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THE PAST AND FUTURE OF MUSIC LISTENING

Between Freeform DJs and Recommendation Algorithms

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In 2010, in response to a *New Yorker* article on Pandora Radio, an online music recommendation service, a Vermont reader objected: "All this new technology has yet to improve on the old radio model: putting yourself in the hands of independent, passionate, and deeply knowledgeable disk jockeys—the likes of which can be found at New Jersey's incomparable WFMU, for example—and following them blissfully into the world of unknown and unexpected sound."[1] This argument comes up repeatedly in online debates—in comments to a *New York Times* blog post on Pandora a reader put forward freeform radio pioneers from the late 1960s, KMPX and KSAN in California, and WNEW in NYC.[2] The unexpected freeform sound is something programmers of digital recommendation software strive for as well. As Sasha Frere-Jones noted in the *New Yorker* article, "the job" of a radio DJ "lingers as a template for much software."[3] One programmer echoed many blog posts when he called for a "serendipity revolution," arguing that the ultimate goal of a system should be to recommend "something new, non-obvious and appreciated that the user would likely not have discovered on his/her own."[4]

To be sure, WFMU is not a typical radio station. It is the longest running freeform station currently on the air, and a former college station currently unaffiliated with a college or National Public Radio, America's dominant public radio network. WFMU began broadcasting in 1958 as a station of Upsala College, New Jersey. It adopted a freeform format in 1967 and remains freeform today, with a brief 1970 to 1975 hiatus of Album Oriented Rock (AOR) format. The station executives, staff, and fans formed a non-profit organization that purchased the station license from Upsala College in the summer of 1994, a few months before the college went bankrupt. WFMU's location, first on the college campus in East Orange, and since 1998 in Jersey City, has allowed the station to reach a large and culturally privileged urban radio audience of the greater New York City area.[5]

WFMU comes up often as a superior alternative to algorithmic music services because many believe that this station provides the most unpredictable music experience for the listener today. Some WFMU DJs are obsessive record collectors with no regular jobs, others are university professors or artists. They play unpopular and, for some, unpalatable, music on purpose. As Ken Freedman, WFMU's station manager since 1985, put it, "We have an organic personality, not a market research personality."[6] The choices and opinions of WFMU DJs and listeners provide a good test case for what music "robots"—as DJs and fans derisively call algorithmic recommendation services—can and cannot do. An early and active participant in online music distribution, WFMU began broadcasting worldwide on the Internet in 1997 and has archived all of its programs for on-demand listening online since 2001. The station posts live listener comments with the show playlists, and chronicles the development of online music on its "Beware of the Blog" blog, established in 2005.[7] This online archive shows that DJs use algorithmic Internet music resources live on the air.

Histories of recommendation algorithms usually date their invention to Nicholas Negroponte's idea in his 1970 book *Architecture Machine* for an "adaptable machine" that could assist an architect in design, or even earlier, to the concept of "soft robots," made to collaborate with humans, put forth by John McCarthy in the mid-1950s and later elaborated by Oliver G. Selfridge.[8] But in the context of music history, the symbiosis of computers and DJs goes back at least a half a decade earlier. This chapter will briefly trace a genealogy of music recommendation systems back to the early popularity of the DJ in the 1940s, then forward to freeform radio and the early cybernetic art experiments in the late 1960s, and to recent, more familiar commercial services. Then, using WFMU DJs and listeners as a case study, the chapter will argue for a symbiosis between the algorithmic resources and radio DJs.[9]

Instead of the DJ-algorithm divide, this chapter argues as central the division between open-access culture and corporate uses of intellectual property. All online music distribution takes various algorithmic forms but in economic terms it divides into two kinds: on the one hand, corporate online services such as Last.fm, Spotify, iTunes, commercial ad-supported YouTube music, and for-profit Internet radio like Pandora; on the other, the non-commercial and pirate demi-monde of free online archives, podcasts, music blogs, torrent sites, non-commercial YouTube music, and nonprofit Internet radio stations like WFMU. Corporate services are inaccessible to most listeners outside of North America and Europe; non-profits and pirates distribute worldwide. This leads to yet another key tension, between cultural cosmopolitanism and narrower Western aesthetic boundaries. "The algorithmic" thus can have different political and aesthetic valences depending on the people and institutions taking it up.

