

The Internet Music Revolution

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In today's lecture we're going to explore a new phenomenon that has appeared on the Internet in the past couple of years, which I have called the Internet Music Revolution. But in many circles, it is known simply as the "MP3 Revolution." So the first thing we need to do is find out what is meant by "MP3".

"Motion Picture Experts Group-1 Layer 3 Audio," a.k.a. MP3

MP3 is an abbreviation of "MPEG-1 Layer 3 Audio." This is a sound encoding process that was developed at the Fraunhofer Institut für Integrierte Schaltungen (Fraunhofer-IIS) in Erlangen (Germany). In its principle, it resembles the sound encoding methods used for the Minidisc, the DCC digital audio cassette and digital television. The MP3 process uses calculations with a much greater degree of refinement and complexity, making it a very efficient encoding method. It is only relatively recently that it has been usable in real time, however, due to the sharp increase in processor power. MP3 is an international standard, which ensures interchangeability of files without compatibility problems. It is well suited for the trading of high quality audio software over telephone or ISDN lines, and over the Internet.

Why not WAV? Why MP3? All about the concept of *compression*

Why MP3? There exist digital audio file formats that give excellent results, since the professionals use them currently for sound recording and post-production on the radio, on disk and in the cinema. The main drawback is that these file formats take up considerable space (1 CD = 74 minutes maximum = 650 megabytes). It is not possible to keep such files in electronic memory or to transmit them over the Internet. **With a current modem, it would take around 32 hours** of uninterrupted and incident-free connection to download 1 CD and your hard disk would be completely full with just a few hours of music. The particular sound encoding of MP3 includes a data compression method, which enables the volume taken up by the audio files to be divided by 10 to 25 times, making transmission over the Internet and storage in electronic memory possible.

On my tiny laptop computer, it would be possible to store nearly **two hundred entire CDs** in MP3 format.

How does MP3 work?

As well as the classic file compression processes of information technology, which restore the bits identically after decoding, the MP3 algorithms use a **psychoacoustic encoding**, that is to say that they take account of the flaws in human hearing. This method consists in cutting the audio file into slices corresponding to a duration of several thousandths of a second and analyzing the content of each slice. By comparison with a hearing model (which differs depending on the encoding processes), the calculation determines the most important audio constituents, which it is therefore necessary to encode with the maximum of precision, and the least important audio constituents, which are not even perceptible by ear, which it is unnecessary to encode with great precision, and which can even be eliminated, if need be. By allotting the bits of encoding available in a 'miserly' way, a substantial economy of space can be made by comparison with encoding methods which do not use psychoacoustic compression, which encode all the constituents of the sound, whether perceptible or not, in the same way. By adapting the total number of bits, these encoding processes are even capable of restoring a sound of variable quality depending on the circumstances or resources available. Naturally, the more the bits are distributed meanly, due to the desire to use less space in memory or to transmit on channels with the lowest rate of throughput, the more the degradation of the sound risks becoming perceptible because the compression is carried out to the detriment of audible sound constituents.

MP3.com and Vitaminic

The existence of MP3 made it possible to create a number of commercial sites that held enormous databases of MP3 files. The most famous is MP3.com. A famous Italian site is Vitaminic. They list many categories of music that can be downloaded.

How MP3 helps lesser known artists be heard

Last year I witnessed a couple of exchanges of e-mail over the Internet. Let's see now what was being talked about:

T. Burmas: With this whole MP3 issue going on, I was contemplating how the world of less marketable music (ie, classical guitar, solo flute, etc.) will be affected. I could be wrong, but I suspect making the distribution (and in some cases the production) costs go to zero should help more obscure artists get their music heard by a wider audience.

Spencer Doidge: There isn't any question about that. A little more often than every seven minutes somebody either plays or downloads a piece of mine. The revenues of May-July have paid for all of my studio equipment.

Who is this person "Spencer Doidge"? He is an example of a new phenomenon created by MP3 technology – an "MP3 artist." I couple of months ago, I wrote to Spencer Doidge and asked him if he would like to send a message to you here about his work with the MP3 phenomenon. Here is his reply:

Hi John,

I'll be glad to write a short message for your presentation. It goes like this:

When our great grandmothers were young, they made their own music. They listened to each other play and sing. Today we only listen to the radio and the CD player.

