Choosing Music in the Internet Era [1]
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INTRODUCTION

The circulation of music on the Internet only came about with the arrival of two specific technologies. The first involves compression systems (notably MP3) that allow the reduction of the magnitude of each file, and the second involves the progressive enlargement of the band available to home users (ADSL) which has drastically accelerated data transferral.
Finally, the birth of Napster and subsequent peer to peer systems [Merriden 2001] has made the practice of searching for pieces of music on the Internet widespread and stable [Mari 1999], to the point of superseding most traditional music media, and generating new forms of commercialisation and control of musical data [Prato 1995; Silva-Ramello 1999]. Without mentioning the legal problem of the explosion of the Internet in the circulation of materials [Darias de las Heras 2003], it is certain that the primitive initial modalities of gathering pieces on the Internet have progressively evolved, taking on considerable technological and commercial features [Di Carlo 2000] that make it possible to identify and download virtually any piece one should desire. The result is an entirely new modality of music consumption, compared to that encouraged by traditional media, essentially passive and lacking in any kind of interaction.

With the arrival of the Internet and all of its corollaries the music listener's problems change profoundly; his/her interest is principally drawn towards the "choice" of music, often independently from the use that he/she will make of it or from the listening modalities that will be put into play.

In this paper our intent is to analyse the data that emerges from a concrete occurrence (case-study) in the circulation of pieces of music through the Internet, and to evaluate user behaviour.

1. THE SERVER AND ITS STATISTICS

At the University of Trento a Server dedicated to gathering and distributing audio material has been active since December 2003.[2]

The project, set in motion by a local music association[3], was taken up by the Department of Computer Science and Telecommunications[4] as well as by the ITC-irst Research Institute of Trento[5] which – on the base of the musical material - set up research projects on the technological architecture of the system, on the support for choosing pieces and on the conservation, cataloguing, and recovery of the data. These themes are become topics of study and training for some students and collaborators.

The server in question is a subsystem of a more generic site, dedicated to spreading musical information and news. The system's architecture [Aguzzoli-Avesani-Massa 2002] is subdivided into three principal modules: the main page concerns the general musical site, from which it is possible to gain access to the pages of CoCoA, the server devoted to the selection of pieces,

and then to KaCo, the download site, connected to the music database. This architecture reflects a distinction between the principal user activities, using a model common to several other web sites: general-purpose visit, selection of material, and actual content downloading. In order to give a concise description of the server's activity, we will now present some statistical results from 2005 alone. The data under discussion comes from KaCo, the server that contains the musical pieces, that is the one to which the users gain access after having created a compilation (as will be explained below).

The evolution over time of all of the indicators brings to light a difference between the first and the second part of the year. Possibly because between May and June there was a 50% reduction of the band capacity allocated to the service.

The average number of pieces downloaded daily (see Fig. 1) is over 4,300. The average between January and April is 5,780, whereas between July and December it falls to 3,470.

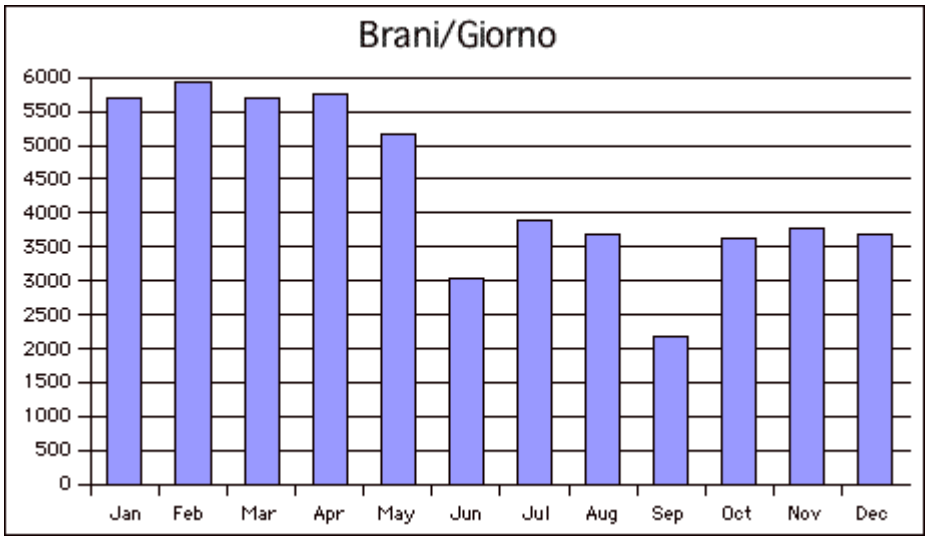

Figure 1. Number of Pieces for Day.

The quantity of data downloaded (see Fig. 2) is almost 250 Gigabytes per month (ca. 8 GB/day).

The average between January and April is 380 GB/month (13 GB/day), whereas for the following months of the year it is 170 GB/month (6 GB/day).

