

A computer take on pianists of old

By **Anne Midgette** The New York Times
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The house lights dimmed at the BTI Center for the Performing Arts in Raleigh, North Carolina, one night last month, the stage lights came up on the grand piano, and in front of a rapt audience, Alfred Cortot played Chopin's Prelude in G (Op. 28, No. 3), as he had not for nearly 80 years.

Cortot is dead, of course. He was not present in physical form, nor was anyone else sitting at the keyboard of the Yamaha Disklavier Pro as the keys rose and fell. But this was his performance come back to life: his gentle touch, his luminosity, even his mistakes, like the light brush of an extra note at the periphery of the final chord.

So, at least, claimed Dr. John Walker, the president of Zenph Studios in Raleigh, which sponsored the event and created the software that allowed Cortot to return. Walker is developing technology that enables him to break down the sounds of an old recording, digitize them and reproduce them on a Disklavier, an up-to-the-minute player piano that can record and replay performances by means of a CD in a slot above the keyboard. Sophisticated fiber optics control the instrument's hammers.

Old recordings of great performers are often marred by scratches and surface noise, or by sound badly filtered through primitive microphones. Walker is offering the same music with the immediacy of live performance and the acoustical advantages of a contemporary piano. To demonstrate the contrast, Walker also let the audience at the BTI Center hear the original Cortot recording from 1926, which sounds as if sand had been poured on the disc's shellac.

"The fundamental root of the problem is that I don't want to hear a recording," Walker said. "I want to hear the young Horowitz, Schnabel, Fats Waller, Thelonious Monk on an in-tune piano."

If the claims he is making for his new technology are accurate, he will soon be able to. His plan is to approach the major labels with his software and delve into their back catalogues, acting as a record producer to make old recordings new. Josef Hoffman without the scratches, Glenn Gould without the mumbling: brought back to life and performing on modern pianos, recorded with modern technology.

"People say this is like colorizing old photographs, but it's not," Walker said. "This process is like being able to set up the entire scene of that photograph again and shoot it with a new camera from any angle, forever."

This is the new world of computer music. In its infancy, way back in the 1960s, the goal was to use digital technology to create sounds and musical forms. Today scientists around the world are turning computers on human performance, seeking to quantify an element once thought to be intangible: the expressivity of a human artist.

The piano is a good place to start. It offers a relatively limited set of variables. With the violin, every aspect of sound production is subject to human vagaries: bow pressure, bow speed, the placement of the fingers. On the piano, it comes down to hammers hitting strings.

Developed by Wayne Stahnke, the first Disklaviers were made in the 1980s by Bösendorfer, the renowned Viennese piano manufacturer. When that company stopped making them, Yamaha took up the baton, hiring Stahnke as a consultant. Stahnke's best-known Disklavier project was a foretaste of Walker's efforts: translations of piano rolls recorded by Sergei Rachmaninoff. The two resulting CDs of "new" Rachmaninoff performances, both called "A Window in Time" and released in 1998 and 1999, are still available from Telarc.

Some listeners find these revelatory. Some find them mechanical, even soulless. The reactions demonstrate a basic difficulty with mechanical reproduction of music: There is a subjective element involved in determining if it works. The final criterion for any such reproduction is the rather imprecise "Turing test" of artificial intelligence: that is, whether it can make the listener think he or she is hearing a person rather than a machine.

At the Austrian Research Institute for Artificial Intelligence, a group of leading researchers known as the Machine Learning, Data Mining and Intelligent Music Processing Group are trying to pinpoint just what it is that fools the ear. Led by Gerhard Widmer, they are looking at everything from improving the way computers "hear" music to isolating the elements of individual performance style, as well as creating graphs and animations to illustrate different pianists' interpretations of the same passage of music.

In a 2003 paper, "In Search of the Horowitz Factor," Widmer and his team described giving the computer 13 recordings of Mozart piano sonatas, played into a Bösendorfer Disklavier by the pianist Roland Batik, to see if they could use the computer to determine rules that described the pianist's interpretive choices.

They did get some rules, though it turned out that many of them applied equally well to other performances of other music. But the machine generated its own performance of a Mozart sonata movement that it had not heard Batik play, but based on what it had learned of his style. With this, it took second prize in the International Computer Piano Performance Rendering Contest in Tokyo in 2002. With no stage fright.

"The first question was, can we hear Glenn Gould play again?" Walker said. "The next question: Cool, can we hear him play other stuff?" To this, Widmer might answer: We're getting there.

But there's still the thorny matter of how to get data from an audio recording into the computer. It's a question not just of having the computer play back a CD, but of translating the music into a language the computer can understand.

The technology, in short, is still in its infancy. But Walker is animated by his vision of the future.



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