For the past 70 years, a few people have controlled whose music we all hear. It costs a lot of money to bring a CD to your local store and persuade you to buy it. Those who control the money control what you hear.

Things are changing. Just as changes 70 years ago gave power to the few, changes today give power to the many. Now it costs me almost nothing to bring my music into your home via Internet. If you hear my music, and if you like it, then you can use email to tell me that. Often that is enough. All artists want attention as much as they need money.

Many of the recorded artists we hear on the CDs are truly the greatest, but all of the pleasure is not at the top of the mountain. Over the ages our ancestors were entertained by their friends and neighbors. That has been taken away from us by radio, television, and recordings, but now we are starting to take it back.

Signed, Spencer Doidge

Copyright Protection

On June 9, 1790, nine days after the first copyright law was enacted under the new U.S. Constitution, the very first copyright entry was submitted to the U.S. District Court of Pennsylvania. Registered by John Barry, *The Philadelphia Spelling Book* holds the distinction for being the first piece of content legally protected from piracy. Other books, maps and charts soon followed. Now, over 210 years later, the Internet Music Revolution has brought the copyright law onto center stage.

The music industry brought major lawsuits against sites like MP3.com. Just a few months ago, MP3 settled the cases pending by agreeing to pay millions of dollars to the music industry.

Several musicians were at the forefront of the fight to protect copyright. Metallica and Britney Spears are two examples of prominent musicians who backed the music industry lawsuits against sites like MP3.com.

But nothing compared to the revolution that came later. It was called Napster.

Napster

First of all, what does Napster mean? The word “nap” means many things in English:

- *To take a nap*: to sleep briefly, especially during the day.
- *To be off guard*. “He was caught napping.”

But it also means this: “A soft downy fibrous surface (as on yarn and cloth)”

The inventor of Napster, **Shawn Fanning**, has hair like that. His friends and family said that he had “nappy” hair. Of course, in British English, “nappy” means “diaper”!

His young friends transformed the description “nappy” into the “Napster.” That’s just a cute and popular way to twist names these days. My brother-in-law is named Raffaele, and my brother Paul, who is American, nicknamed him “the Raffster.” So Napster is just the nickname of its inventor, Shawn Fanning.

The Invention of Napster

It all happened a couple of years ago, when Shawn Fanning was 18 years old. He was sitting in his dormitory room at Northeastern University in Boston. He was listening to his friends complain about how difficult it was to find good music at the central computer of MP3.com.

Then suddenly an idea came to Shawn. He thought, “all of these people are looking for music on the Internet. They have a lot of music sitting on their own individual computers. Why not find a way trade music directly? Why not find a way to make it possible to talk directly with each other instead of having to look in a central site?”

And so Shawn set about creating the first program in history that made it possible to do just that. It makes it possible for Internet users all over the world to come together and trade their music files directly.

To understand it, think about acquiring books, for example. One way would be to go to a central place, like the public library. Another way would be to get together with all your friends, show them what you have, and then trade with each other.

The program was an instant success, because it exploited the most important properties of the Internet. It allowed millions of people to communicate with each other, creating an enormous community all over the world of music traders.

By last year, it was estimated that there were over 60 million users of Napster all over the world. But even more amazing is another statistic: it is estimated that all together, the number of pieces they share among each other is more than one billion. It is the largest music library in the history of the world.

Now, to give you a feeling for the kind of fanatical support that exists among Napster users, and also to give you a feeling for what Napster is particularly useful for, I am going to read to you a testimonial to Napster that I asked one of its most fanatical users to write for you — my youngest brother.

I became fascinated with music files when I started experimenting with my new computer. I wanted to obtain as many music files as I could to listen to while working on the computer (word processing, reading e-mail, etc.)

MP3.com ... allows you to download music. But, this free music is usually not the popular or classic stuff that I was interested in or the major record labels were willing to give up

I was hearing from friends that THE service to get ANY MP3 files you wanted was Napster. I knew there was some question about the legality of the service Napster provided but I downloaded the software and created an account anyway. Before I knew it, I had downloaded one hundred songs, spending several hours a day “trading” music.