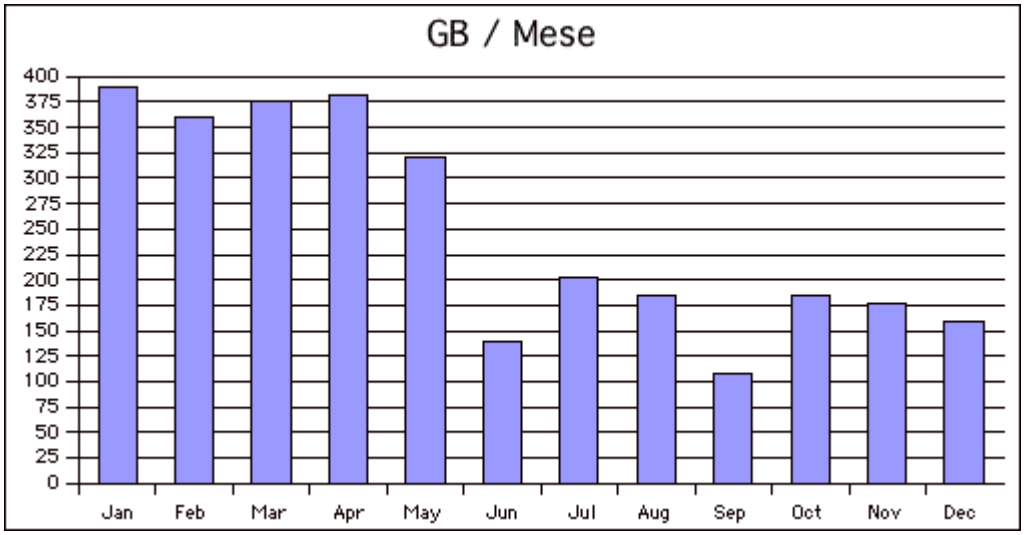

Figure 2. GigaByte for Month.

The number of "visits" per day (see Fig. 3) is 737 in the space of the whole year. From January to April it is 790, while from July to December it is 716.[6]

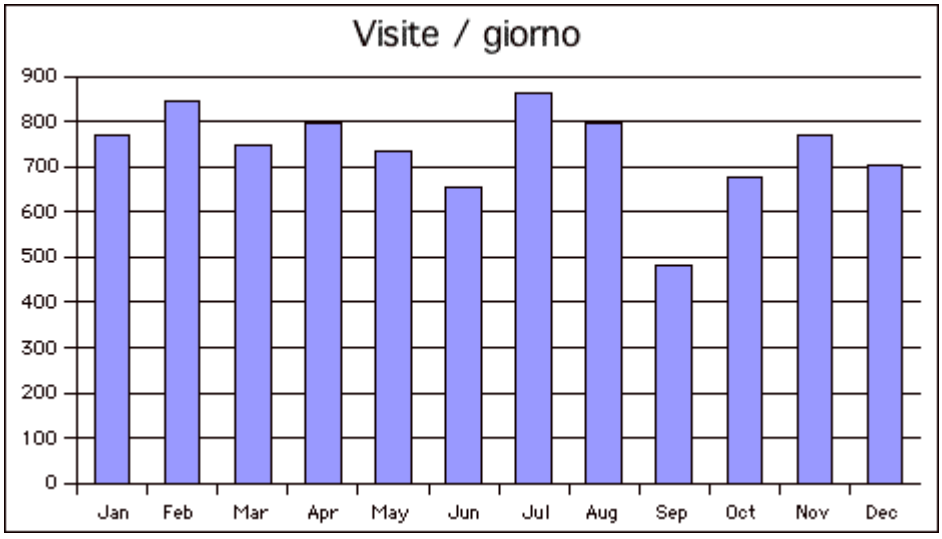

Figura 3. Number of Access for Day.

2. THE CONTENTS

The server draws together pieces of various origins, all declared by the creators of the site to be public property. The main sources are personal recordings of musicians' own performances, those of the musical association's chamber group, those of colleagues who have given their consent, and commercial recordings that have become freely distributed following the

bankruptcy of the record companies (mostly from eastern Europe) who held the rights to them.

2.1 The composers

There are 440 different composers present in the catalogue, who belong to every period and/or genre. Beginning with the repertory of Gregorian chant, one reaches in fact the first decades of the 20th Century (Nielsen, d'Indy), which coincides with the lapse of time used for didactic purposes by most conservatories. Given the declared origin of the audio materials, many of the composers have a clearly eastern European origin, but the major representatives of Italian, French and Mitteleuropean music are also present. Alongside the most illustrious names of the History of Music one can find relatively little known names, satisfying in this way the demand both for well known composers and that for minor or for more specialist demands. Figure 4 illustrates the number of pieces per composer, in alphabetical order from Abel to Zwierzchowski, listing however only the more relevant composer.