The pre-history of various online music dissemination practices proposed here depends on the notion of "serendipity," a word that often comes up when recommendation system programmers describe their goals, and when music fans describe their preferred listening experience. According to the *Oxford English Dictionary*, "serendipity" means "making unexpected discoveries by chance." English nobleman and writer Horace Walpole introduced the word in a private letter in 1754, referring to an old tale about the three princes of Serendip, "who were always making discoveries by accidents and sagacity, of things they were not in quest of."[10] Historians, sociologists, and philosophers of science took up this notion to explain unexpected discoveries in science.[11] "Serendipity does exist," philosopher of science Pek Van Andel maintains, and is accessible only to humans:

> A computer program cannot foresee or operationalize the unforeseen and can thus not improvise ("imprevu")="unforeseen"). It cannot be surprised or astonished, and has no sense for humor, curiosity or oddity. Because we do not always realize all the implications of our theses, when we put them into our computer, the results can be surprising for us, whether trivial or not.[12]

Others propose a more complicated relationship between the calculated and the unexpected. The kind of "sagacity" required for serendipitous discoveries has been linked by historian Carlo Ginsburg to "conjectural" knowledge, which draws upon intuitive, circumstantial interpretation of clues, symptoms, and signs. Governments and corporations have repeatedly attempted to quantify this everyday practical knowledge in service of large-scale population management projects. Sir William Herschel invented fingerprinting in 1860 when observing Bengali peasants in his administration marking documents with fingers dipped in tar.[13] In 1882 French police officer Alphonse Bertillion proposed anthropometry and thus, by extension, contemporary biometrics. He likened his modern police methods to ancient hunters' tracking strategies.[14] Throughout its history, the radio industry, too, tried to manage music audiences by blending quantification and intuition in anticipating listener desires, aspiring to the scientific authority, yet forced to draw upon informal human judgment. Disc jockeys have been at the center of these contradictory efforts.

In the 1940s, radio began its transformation from a primarily national to a local medium. Even before regular commercial television network programming began in 1948, the U.S. radio and music industries confronted resurgent institutions unaffiliated with the national networks. In radio, the number of independent stations soared from 45 (5%) in 1945 to 916 (44%) in 1950. In the music industry, the "big three" music labels and the original performance rights organization, the American Society of Composers, Authors, and Publishers (ASCAP) were losing ground to independent labels like Savoy, National,

and Chess, specialty music markets like hillbilly, bebop, and jump blues, and a new specialty artists' performance rights group, Broadcast Music Incorporated (BMI).[15] The key cultural institution of the period—the disc jockey—both demonstrated the existence of new local audiences for radio music and served as an instrument of these audiences' formation.

Taking advantage of the emergent specialized ethnic markets, disc jockeys spearheaded the production of new music genres and radio formats in collaboration with local audiences. Al Jarvis began what is considered the first disc jockey show in 1933, but DJs did not become a national phenomenon until the 1940s. Already in 1944, a survey found that teenagers knew small independent "hot jazz" labels only because of their exposure via disc jockey programs.[16] Propelled by the ASCAP recording ban of 1942 and by the reinstatement of transcription as a valid form of radio music, three thousand disc jockeys were on the air by 1947, when the networks finally lifted their ban on record shows.[17]

Disc jockeys' influence in the industry rested on their personal connection to listeners. Disc jockeys had a unique opportunity to introduce a record on the air and test its local popularity on the spot. In 1942, Capitol Records became the first studio to provide free releases for promotional purposes. Six years later, every record company, including the majors, had a budget for DJ records.[18] Music producers believed that DJs could make an individual record, and build a reputation for a record company.

