Seminar: Multimedia Coding and Transmission

Historic Music Coding
Ifi, UiO
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This part of the course ...

• ... is the history of a lost technology
This was supposed to be on the Titanic

Welt Philharmonic Organ
• Built in 1912
• by Welte, Freiburg
• 260 pipes, 7 registers
• programmable
• pneumatic
• MIGNON system

History: The Rise

• ~1650: Clock with music facility
• ~1720: Wooden clock (Kuckucksuhr)
• ~1800: Organ (and other instruments) with
  – Cylinders
  – Disks
• ~1880: Orchestron / organ / piano
  – Paper rolls
• ~1904: Welte Mignon / Hupfeld DEA
• Technology Top: 1905-1929
History: The Decline

- 1877: Edison Phonograph
- 1887: E. Berliner: Record
- 1929: Sound film
- 1929: Radio
- 1931: Magnetic Tape Recorder
- ~1931: Welte stops production

The History of the Pianola

The First Pianola

The first Pianola was completed by Edison E. Veeley in a workshop at his home at 312, Forest Avenue, Detroit, in the spring and summer of 1895. Veeley later joined the Edison company, which put the instrument on sale in the USA in 1897, and in Europe in 1899. But the Pianola and its competitors were not only the invention of any one person. E. Veeley's particular contribution was to draw together a number of existing mechanisms which resulted in creating the first truly musical piano-playing device in the world.

The Pianola Mechanism

The mechanism of the pianola is brought into operation by means of electric power generated by the pianola's foot, and controlled in pitch by a perforated paper roll. The greater the motion of any one action, the louder a particular note or closed will sound, and the consecutive pianola must learn to control dynamics as rapidly and subtly as a normal pianist.

Music Rolls

The vast majority of music rolls for the normal pianola were not recorded at a keyboard, but simply perforated by a technician after being marked up in pencil with reference to the original sheet music. Thus there are no changes of tempo, rubato or phrasing on normal pianola rolls, and instead the operator is provided with a tempo control, which must be used to create musical performance.

Reproducing Piano

By late 1904 the firm of Welte in Trebing had developed a new type of paper roll, known as the Welte-Mignon, and this was followed within the year by the Dem piano manufactured by Ludwig Hugfeld in Leipzig. Both these instruments and their competitors have over the years come to be known as reproducing pianos, the other main systems being the Duo-art and the Ampico.

Reproducing Piano Rolls

Many of the major pianists of the early twentieth century made rolls for the reproducing pianos, and these recordings are an important legacy of classical piano music and interpretation, as well as pianist's repertoire. The first sets of the player piano came to an effective end in the early 1930s, with sales of pianolas at that time only.

Composers for the Pianola

Besides playing works from the standard piano repertoire, pianola may be used for music dedicated by the restrictions of the banjo band. Well over seventy composers have written or arranged music especially for the pianola over the years, including Strauss, Hindemith, Milhaud, Percy Grainger and Herbert Howells.
Companies

- Welte - Vöhrenbach / Freiburg
- Imhof & Mukle - Vöhrenbach
- Hupfeld - Leipzig
- Gebr. Weber - Waldkirch
- Aeolian Company - Detroit
- American Piano Company
- ...

Music Coding

- Cylinders
- Metal / Paper Disk
- Planchette
- Paper folds
- Paper Rolls
- mechanic
- pneumatic
Paper Rolls

- Pneumatic
- Mechanic

Paper Rolls vs. Cylinders
- longer play time
- cheaper
- less space
- easier to handle
- less error prone

Paper Roll Systems

- Pianola (Edwin S. Votey, 1897, Detroit) (Aeolian)
- Welte Mignon (1904, Freiburg)
- Hupfeld DEA (1905, Leipzig)
- Duo Art (Aeolian)
- Ampico (Stoddard, 1913, American Piano Company)
- ...

Welte Mignon

- Patented in 1904 by Welte
- Nuancierungs-Apparat
- 1904: Phonoliszt by Hupfeld with DEA system

How it works
Coding of Paper Rolls

Reading Piano Rolls

- Pneumatic
- FiberOptic
- Scanning/OCR
- (Mechanic)
Hupfeld Phonoliszt-Violina
Phonoliszt Violina - 1910

- Built by Hupfeld, Leipzig
- 3 violins (1 string each)
- piano
- programmable
- pneumatic
- DEA system
- 6 music roles

With animation ...

- Built by Weber, Waldkirch
- Model Styria (1920)
- Includes piano, violin, cello, flutes, drums
- Includes an animated image
- programmable
- pneumatic
The Cinema Organ
- Built: 1924
- Welte Mignon
- St. Gallen, Switzerland

STODART / WELTE MIGNON
REPRODUCING GRAND PIANO
Composers and Technology

- Karl Bockisch
- Edwin Welte
- Composer d’Albert

- Edvard Grieg

In the beginning of the 20th century, Edvard Grieg recorded a few of his own compositions - both on gramophone and with the Welte Magnat technique. This CD contains nine gramophone recordings made in Paris in April 1904, and four Welte Magnat recordings made in Leipzig in 1909. The recordings give a very good impression of a pianist with his own style, filled with charm, expressiveness and distinctively romantic in expression as it was. The sound on the gramophone recordings has the natural sound of the original recordings. The sound of the Welte Magnat recordings is perfectly clear.

Music was (and is) business
MIDI - The Revival

- 1983 MIDI Version 1.0
- Music Instrument Digital Interface
- File Format
- Electrical Specifications
- General MIDI
- Sequencer

What can we learn?

- Technology and market ...
- Patents and media formats ...
- Technology and fine arts ...
The End