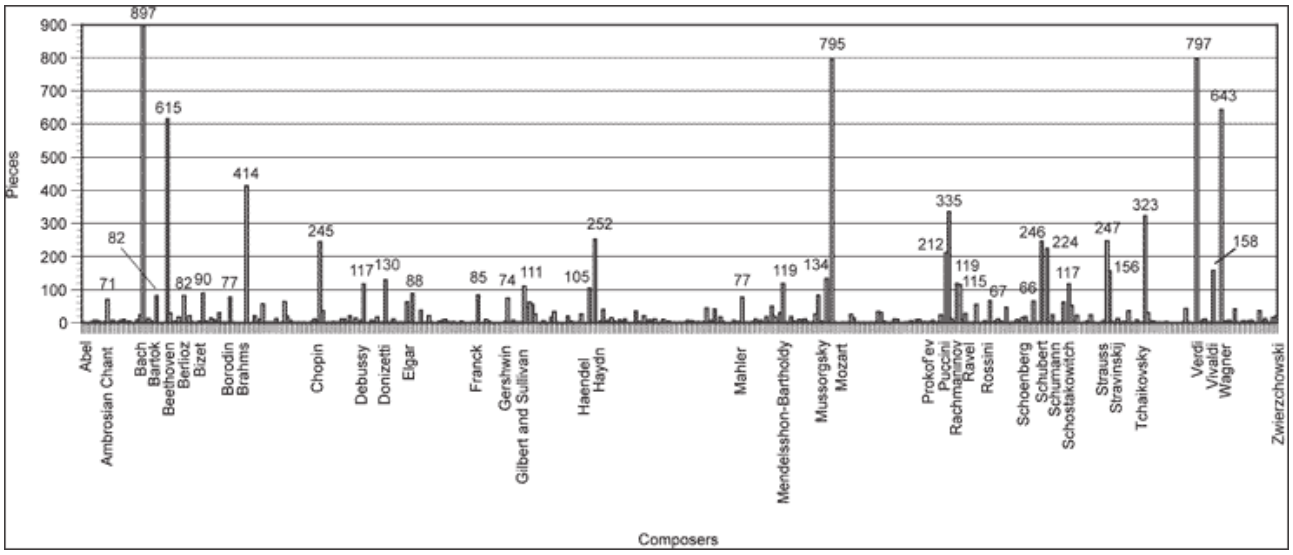

Figure 4. Number of Pieces by Composer (excerpt).

2.2 The pieces

The pieces available on the server are all encoded in MP3, following one of the most de facto widespread standards on the Internet. In all there are 11,603 files, more than 50 Giga-Bytes of data, all of which have been given names of eight characters at the most, in a non uniform if not out and out random way, or at least using criteria that are not musical and/or semantic, giving an overall impression of aleatoriality.

The analysis of the data was then carried out with the aid of an internal Database, extremely rich in information, which allowed the extraction of some significant results.

The pieces were grouped, for example, by genre, even if generally in a somewhat erratic way. The typically musical habit of superimposing "genres" and "forms", "stylistic attributions" and "compositional structures" in fact led to a fair degree of terminological redundancy and a loss of coherence in the grouping. Notwithstanding these observations, the categories used are well apt to distinguish the pieces and are largely correct, considering above all their use on the behalf of users who are not completely at ease with the many semantic nuances of the musical repertory. There are 54 "genres" used in all, and they distinguish the pieces most importantly according to historical periods (es. Baroque, Early music, etc.), repertories (ex. Opera, Chamber music, etc.), and forms (Concertos, Symphonic Opera, etc.). The most important indication one can draw consists in the differentiation (see Fig. 5) which shows a substantial majority of instrumental pieces with respect to vocal ones.

Figura 5. Presenza di musica vocale e strumentale

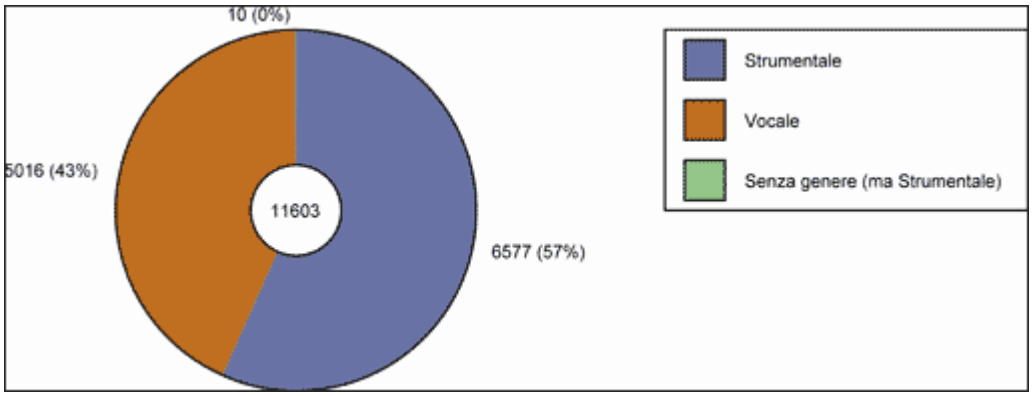

Figure 5. Presence of Instrumental and Vocal music.

Another significant fact consists in the distribution of the pieces according to composer. As is clear from the preceding Figure 4, even though a small number of very well-known composers present the greatest number of pieces, most of the composers are present with less than 10 pieces (see Fig. 6).

