INTRODUCTION

Juan-Pablo Cáceres
Network Musical Performance Workshop
Technical and Artistic Strategies to Perform Around the Globe
Center for Computer Research in Music and Acoustics (CCRMA)
Stanford University
Workshop Overview

https://ccrma.stanford.edu/workshops/nmp2010/
The Vision

“I dream of instruments obedient to my thought and which with their contribution of a whole new world of unsuspected sounds, will lend themselves to the exigencies of my inner rhythm.”

Edgard Varèse (1917)
Before the Computer

Ada Lovelace during her work with Babbage’s difference engine:

“Supposing, for instance, that the fundamental relations of pitched sounds in the science of harmony and of musical composition were susceptible of such expression and adaptations, the engine might compose elaborate and scientific pieces of music of any degree of complexity or extent.”

Ada Lovelace (1843)
Beginnings of Electronic Music

Elisha Gray: “Musical Telegraph” (1876)

Thomas Edison: “Phonogram” (1877)

Valdemar Poulsen: “Telegraphone” (1898)
Player pianos (early 20th century)
Ideas of Change

Ferruccio Busoni "Manifesto" (1907)

Luigi Russolo and the Futuristas (1913)
First Instruments

Leon Theremin (1920)

Ondes Martenot (1928)
Aleatoric and Concrete Music

John Cage “Imaginary Landscape 1” (1939)

Pierre Schaeffer “Musique Concrète” (1949)
Stochastic Music, Multimedia

"Poeme Electronique" 425 speakers and video, Edgard Varese (1958)

Measures 52-60, "Pithoprapka", Iannis Xenakis (1956)
1964: VCO Synthesizers

Robert Moog VCO Modular Synthesizer

Donald Buchla VCO Modular Synthesizer
Computer Music Languages | Milestones
1957: MUSIC I/MUSIC-N family:

- Unit Generators (UGens) (atomic and predefined processing blocks)
- UGens: Audio Input, Output, and Control Inputs
- Examples: Oscillators, Filters, Amps, Envelope Generators
- A Patch (instrument) is formed by connecting several UGens
- An Orchestra is created through the connections of several Patches
- A Score controls an Orchestra
Max Mathews handles a copy of MUSIC IV to John Chowning
Chowning y Andrew Moorer create MUSIC 10 and SCORE

Very Slow Process
1968: MUSIC V in FORTRAN
Real-Time Systems
...Network Music
Network Music Performance

Def:

“A network music performance (nmp) is a bi-directional, dis-located and multi-modal set of interactions regardless of its synchronicity or asynchrony between participants.”

Alain Renaud
Where does it come from?

1876

Elisha Gray: “Musical Telegraph”

1929

Der Lindberghflug
Paul Hindemith / Kurt Weill / Bertolt Brecht

Radio Broadcast + Listener at Home
1950’s

John Cage’s “Transistor Radio” Pieces

1966 - Public Supply - Neuhaus

© Max Neuhaus
Late 1970’s

The Hub
A computer music network band

The League of Automatic Music Composers 1978-1983
1988 - Françoise Legrand - Satellite Symphony: Beethoven and One Woman's Dream
Digital Networks

1990’s

Speedup of the Internet

Firsts bidirectional, “real-time” music exchanges

Real-time  →  30 to 0.5 seconds
Year 2000

http://ccrma.stanford.edu/groups/soundwire/
Some Examples
TeleJazz

Banff Centre

3500 km
30 ms

Humber College
TeleJazz - 16 channels | 48kHz | 16 bits
Terry Riley’s *In C* - Stanford/Beijing
April 2008
History of Computer Music

- Joel Chadabe, “Electric Sound: The Past and Promise of Electronic Music”