What’s great about Napster is I could find any and every song I wanted. At any one time, there was some user on-line who had the song I was looking for. For example, I wanted to put together an R&B collection of music from the 60’s and 70’s. I found and downloaded both the theme song from Shaft by Isaac Hayes and Jungle Boogie by Kool & The Gang in less than 10 minutes. It would be an expensive and time-consuming proposition to buy all the CD’s that contained the music I was after. At the same time I found it exhilarating to share my files with other users, watching the transfer of files from my computer to someone else’s in a true peer-to-peer network over the Internet.

I understand that there may be legal issues with the music I have downloaded, and it is for this reason that Napster may soon have to change the way they do business or even shut down altogether. As a user, I would be willing to pay a monthly service fee, or even a per song fee for the convenience of downloading music with my computer. In some instances, "trying" out a song downloaded from Napster has prompted me to buy the entire CD that contains the song. This is one instance in which the Napster service has already stimulated sales. Either way, downloading digital music from the Internet is here to stay, and the music recording industry is going to have to figure out a way to embrace the new technologies and means of distribution.

Suing is Better Than Doing

Napster was finally sued by the recording industry. Here is Time Magazine's report on the incident:

Desperate to do something, the recording industry decided to sue the software firm that created Napster, despite the fact that this firm has no control of how their software is used. (It's like suing a word processing firm because someone wrote a death threat using its product.) The music business initially feared the advent of blank cassettes. Then, rock bands fretted that their fans would buy fewer albums if those people could secretly tape-record the concerts. Both concerns proved unfounded. In fact, the Grateful Dead blazed a trail by creating specific areas during concerts where Deadheads could record the gigs. Remember, the Dead was invariably one of the top bands annually when it came to generating revenue from concerts year after year. While the music industry may succeed in shutting down Napster they can't put the genie back in the bottle. Already there are several software programs similar to Napster being circulated. If Napster is put of business, something else will simply take its place.

Napster's huge success is due to three factors. Firstly, it is supremely easy to use, secondly it has become the global music archive and thirdly, it has done this through creating a community of users. Before Napster, an online music fan would take hours to track down and download a particular song, using different search engines. Today, Napster counts more than 60 million users worldwide.

Napster has been effectively shut down

Just in the last few months, Napster has been effectively shut down by the music industry. There was a court decision saying that it had to block access to a large percentage of its music titles — a percentage so large that it was no longer an effective way to share files. Now Napster is fighting for its survival.

Gnutella

But as my brother noted, the genie is out of the bottle. There are already many other peer-to-peer programs out there that allow people to share things directly over the Internet.

One of the most well-known of these is — believe it or not — Gnutella. (I suppose its creator loved Nutella.) Gnutella is even more decentralized than Napster. Napster holds a central directory of its users; and, it only allows you to exchange MP3 pieces. Gnutella has no center at all. People just exchange messages directly with each other. Furthermore, Gnutella allows you to exchange *any* kind of information, not just music. This leads me to the next topic.

The Content Revolution

The real implication is far wider than just music, of course. This is not an Internet Music Revolution - it is an Internet Content Revolution. That is, *anything* that can be distributed over the Internet can now be distributed in the same way as music.

One unlikely example is stitching patterns. They might not seem interesting to many of you, but they are a very serious business. Just a couple of months ago there was quite a scandal, where one of the largest distributors of stitching patterns brought a lawsuit against people who were illegally downloading stitching patterns.

Another example is the distribution of video and movies. Similarly to MP3, there is also a new compressed format called DIVX. Soon, it will be possible to distribute entire films and videos over the Internet, with the same implications and issues as there are for music.

Consider these comments from Barry Scott Will, a Richmond, Va., systems administrator and Web developer:

"Simply put, the supply of content has increased so the price of content has come down. The Internet, especially because of the easy access to digital media, is causing intellectual property to be worth less than it was in the past.

"Over the next generation (or two), creative people (and the companies that manage their works) will have to adjust to two changing factors: the way in which they earn money from their intellectual property and the amount of money they earn for their intellectual property. The market has effectively said, 'We will not pay these prices for prepackaged content any longer.'