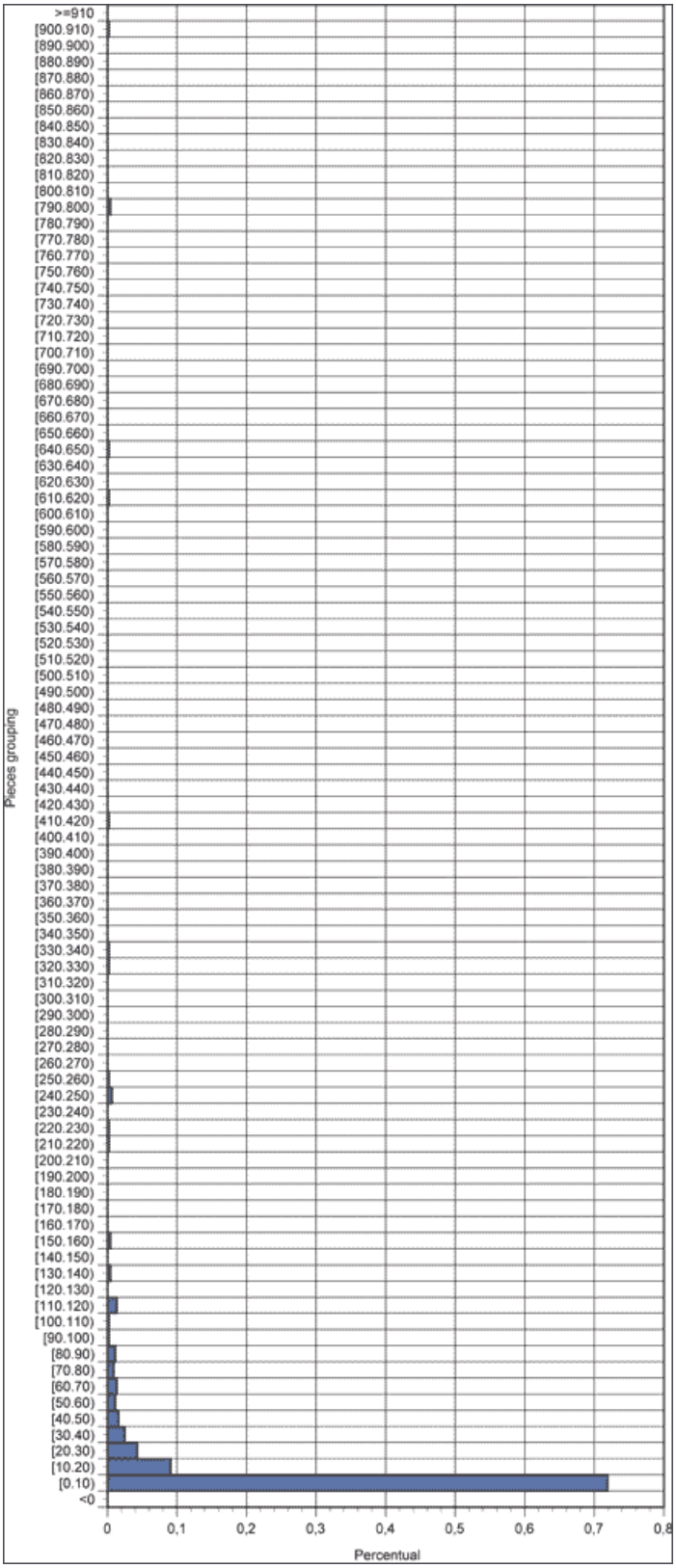

Figure 6 (right). Distribution of Pieces by group's numbers related to each composer.

Each file contains a single piece of music, regardless of whether it is autonomous or is part of a larger formal structure. For this reason, in order to "recompose" more articulated forms (ex. Suites or Concertos) the user must identify and select each single movement.

Both data have evident statistical consequences concerning the probability of choice on the behalf of the users, that at present have not been fully analysed, but whose partial results will be examined further along in the discussion.

3. ANALYSIS

The analysis of the data provided by the CoCoA and KaCo servers comes up against two principal difficulties: on one hand it encounters an enormous quantity of information; on the other it is tied up with the "virtual Self" [Caci 2001], the navigators' absolute anonymity, which makes a clearly linear reading of the observed data impossible. Although from the server's position it may be possible to come to a partial identification of the users, the impossibility of privacy violation prevents us from undertaking any research in this direction. The users will therefore be considered as a necessarily collective unity, united by the adhesion to the server (which one must join, even if this is free of charge), which represents in this sense a real community, even if made up of absolutely anonymous individuals who do not necessarily interact among themselves.

3.1 The users

The system's total number of registered users is 84, 366 (as of 28 December 2005), not all of whom however have undertaken data downloading sessions. Reasons such as relation with the site's user interface, connection speed, and interest have led to limiting this latter category of users to 65,148, discarding 19,218 unities. This deviation is amply justified by strictly operative reasons: the user interface, currently being rewritten upon insistent user request, has led to much difficulty in comprehending the download mechanisms, and furthermore the sudden reduction of the transfer band carried out by the University in order to save funds in the second half of 2005 (for this see above all Fig. 2) has compromised in an evident way the speed of the initial transfer, leading to lengthier downloads and the estrangement of some users.

Among them, to conclude, only 890 fully completed the registry procedure providing (not necessarily true) personal information, including photos, interests, and various other information. Just as any other modern portal, the CoCoA server in fact allows the creation of mini-communities that encourage the creation of personalized pages on the behalf of each user, and the possibility of interacting and creating relationships. The Department of Sociology and Social Research of the University of Trento is involved in these aspects, within the span of the research project.[7]

3.2 The musical choices: criteria and results

The most downloaded piece of the entire collection is Maurice Ravel's Bolero (3,694 selections),2 while the least downloaded are two arias (Oto bluznierca! e Boze poblogloslaw) from Karol Szymanowskj's King Roger (26). In all, 3,061,099 pieces were downloaded (as of 28 December 2005), with an average of 263.8196156 downloads for each piece. The second most downloaded piece was Mozart's Minuet K 122, with a total of 1,689 selections.[8]
A statistical analysis of musical preferences based only on one piece or one composer has very little meaning in itself. Indeed, it only expresses the absolute preferences of the user community, and is perhaps useful as an invitation to discuss the pieces and the reasons of their reception, but is surely non able to represent the cultural mechanisms of the choices made: in order to become significant, these results would have to be compared with detailed information on the users (sex, profession, age, education, etc.), and such a mass of data would make any analysis practically unfeasible, even in possession of all of the necessary information.