Yet for every DJ who claimed to make a hit record through constant airplay, there were several who complained that their audiences did not share their sophisticated tastes. "Most of my listeners tend toward hillbilly," a jockey from Spencer, Iowa confessed. "I've been trying to educate them otherwise, but it's a long, slow process." A Pittsfield, Massachusetts spinner appealed to his colleagues to push bebop and big band jazz: "I think if more jocks would get with it there wouldn't be such an overwhelming demand for corn."[19] Not all audiences could be constructed by the music industry's publicity efforts. It was disc jockeys' ability to stumble upon emergent audiences that made their reports so valuable for the music industry.

It is at this point that computers and disc jockeys combined the algorithmic and informal aspects of the music business. In 1949, performance rights group Broadcast Music Incorporated placed a full-page ad in *Variety*, a major trade entertainment weekly. In the ad, a team of doctors examines an anthropomorphic "log" in an operating room. In such a clinical way, the ad suggested, BMI analyzed more than 32,400 daily station music logs on IBM "electronic accounting and tabulating machines." BMI promised radio station managers to diagnose the "strength of the heart of your broadcasting ... according to the first scientific and automatic system of checking actual broadcast use of music." The mixed organic and technical metaphors revealed a fundamental tension in 1940s music audience research: the new powerful computer technology, programmed to increase profits, tried to learn from disc jockeys' ad hoc aesthetic

choices, made to please or convert their local listeners. Today, commercial music recommendation services aspire to this "for-profit serendipity" as well.

By the late 1950s, disc jockeys lost their relative autonomy, their control over playlists decimated by payola scandals and by Top 40, a scripted format that forced DJs to play only top hits with no improvised banter. In the late 1960s, however, DJs were back as a cultural force, in a new format, freeform radio. By the early 1960s, FM radio stations proliferated and small portable transistor radios became a popular means for music listening, especially among young people. In July 1965 the Federal Communications Commission prohibited FM stations from simulcasting more than 50% of programs from their parent AM affiliates, making possible the rise of FM rock radio in general and freeform radio in particular.[20] Freeform DJ style relied on the industry's inability to count their alternative audiences, and survived beyond the pale of ratings services.

Freeform DJs broke with the fast paced, ad-dominated Top 40 format. DJs aired personal commentary on local and national events and played several tracks from the same album one after another, taking long stretches between ads. They offered psychedelic music and other rock genres unavailable on Top 40 stations. They revived the 1940s tradition of live interaction with listeners. Bob Fass, who ran *Radio Unnameable* on WBAI-FM in New York from 1965 to 1975, not only took calls from his listeners, but sometimes put several of them on the air, inviting them: "speak among yourselves."[21] In the early 1970s, radio stations returned to the commercial model and many DJs were forced out.[22]

As freeform radio emerged, the nascent computer art movement explored music, serendipity, interactivity, and programming. A pioneer computer art exhibit in London in 1968 was titled "Cybernetic Serendipity," and deliberately looked for the unexpected in the interaction between the computer, the arts— including music—and the audiences. The exhibit was extremely popular; over 45,000 visitors attended.[23] The show featured computer-programmed music as well as traditionally composed music by such composers as Iannis Xenakis and John Cage.[24]

To be sure, algorithmic music composition, based on a symbiosis of composers and computers, followed a trajectory different from algorithmic music recommendation, modeled on interactions between DJs and computers. Yet the technical aspects of exhibited algorithmic music presaged the issue of "random" algorithmic music selection tackled by contemporary music delivery algorithms such as the shuffle function in iTunes, epitomized in the iPod Shuffle, released in 2005. Famously, Apple programmers had to rewrite the algorithm to allow users to manipulate the shuffle feature, making it not truly random.[25]

Contributors to the exhibit also experimented with programmable serendipity. The press release noted that "Through the use of cybernetic devices to make graphics, film and poems, as well as other randomising machines which interact with the spectator, many happy discoveries were made."[26] The organizers' idea of interactive "randomising machines" extended to computers and their users such art experiments as William Burroughs's randomly reassembled text and sound cut-ups and much of John Cage's own works that incorporated chance sounds from devices such as radio sets.[27] Yet unlike these "analogue" experiments and like the iTunes shuffle feature, the exhibit's visual and sound effects may have seemed random, but in fact obeyed programmed software.