"Technology always ends up putting some other industry 'out of business.' The automobile replaced the carriage; the Internet is replacing traditional publishing industries.

"MP3 has given us a 'mature' technology for the distribution of audio content. While I don't agree with theft of copyrighted material, the RIAA (Recording Industry Association of America) and artists should be re-thinking their business model, not punishing the market.

"By the time my son is grown, the 'Tom Cruise' of his generation will not be able to command \$25 million per film. I don't know if that's good or bad; it's just the way the economy is changing."

The fate of Stephen King's new book

The most obvious example of the next content to be distributed over Internet is literature. As we have noted, there is more and more literature online now, and there is also a new concept called e-books, or **Electronic Books**. The distribution of books online may change the publishing industry forever.

But will it really change so much? I'd like to end my talk with a story that was in the news just a few months ago.

The famous American horror writer Stephen King recently decided to try his hand at something very adventurous: bypassing the official publishing industry, and publishing a novel directly on the Internet. More precisely, he was publishing a serial thriller, in installments, like the great masters of the past used to do, like Charles Dickens and Mark Twain. The thriller was called "The Plant."

It worked like this: he would bypass the publishers and offer a chapter a month to his fans directly on the Internet. There was one condition. They had to voluntarily pay one dollar if they downloaded the chapter. As long as readers kept paying, he would keep writing. As soon as they stopped, he would stop.

As you can imagine, the book publishing industry was absolutely terrified by this. The headlines were all saying things like “Stephen King starts a revolution in the publishing industry!”

In the beginning, in fact, over 120 thousand of his readers paid their one dollar and downloaded the chapters, and he kept writing the installments as promised. But as the story unfolded, the fans became less and less faithful. By the time the fifth chapter was reached, fewer than 40 thousand were paying. He finally gave up and stopped writing.

Everybody was surprised by this, including the book publishing industry. (They were probably very happy about it, too.)

Why did it happen? Why did they stop paying?

An interesting analysis was offered by an Argentinian writer named Alberto Manguel. This is what he wrote:

Serials of any kind, whether the cliffhangers of my childhood or the installment novels that enthralled our grandparents' generation, require something our time is overwhelmingly lacking: **patience**. ... Waiting is half the fun, as the inventor of the serialized novel, Queen Scheherazade, knew well, when she postponed again and again the last of the Arabian Nights ... But patience is no longer a virtue, especially on the Internet, which promises almost instantaneous communication. Nothing seems worse suited for leisurely reading and slowly measured pleasure than this instrument, faster than thought, seemingly incapable of ever sitting still. ... Stephen King's fans, who would stand in crowded lines for hours to buy his newest book, may not have the imaginative strength necessary to wait all on their own for the story to unfold, chapter after monthly chapter ... Fittingly, Mr. King's impatient fans may have achieved a horror beyond anything the Master of Horror himself would dare imagine. In their search for immediate gratification, unwilling to look backward or forward, they live in the nightmare of an everlasting present.

Resources

Here is a selection of resources on the World Wide Web for those who would like to find out more about the topics mentioned in this lecture.

Sites in English

www.mp3.com

One of the most important sites worldwide for MP3 music.

www.mp3now.com

All the information you want about Mp3 software, hardware, downloadable files, technical specifications, articles, advice for beginners, etc.

www.mp3sky.net

A veritable bazaar of MP3 resources, where the latest information on software and hardware can also be found.

www.napster.com

The original decentralized music exchange system on the Internet.

www.riohome.com

The site of one of the very first MP3 walkman players, Rio Digital Audio.

www.winamp.com

At this site you can download Winamp, one of the most complete programs for reproducing MP3 files on the personal computer.

Sites in Italian

www.vitaminic.it

One of the most original music portals in Italy, with a vast selection of MP3 titles.

www.envidia.it/mp3

A practical search engine for MP3 songs, with links to other search engines, classified according to files downloaded most often, etc.

www.mp3.it

This site answers many of your most basic questions about MP3, what it is, how to find it, and also presents a mailing list.

www.mp3italia.com

One of the best Italian web pages for searching for MP3 songs and for keeping up to date about new software and hardware as it becomes available.