Furthermore, one must not underestimate how the very procedure of piece selection in CoCoA does not favour the choice of single pieces, but, obviously, the creation of lists (from one to 15 pieces in all) of files, to be downloaded all at once. This implies that for every download session each user does not limit him/herself to selecting one single piece, but proceeds rather by coupling multiple files.

Although it may not appear significant in our current contest, the enormous distance between the first two positions is worth some consideration. Although CoCoA only deals with classical music, the user reservoir which it aims at has many interests, not necessarily concentrated specifically upon this repertory. The MP3 standard has proven for the Internet to be a possibility of transmitting files related to the popular music repertory (pop-rock music), for which reason it is extremely likely that most contacts come about with reference to this repertory. The Bolero, from this point of view, is one of the most well known pieces, not least by way of the homonymous film that in 1981 brought Ravel's music to the attention of all types of media.[9]

The first 45 positions in the classification of the most downloaded pieces are in any case instrumental pieces. The first vocal piece, the Kyrie eleison (with 1.106 selection) from Wolfgang Amadeus Mozart's Requiem, appears in the 46th position, followed at a short distance by La voilà (47th), taken from George Bizet's Carmen. The other sections of the Requiem follow immediately, downloaded however less and less frequently: the Confutatis (50th with 1,092 selections), Requiem aeternam (56th with 1,073 selections), Recordare (67th with 1,050 selections), Dies irae (72nd with 1,021 selections), Tuba mirum (77th with 1,008 selections), Lachrymosa (82nd with 997 selections), Rex tremendae (84th with 993 selections), Benedictus (93rd with 966 selections), Sanctus (94th with 965 selections), Agnus Dei (97th with 953 selections), Hostias (99th with 951 selections), Lux aeterna (102nd with 945 selections), whereas a Cum sanctis (4709th with 257 selections), erroneously attributed to the same work, closes the list of pieces by Mozart. The Requiem is present in another registration, also very often downloaded, which once added to the preceding classification has the effect of entirely upsetting the classification:

Section	1st version	2st version	Total
Requiem	1073	870	1943
Kyrie	1106	870	1976
Dies irae	1021	834	1855
Tuba mirum	1008	825	1833
Rex tremendae	993	825	1818
Recordare	1050	863	1913
Confutatis	1092	883	1975
Lacrimosa	997	844	1841
Domine Jesu	1002	843	1845
Hostias	951	858	1809
Sanctus	965	859	1824
Benedictus	966	883	1849
Agnus Dei	953	361	1314
Lux aeterman	945	361	1306

From the sum of the two versions it is clear that the Kyrie springs into the second overall position, overcoming moreover another piece by the same composer, giving evidence of the vast appreciation of the music of Mozart. This analysis of the Requiem alone further confirms the fact that the choice of files was absolutely free, without any exterior constraints, to the point of allowing the total dismemberment of the work in extremely disparate quantities, based upon an unforeseeable specific interest in the single movements or sections. Some of these differences in position in the user classification can surely be attributed to the complexity of the server's interface, even though the distance between the two extremes (1976 selections of the Confutatis against 1306 of the Lux aeternam) appears frankly unjustifiable. The most plausible hypothesis involves a substantial distance between the primary interests of the visitors of the site and CoCoA's repertory. The lack of balance among the choices of the Requiem induces us to suspect that the users perhaps are not entirely aware of the work in its entirety, and for this reason, with the only possible exception of the Kyrie eleison, the single parts were selected in an irregular manner. The fact that in the Cum sanctis, erroneously attributed to the work, we see an extremely low number of downloads (only 257), demonstrates in any case that the users did not fall into the same error as the site's creators, showing a greater preference for the other sections of the work.
The distinction between the choice of single pieces and the "grouping" of pieces (from here on "Compilations") is therefore decisive, given that the latter procedure allows us to verify the coupling of the pieces, and therefore the degree of adherence (stylistic, technical, linguistic, etc.) between them, considered as a "unity".
The system presents two different quantifications of the compilations. The CoCoA server had 1,246,243 selections, whereas on KaCo 798,830 downloads were carried out. The deviation between the two figures has the same motivations as stated in 3.1.
Further significant data seem to be offered by the total number of pieces in the compilations requested of KaCo, 5,890,377, which when compared to the number of pieces actually downloaded, 2,382,633, shows a high mortality of the requests: in almost half of the cases the users do not succeed in downloading the music they inserted in the compilation, probably for reasons of overcrowding of the site. It is moreover interesting to note the average number of

pieces per compilation. The ratio between the pieces requested in KaCo and the number of compilations (5,890,377 / 798,830) comes to 7.4 pieces per compilation, whereas an analogous calculation applied to the 1,246,243 compilations present on CoCoA comes to 6.2. In the latter case the difference may be traceable to an elevated number of two to three piece "trial" compilations, which the users do not even try to download.
Generally speaking, note that the first 13 composers in the classification of the most downloaded (see Fig. 7) account for over 50% of the total preferences:

Compositor	Pieces	Download
Johann Sebastian Bach	7,70%	9,66%
Wolfgang Amadeus Mozart	6,82%	9,49%
Giuseppe Verdi	6,87%	6.74%
Ludwig van Beethoven	5,30%	6,49%
Richard Wagner	5,54%	4,98%
Pyotr Il'yich Tchaikovsky	2,78%	2,99%
Fryderyk Franciszek Chopin	2,11%	2,91%
Giacomo Puccini	2,89%	2,83%
Johannes Brahms	3,57%	2,72%
Antonio Vivaldi	1,36%	2,27%
Franz Schubert	2,12%	2,25%
Franz Joseph Haydn	2,15%	1,85%
Sergey Prokof'ev	1,83%	1,58%
n. 13	51,04%	56,76%