In some aspects, developments in freeform DJ culture and cybernetic music had different roots and goals. Cybernetic Serendipity exhibit sponsors included IBM, Boeing, General Motors, Westinghouse, Bell Telephone Labs, and the US Air Force research labs. Critics pointed out that the exhibit showcased these institutions' work without any critique of computers' role in nascent "technocratic authoritarianism" in Western societies and in the looming nuclear conflict.[28]

Yet in other ways, both freeform radio and cybernetic music provided a counter-cultural counterpoint to hyper-rational post-war scientism. As Fred Turner has shown, the earliest military projects that gave birth to the Internet may have seemed like a "closed world," but in fact rested on informal collaborations between engineers and social scientists.[29] The exhibit poster pointed to that history of informal experimentation. Continuing the theme of human-computer symbiosis introduced by the BMI ad in the 1940s, it arranged geometric lines and computer parts into a cyborg-like figure with one inquisitive eye. This image, and the exhibit as a whole, suggested democratic, participatory, and personal uses for computer programming, directed at art and everyday life rather than military or economic dominance. This alternative, although not oppositional, view of an algorithmic future echoed freeform radio's 1960s intimate and interactive practices.

One music composition at the show echoed the job of a DJ, or of a recommendation algorithm, more directly. Peter Zinovieff exhibited a computer that played variations on tunes that you whistled to it. Zinovieff recalled in 2010:

> [P]eople came along and whistled into the computer. The computer analysed the whistle and would often guess what the person was going to whistle next. I took several of the most popular tunes that people would whistle and the computer, a massive great thing, would make tunes out of the whistles.[30]

Zinovieff's robot was less like a composer creating new music then like a DJ who recommended a tune based on what users "requested" by whistling into the device. In different ways, Pandora and Spotify try to play variations on their users' chosen melodies.

Today, most algorithmic music services claim to allow users to become their own DJs, crafting their music stream according to their own tastes. But they offer competing approaches to music recommendation. Last.fm, an international

online site founded in the United Kingdom in 2002, relies on genre labels and user tagging. Pandora, an online and smartphone radio service available in the US since 2005 and in a limited form in Australia and New Zealand since 2012, deliberately ignores opinions of friends or experts in favor of "music genome" descriptions created by professional musicologists. Because it relies on hand-coded data for music recommendation, Pandora Radio has a much smaller music catalogue than other music sites: one million songs against several millions on Last.fm and Spotify. Spotify, available first in Sweden, then throughout Europe, and since 2011 in the US, plays music on demand; Pandora and Last.fm do not.[31] Opponents of music services focus on how little all of them pay musicians and their privileging of algorithms over human DJs. As WFMU DJ Marty McSorley pointed out about Spotify in a typical exchange with listeners, "the artists get paid next to shit. [A]nd [it's] robots. and [I'm] scared of robots."[32]

As McSorley's comment shows, exploitation of musicians is one legacy of the 1940s music industry most evident in contemporary online music services. Spotify, in particular, has become embedded in the traditional music industry, relying on it for operation and expansion. The four major labels, Universal, Warner, Sony, and EMI, have owned 17% of Spotify since 2009.[33] The company keeps its deals with master rights holders (usually labels) secret; each is negotiated privately, and in exchange for discounts in royalties labels are offered a stake in the company. Each label pays an unknown small share to its artists. Charles Caldas, the CEO of Merlin, which represents over 10,000 indie labels in negotiations with streaming services (and owns 1% of Spotify) praised Spotify for paying 250% more to Merlin's clients in the year ending March 2012 than the previous year.[34] Yet artists who post their work on Spotify themselves via TuneCore have been getting a paltry 0.004 cents per play.[35] Spotify, and, to a lesser extent, other music services, make money for major players in the business at the expense of independent artists.[36]

