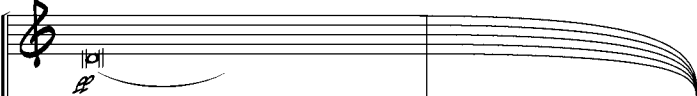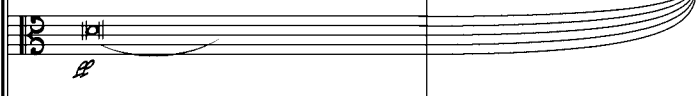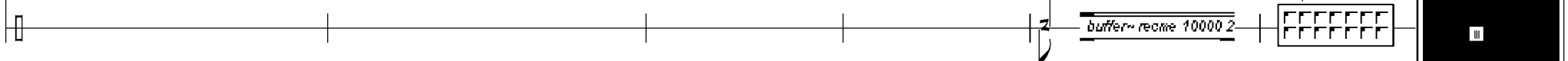
"You need chaos in your soul to give birth to a dancing star."
- Friedrich Wilhelm Nietzsche
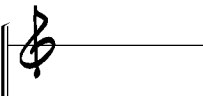
hold the note long endlessly,
occasionally change in a random way to:
s.p, tremolo, pizz, bow eff. overtones....

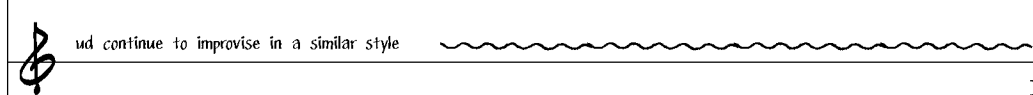quasi parlando - ad lib.

ud continue to improvise in a similar style

free improvisation horizontally and vertically
with the pictslider to control x phase signal in.

recording strings

preset 1-4

buffer~ recme 10000 2
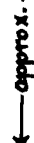
fade out ———————— al niente

"Chaos often breeds life, when order breeds habit" - Henry B. Adams

ud continue to improvise in a similar style

con. simil.   Senza dim.   Max continue similar and fade out   12-15"

approx..

musician should leave the stage empty

My goal is to communicate the organization and beauty
 that exists in our universe underneath the appearance of random chaos.
- Aleta Pippin