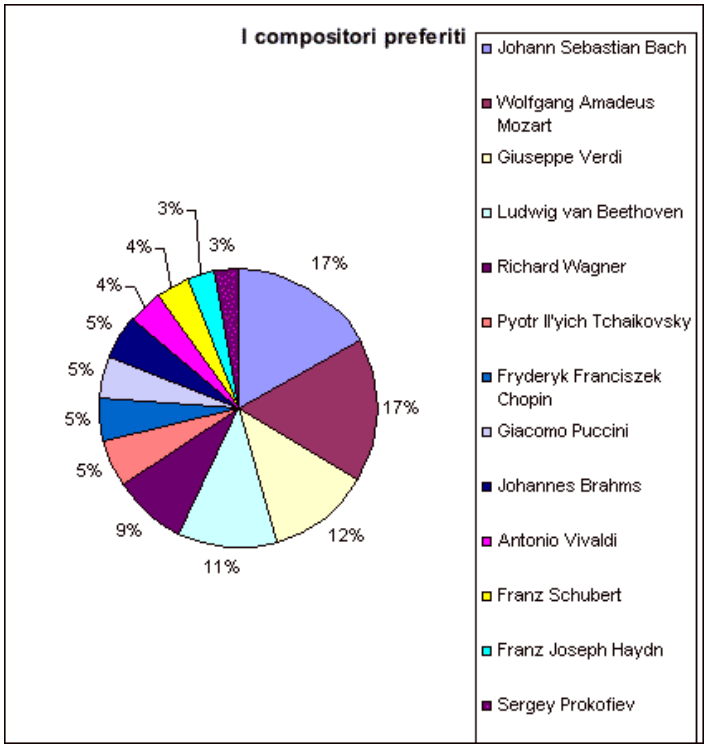

Figure 7. Percentage among the first 13 composers of expressed preferences. Values rounded off and referred to 56,76% of total preferences reached by the composers.

Collecting the 54 "genre" categories that appear in the site into 10 larger categories (ex. grouping "Symphonic Opera" with "Opera" and so on), one obtains an astonishing result.

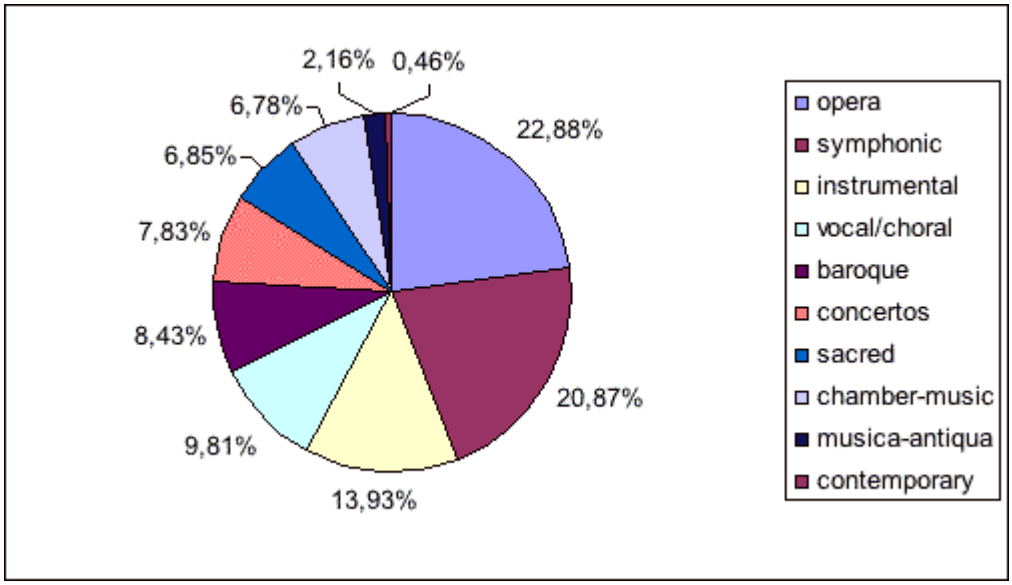

Figure 8. Percentage of preferences among the musical genres.

In this way the vocal genre, and Opera in particular, takes on a primary role among the preferences, even though the presence of surely still combinable "genres" here maintained distinct in order to show the peculiarities of the cataloguing reminds us that the general preferences go above all to instrumental music.

4. DISCUSSION

The presence of such a high number of registered users, of telecommunication contacts, and of available pieces, could lead one to portray the process of piece choosing as a typical mass phenomenon. Actually, the nature of the computer, generally used in solitude, allows us on the contrary to individuate entirely personal choices, to see how the preferences were carried out within the full control of each user's own integrity. As is known, mass psychology tends to modify individual behaviour, showing characteristics of uniformity that encourage us to imagine a kind of collective mental unity.

The only "collective" element of the CoCoA informatic system actually consists in the objectivity of the system of selection. The "collective" factor at this point equates to each user's degree of adherence to the modalities of selection of the pieces and of the compilations (that is, to the interface), with the ensuing elements of social psychology, which «studies phenomena in order to correlate the way people take on, handle, elaborate, or disregard information coming from the environment (whether natural or virtual) following the idea that these processes always come about in a specific social context, made up of people who interact, who belong to different groups and categories that are in turn in reciprocal contact, in a culture that makes some kinds of behaviour more desirable that others» [Cavazza 1997, 14]. CoCoA, like all portals of its kind, produces a slight process of influence by way of its "community" aspects; in any case the 890 users who gave all their personal information make

up a very small percentage of the 84,366 total users.