At the same time, the legacy of the 1960s is evident in the ways commercial services have to band together with freeform stations to combat copyright restrictions. Tim Westergren, one of Pandora's founders, actively participated in the effort to fight high royalty rates in 2007. When online performance rights organization SoundExchange attempted to institute prohibitive per-play fees, both commercial subscription services and non-commercial stations including WFMU organized a day of blackout in protest, and led 300,000 listeners to write angry letters to Congress. After two years of negotiations, SoundExchange relented and made rates only marginally better, hurting both small stations and commercial giants like Pandora. As Ken Freedman explains, "Commercial stations have to start paying per song per listener right away, whereas non-commercial stations are given the first 230 simultaneous streams for a flat rate of $500.... [But] As soon as you start developing a significant audience, it becomes completely unaffordable."[37] Spotify, Last.fm, and similar services also have to fight for survival in the antiquated world copyright system.

The third important legacy of both the 1940s and the 1960s is the appeal of idiosyncratic music recommendations—both welcome and not—a mark of both the earliest and the later freeform disc jockey shows. In response to an Ella Fitzgerald's "Two little men in a flying saucer" heard on WFMU, a listener confessed that he in vain "tried to train a [P]andora station to play" World War II tunes like Fitzgerald's. He "wanted the feel of a radio playing in a Lockheed plant somewhere 'round '44." Unfortunately Pandora's "music genome" lacked a sense of history. "I constantly kept having to shake a can of pennies at it to not play contempo clowns covering classics done right the 1st time."[38] But such ahistorical mistakes also provide unexpected discoveries. Last.fm displayed cultural ignorance when it mixed up a jazz funk Japanese artist Kino with a 1980s Russian rock group by the same name. Some Russian fans were angry when they didn't hear the soundtrack for an iconic Perestroika-era band. Others, however, were happy to encounter a different group by the same name by chance.[39] Serendipity has become one of the key pleasures sought in the online listening experience.

Online freeform radio stations in general and WFMU in particular have become both a model for and an alternative to music recommendation software, yet their operations are more often praised than closely studied. Radio stations began to stream online in the 1990s. By 2000, shoutcast.com listed 3,615 international channels. Only a few were all online at a given time, but enough were for one observer to declare a "radio free internet" revolution.[40] In 2001, 2,000 people per day listened to WFMU's live stream or archived tracks—about 10% of the station's entire daily audience.[41] By 2008, WFMU's online public outnumbered its radio audience; by 2010, twice as many people listened to the station online as over FM.[42]

By 2007, WFMU made it possible for users to comment on the shows in real time online. By 2009 almost every playlist attracted comments from fans in the New York City area and internationally. Judging from press and online commentary, many of WFMU's most active listeners are former DJs, independent musicians, struggling writers, obsessive record collectors, and veteran music fans. Some musicians featured on WFMU are also devoted listeners. Underground sound artist Frank Pahl posted to one of the shows: "[I] was noticing a bump in my music for architecture sales"—on his personal site—"and the comments mentioned [WFMU]. [I] went to your webpage and you were playing [B]ilbao [E]ffect ... [G]o figure. [Y]ou just made my day!"[43] Some DJs are active as independent musicians, sound artists, or record producers. WFMU thus blurs the line between music production and distribution.

Dubbed by one observer a station that plays "no hits, all the time," WFMU revels in promoting rare recordings.[44] WFMU plays obscure world music, unpopular cylinder recordings from the early twentieth century, 45-RPM recordings, sometimes at the wrong speed, and recordings that were never officially released. It also compiles lists of terrible music, such as the 30 tracks

featured on the "Treasure Trove of Found Sound Vocal Workouts" on WFMU's blog.[45] It includes an ear-cringing karaoke cover of Queen's "Bohemian Rhapsody" by Moritz, a guest at a birthday party of a German journalist Michael Netsch, who then mixed and published the track online.[46] Not only do DJs play such tracks, they also encourage their production. While Freedman streamed the Moritz track on his show, in playlist comments another DJ, Vicki Bennett, made Netsch promise to email more mp3s for her own future broadcast.[47] At times, WFMU DJs seem focused on encouraging their listeners to explore music they ordinarily may *not* like.

At the same time, WFMU found eclectic uses for algorithms much like algorithmic music composers found serendipitous uses for military computer technology in 1968. As early as 1998, WFMU's "Accuplaylists" added the ability to list song information online in real time, reloading the playlist page every 45 seconds during the program.[48] "For the first time," remembers WFMU DJ and listener music historian David Suisman, "you could find out what some off-the-wall, indescribable recording was while it was playing—rather than waiting for the DJs mic break."[49] WFMU pioneered the streaming and archiving of its programs permanently online; was one of the first stations to add an online comments feature; and the first to add smartphone apps for listening to the station—an iPhone app in 2007.[50] WFMU has collaborated with other stations in online streaming. When New Orleans FM station WWOZ found itself homeless after hurricane Katrina, WFMU hosted *WWOZ in Exile* and helped collect support in music recordings and funds; upon returning to New Orleans, the station broadcast primarily online rather than over the air.[51]

Considering this early conversion, it shouldn't come as a surprise that WFMU online comments show that users and DJs routinely use music "robots" during broadcasts, for reference and playlist material. Listeners use Last.fm to look up pictures and schedules for bands whose songs are playing; post links to YouTube clips of songs they want to hear, and occasionally torrent links for pirated albums. With the advent of Spotify and YouTube some DJs began to search these sites in real time for a requested track.[52] Former DJ Cecile is a fan of Pandora; Richard from Venezuela keeps pushing Last.fm. WFMU has a page on Last.fm and added "scrobbling" to its latest iPhone app—a feature that allows Last.fm to use WFMU listening to improve a user's recommendations.[53] The relationship between the freeform and the algorithmic in music is more symbiosis than rivalry.

This symbiosis vastly extends the kinds of radio performances DJs can produce today. In 2012, WFMU DJ and audiovisual artist Vicki Bennett organized "Radio Boredcast, a 744-hour continuous online radio project," part of the International Festival of Art, Technology, Music, and Film in England. Bennett conceived the show as a long-playing extension of her "DO or DIY with People Like Us" show on WFMU. The broadcast, inspired by the John Cage piece "As Slow as Possible," celebrated the slow and deliberate appreciation

of music, spoken word, and sound art, and featured dozens of DJs. It is now archived on the WFMU website.[54]

This collective performance of broadcasting and listening would not have been possible without the infrastructure of net servers, protocols, and apps, as well as net radio and computer art organizations. DJs submitted their original shows from various parts of the globe, from Philadelphia to Barcelona. One could listen to the broadcast via an iTunes subscription; or via the website, iPhone app, or Android app from BASIC.fm, a net radio broadcast project. The photo accompanying press reports of the show echoes both the BMI ad and the Cybernetic Serendipity exhibit poster in blending calculation and intuition. Instead of anthropomorphic and algorithmic representations favored by the two previous images, the photo represents the contingencies of human labor in a digital environment—the sticky notes precariously attached on a board, each representing a separate segment of the 744-hour online extravaganza. The freeform DJ's job has become inseparable from online and algorithmic means to recommend and distribute music.