The compilations express the degree of preference of each individual, because they are defined on the basis of personal, not collective, experiences. Precisely because these preferences are based on strictly personal choices, the compilations might not represent the "foremost" choices of each user. For example, I like Mozart, and I therefore chose pieces by Mozart. However, for the very reason that I like Mozart, quite probably I already own pieces by Mozart: on cassette rather, or on record or CD. In all likelihood, the user will choose pieces that he/she does not possess, even though this is not infallible; he/she might also select pieces that he/she already is acquainted with and of which he/she owns a copy, even if only to have a different performance, or to have it in a format (MP3) that is easier to manage (i.e. with an MP3 reader, or listening to music on a Personal Computer or Laptop).
The compilations could be subdivided into four possible categories, on the basis of the criteria used in choosing:

a) "Objective compilations", which contain the pieces of a work that is made up of different movements;
b) "Monothematic" compilations, which contain pieces by a single composer;
c) "Homogeneous" compilations, made up of pieces that all belong to one genre;
d) "Irrational" compilations, made up of pieces by different composers and in different genres.

The analysis of the data on piece pairing and on the compilations unfortunately has not yet reached its conclusion, but the "objective" and "monothematic" categories seem without any doubt to stand above the following two.

Within the fourth category of Compilations, one might note a seemingly unusual – if reasonable – practice. Some users in fact select their choices in an alphabetical manner, that is following the order of presentation of the composers.

CONCLUSIONS

Analyses of the socio-psychological mechanisms on Internet are generally carried out following schemes, which are perhaps not very advanced but quite efficacious, based upon oppositions: info-rich vs. info-poor [Maldonado 1997],[10] cyber-democracy vs. Big Brother [McLuhan 1964; Kerr 2004], etc. Such analytical procedures, while presenting rich results and very interesting prospects, tend not to consider one of the foremost consequences of the digital explosion of our time, surrounded as we are by "Information Technology" [Rapaport 1991], which consists above all in our relation with a virtual reality which, in the acceptation of Merleau-Ponty [1954], becomes an "existential space" and therefore a completely new perceptive environment [Attardi 2001].

5.1 Profile of the users

The most important mechanism in the relation with the new computerized environment can be found in the usability level of the available instruments, and from this point of view the CoCoA system appears to be quite encumbered. The interface problems are so evident as to currently necessitate a thorough revision. Another knotty point is the band available to the server, having been reduced in the second half of 2005 and thus lengthening the usage time of the system. This means that the profile of the average user of the system is characterized by several aspects:

a) He/she must be interested in classical music (which is not to be taken for granted, given that popular music today, whether on a commercial level or in the principal media's programming and distribution, seems to be the model of contemporary music in a virtually undisputed way);
b) He/she must have a connection without time limits (given the great amount of time necessary for downloading, above all after the band reduction);
c) He/she must have a fast connection (at least ADSL, to be able to bear the quantity of data in every compilation: with an average of 7.4 pieces, each of a presumed size of at least 2 Mb, every download "weighs" at least 15Mb);He/she must be musically educated (both in order to recognize any errors in the cataloguing/classification of the database, and to pass the "obstacle" implemented by the site's administrators who, before allowing downloads, require each user to answer a few questions involving musical culture. This procedure aims at systematically "slowing down" the downloads so as not to overwhelm the server's activity).

The extreme precision of these "minimum" characteristics for complete usage of the server automatically reinforces the impression of a homogeneous community, perfectly in line with the idea of the micro-worlds [Attardi 2001, 22] that make up the Internet.

5.2 The selection of music

Rather than in various theories of virtual communities, the real fulcrum of interest in this case is to be found in the repertory which, let us remember, is available free of charge. Perhaps this is the reason for the scarce collaboration in constructing an active community among the various users (remember the "no more than" 890 users who registered completely) and for the much greater attention that was given to choosing and downloading the pieces.
Choice theories have long since accepted the role of emotion, confirming that choices are not made only on the basis of strictly rational thoughts or instincts. In particular, "regret" theory [Rumiati 2000, 88-90] represents quite well the tendency towards "less risky" or more economic choices. This attitude in any case retains some strongly rational connotations (utilitarian) that in the case at hand emerge in the gratuitousness of the goods and in their, relative, simplicity of retrieval. From this point of view the site, in spite of its many difficulties of access and adhesion, closely recalls Skinner's Box,[11] which highlights the performance of behaviour that provides a reward (the pieces).

The difficult path towards retrieving the music puts in act precisely the type of repetitive behaviour [Wallace 2000, 253] that tends towards a perpetual gratification in learning the

logical mechanisms that govern the site's structure, with consequent "dependency" effects. The ratio of data downloaded and daily visits indicates an average of 11.5 Mb downloaded at every contact, which is frankly a very high number which seems justifiable only by imagining a sort of "hoarding" which is often self-justified. Let us recall in this regard downloading in alphabetical order and in its clearly systematic nature which seems more oriented towards the total acquisition if the pieces contained in the site than towards their conscious selection. Other apparently irrational behaviour, on the other hand, often converges in a justification motivated by "comparison" (ex. not having reached an objective "by the skin of one's teeth", or else not having reached it by a substantial margin). This attitude, according to experiments done by Kahneman e Tversky [Rumiati 2000, 94-95], shows «that, when the result is not reached "by a hair's breadth", the counterfeited construction [reconstruction of events intended to reach a result that has not come about] highlights the delusion or the anger of he/she who was closest to the objective […] But it also shows that the greatest satisfaction is associated with an objective reached fortuitously, compared to the situation in which the "margin" in reaching it was greater» [Rumiati 2000, 94]. This is particularly true for "music enthusiast" users who accidentally came across the site, or for the many protests about the continual slowing down that they suffered, whether due to the interface or the reduction of the available band.