In this common field of algorithmic online music distribution, freeform radio tradition clashes with the for-profit model represented by corporate streaming services. Unlike founders of commercial services, WFMU DJs embrace legal and pirate sites that freely share music. Vicki Bennett remembered how she herself benefited when Rick Prelinger shared his collection of educational and industrial films freely online via the Internet Archive: no longer did she have to beg national and local archives for footage to make an artwork. Listeners of Last.fm and Spotify, she argued, should be wary of leaving all music to the commercial cloud services: "this 'automatic and effortless' experience of access may be improved upon by eventually narrowing down results to only mainstream or sponsored content."[55] The eclectic aesthetic of WFMU DJs goes together with a moral economy of music, where independent artists and international audiences take precedence over excessive copyright restrictions.

The history of music blogs, a practice that peaked around 2006, is a case in point. Music bloggers take advantage of cloud storage services to democratize music recommendations previously reserved for professional music critics. They curate mp3 collections of rare and non-Western genres; some blogs eventually became advertising venues for music labels. According to Casey Ray, "Much like the FM DJs of the late 1960s and '70s, music bloggers helped define an era."[56] Many serve non-Western musicians and audiences. "A web search for an obscure artist heard on the radio will take you to a blog telling you all about them," Bennett describes the "grey culture" of listening via blogs, "sharing out-of-print material, with tags linking to related areas. An adjacent column will have links to 25 other websites and radio stations with similar interests. There then follows a wonderful odyssey into hidden and often forgotten sonic worlds."[57] WFMU's blog, too, posts YouTube clips and mp3 collections of rare music for its fans.

Currently, music blogs are under threat from federal enforcement agencies that crack down on copyright infringement. When the FBI closed Megaupload cloud storage service along with a pirate book sharing site library.nu in January 2012 and took all of its files offline, many music blogs lost their entire libraries in the action. As of mid-2012, of the three blogs WFMU listed as hit by the Megaupload shutdown, HolyWarbles no longer existed, Mutant Sounds was in hiatus but accepting re-uploads from users, and Global Groove was running as usual.[58] Users volunteered to re-upload their own files to restore libraries. As one user reported, "Mutant Sounds has helped [in] broadening my views on music, for which [I] am extremely grateful. I too would like to help you out in reuploading any item."[59] Other sounds were irretrievably lost. "The last thing I downloaded from HW [HolyWarbles]," one user remembered, "was a rare, completely out of print album by Marie Jubran, a Syrian artist who recorded mostly during the 50s."[60] When US agencies crack down on piracy, they at the same time decimate globally translocal music communities created by bloggers.

Conversely, by virtue of their business plans, online commercial streaming services stay confined within Western economic and aesthetic boundaries. WFMU, with numerically smaller audiences, reaches farther geographically than Pandora, Spotify, or even Last.fm, which is only available on the iPhone in the US, UK, and Germany. Restricted in their reach and repertoire, commercial music services cannot help but create a neo-colonial listening experience for their customers.

Take, for example, Pandora's "music genome" that describes "the relative exoticism of the melody scale." As the New York Times explained in 2009, during a Pandora coding session, after listening to a raga, a North Indian classic music form, one expert, a violinist, opined: "I actually put exotic at 3.5," which prompted a lecture from an Indian music expert on how one would understand "exotic" in relation to that particular melody.[61] But the very category "exoticism," a term with a long colonial history and connotations, would not make sense in the North Indian context. It does make sense, however, when we think of Pandora as the inheritor of the Western commercial "world music" marketing category invented in the 1980s and 1990s, exemplified by the Putomayo label, which sells CDs of feel-good samples of "world music" in North American retail stores.[62] Music blogs, and online playlists and comments spaces set up by WFMU and other freeform stations, provide a unique alternative to such neo-colonial projects.