Finally, "cognitive dissonance" [Rumiati 2000, 94 sgg.] indicates the extent of the gap between expectations and results, the alternatives and the "affective" considerations with respect to the initial expectations, and comes out essentially in the protests of the various users. In fact, the site does not put itself forward in the way of a Web-based decision making, in which the system itself suggests solutions in reaching one's own desires [Fasolo-McClelland-Lange 2005, 340], but in any case guarantees the users' overall satisfaction, based on their competence and their interests.

As far as the contents of the choices are concerned, if the application of fundamental rules (ex. "objective" compilations) shows a relative cognitive simplicity, which does not take into consideration the many possibilities of feasible combinations, recalling instead only rudimental mnemonic elements, at the same time the knowledge of such groupings clearly indicates that this kind of choice belongs without doubt to the Implicit competence model [Jones 2004, 152-153] rather than the Explicit competence model, giving the consequence of not being clearly quantifiable on the basis of accesses to the system, but only hypothesized on the basis of the results obtained. In fact the distinction between implicit and explicit knowledge becomes evident when the description of the events governed by rules is so complex and subtle as not to be intuitable or achievable by imitation [Baroni-Dalmonte-Jacoboni 2003, pp. 4-5].

Therefore, in our case, we can suppose on the basis of the results in our possession, that the users have a good dose of musical competency, but not that the latter is necessarily the only criterion of adhesion to the mini-community of the site in discussion. The choices appear to be carried out on the basis of a choice mechanism that is influenced above all numerically [Baron 1998, 411] in which the surpassing of indicators (average number of available pieces per composer) induces reinforcing the choice, which is also predictive, in certain areas of interest. In particular we are dealing with a linear model [Rumiati-Bonini 2001, 155 sgg] in which one element of the information (in our case the title and the composer of the work) tends to add itself to the weight of the variable (number of pieces), thus reinforcing the conviction of the choice. This is particularly true for the concentration of 56,76% of the data downloaded in only

13 composers, but also in referral to the analysis of the absolute values, which tends to reward the notoriety of specific pieces, regardless of the available alternatives.

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NOTES

1. Relazione presentata al 9th International Conference on Music Perception & Cognition (ICMPC9) del 2006, sulla base di un lavoro di ricerca eseguito con il contributo della Provincia autonoma di Trento.

2. http://cocoa.itc.it:8080/cocoakaradar/home.html.

3. http://www.karadar.com.

4. http://dit.unitn.it/welcome?lang=it.

5. http://www.irst.itc.it.

6. The visit count considers one work session with the site as a visit, regardless of the number of pages viewed.

7. http://www4.soc.unitn.it:8080/dsrs/content.

8. The piece is found in three different versions, classified respectively at the 1st position (1.784 selections), the 75th (1.011), and the 124th (899).

9. Bolero, Director and scene writer Claude Lelouch, Choreography by Maurice Bejart; the rich cast included: Fanny Ardant, Richard Bohringer, Evelyne Bouix, James Caan, Geraldine Chaplin, Nicole Croisille, Eva Darlan, Jorge Donn.

10. On one hand, the arrival of the Internet has brought about a new means of communication undoubtedly responsible for excluding large sections of the population from the new media, who remain "illiterate" with respect to them and are cut off from the information that circulates in them; but on the other, it must be said that the net allows us in some fashion to overcome the classic dichotomy, of Marxist origins, that concentrates on economical relationships. India is a clear example of this, a veritable new Silicon Valley (http://www.businessweek.com/adsections/indian/infotech/2001/silicon.html) that, notwithstanding the endemic structural fragility of its economy, has become a reliable point of reference in software development, with encouraging consequences in the growth of computer literacy. In any case, current awareness of the problem is strong enough that, alongside traditional humanitarian aid, the "One Laptop Per Child" project (http://http://www.laptop.org) stands out for what is only an ostensible eccentricity, having put together a small low-cost but high technology laptop ("Xo"),

essentially based on open-source patents. The aim of the project is to promote the widespread diffusion of IT fluency among all of the world's children.
Remaining within the prospective of the opposition expressed by Maldonado, one must also consider the increasingly heated contraposition between free and owner based software.

11. The Skinner's Box takes its name from Burrhus Frederic Skinner, who, under the influence of Ivan Pavlov (conditioning) and John Watson (Behaviourism), centred his own interest on stimulus-response reactions, applied in particular to rats and pigeons. It is an experimental milieu (operant conditioning chamber) in which the subjects operate in response to stimuli based on movement (object pressure), sight, etc., with corresponding gratification (es., food). Skinner applied his research on animals to human behaviour, developing for example self-learning machines. Many of the information mechanisms of auto-instruction use the principles laid out by Skinner [Green 1984]. Cfr. also Holland-Skinner 1961, Skinner 1968, 1989.