Like aesthetic choices, algorithms embody particular social and political sensibilities. Recommendation services continue to "perfect" their algorithms, fixing what managers believe are errors and glitches. Yet it is precisely when the algorithm "fails" that we gain insight into the aesthetic and political judgment of Internet users. The Netflix Napoleon Dynamite problem is a case in point. In 2008, Netflix discovered that its algorithm failed to predict whether a user would like or hate Napoleon Dynamite, a film about the misadventures

of an awkward high school teenager. Netflix then proposed a one-million-dollar contest for 10% improvement of the site's recommendation engine. Programmers could test their code on Netflix site in real time, and if the code helped recommend the films users already liked, their code was considered an improvement.[63]

Yet from freeform radio listeners' perspective the Napoleon Dynamite problem was not really a problem. WFMU DJ from 1996 to 2009, Kenny G, aka Kenneth Goldsmith, provides the best example of a DJ who invites "haters"—loudly dissatisfied listeners. In the later years, his WFMU show was called "An Hour of Pain," with the motto, "I apologize in advance—it's only an hour." Kenny G took the name of a famous smooth jazz saxophonist as his DJ pseudonym and then read on the air letters sent to him by listeners who mistook him for the musician. Goldsmith's "uncreative" books include Day—an entire issue of the New York Times for Friday, September 1, 2000, retyped in 9-point Bookman Old Style font.[64] Kenny G offered to a freeform radio listener what Napoleon Dynamite, before the contest, offered to a cinephile: an unpredictable element that stretched one's patience yet led one to unexpected discoveries.

Thus before its million-dollar contest, Netflix serendipitously came up with an algorithm that recommended the unexpected and the bizarre—an equivalent of what music fans have insisted makes WFMU DJs superior to apps. Then Netflix deliberately chose the code that embedded a more mainstream, predictable aesthetic—a move so far mirrored by music recommendation services.

By contrast, freeform DJs' unpredictable aesthetic comes with a politics, one especially proactive about combatting copyright. In 1996, Goldsmith created UbuWeb, an online archive of avant-garde poetry, music, and later video. "I wanted to create a warehouse for the avant-garde," Goldsmith explained, "proposing the idea that not all economies are the same." Instead of clearing sound and video files with authors beforehand, he posts them first and then waits for authors to contact him about taking them down. Very few protest, and if they do, negotiation ensues and usually Goldsmith convinces creators to leave their work available on the site.[65]

Likewise, WFMU founded and maintains several services that promote the sharing of free non-infringing music. In 2009 it launched Free Music Archive (FMA), a collection of downloadable tracks curated by freeform radio stations, independent labels, and small concert venues. All the uploaded tracks are cleared for use through a Creative Commons license or a direct agreement with the FMA. WFMU has presented its "Free Music Archive Radio app" as "Creative Commons Pandora."[66] WFMU iPhone app is streaming UbuWeb content. These intertwined freeform online algorithmic projects together acquire more cultural force than WFMU, FMA, or UbuWeb would have alone.

It remains open whether the future of online music will be defined by Spotify and its corporate shareholders, or Free Music Archive and UbuWeb. Many recent algorithmic "corrections" in commercial services—those matching

listeners' music tastes, those measuring "exoticism" of world music according to Western users' expectations, and those gating music according to geographic copyright restrictions—reflect the views of the services' corporate owners. Algorithms have politics because of people and structures that create them, people either unable or unwilling to recognize the unexpected insights, political and aesthetic, that certain iterations of algorithms can provide.[67]

Notes

1. Keith Chamberlin, "Re: You, the DJ," *New Yorker*, July 26, 2010.
2. Philip R. Olenick, comment to Claire Cain Miller, "Listening to Radio on the Web? That's So Last Year," *Bits—The New York Times*, September 10, 2009, http://bits.blogs.nytimes.com/2009/09/10/listening-to-radio-on-the-web-thats-so-last-year/.
3. Sasha Frere-Jones, "You, the DJ," *New Yorker*, June 14, 2010.
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SECTION II

Radio's New Sounds