

TECHNOLOGICAL IMPLEMENTATION PLAN

Description of project

EC PROGRAMME:	IST
PROJECT TITLE:	Content-based Unified Interfaces and Descriptors for Audio/music Databases available Online
ACRONYM:	CUIDADO
PROGRAMME TYPE:	5th FWP (Fifth Framework Programme)
CONTRACT NUMBER:	IST-1999-20194
PROJECT WEB SITE (if any):	http://www.cuidado.mu/
START DATE:	01 Jan 2001
END DATE:	31 Dec 2003
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Executive summary

Original research objectives The CUIDADO project aims at developing and experimenting innovative products and services relying on a comprehensive music/audio content-based approach. It covers content information extraction as well as exploitation from the analysis process (extraction of descriptors), through the navigation process (retrieval methods and

browsing interfaces), up to the creative process (consuming and authoring tools). It therefore coordinates a scientific, multi-disciplinary research program oriented towards sound and music content description, and a development program which aims at validating resulting descriptions in full-featured audio navigation and editing applications. The project methodological framework combines dedicated research and technology development with a user requirement engineering and marketing approach in order to ensure the adaptation of produced technologies to targeted needs and markets. The main project objectives can be expressed as follows :

- 1 Experiment new audio/music content-based features in two pilot applications The project aims at developing two pilot experimental applications, which illustrate, each in its field, new possibilities of music/audio content browsing and manipulation: – the Music Browser: a classification and retrieval system for music titles catalogues (for record labels and copyright societies) but also for Web music monitoring and detection of pirate recordings. This application, intended to an as broad as possible user target, features an online music catalogue with high-level browsing and automatic sequence generation features. – the Sound Palette: an authoring tool for retrieving, processing and editing sound samples. Targeted to professional users in the field of audio and music production (recording, multimedia, post-production), it provides audio sample database browsing and editing features, available in two implementations : as an online service and as a plug-in to an existing audio production commercial application. The design and validation process involves a selected panel of professional users and experts in order to ensure that the produced applications conform to the needs of target users and meet their expectations. The application development, together with assembling required technical modules performing descriptor processing and data access, puts a strong emphasis on designing new user interfaces adapted for the application features.
2. Design audio/music descriptors relevant for target applications There is no generic way of describing audio/sound information since possible divisions highly depend on the context of exploitation, including the user himself, and his own categorial references, and the related tasks he is to carry out. Thus designing descriptors can only be considered as a function of targeted application features. Designing descriptors for music/audio fall within the scope of the MPEG7 standardization process, so a tight bi-directional coordination is searched between the project and MPEG7 committees. Another key issue in content processing in general is to find, through machine learning techniques, appropriate relationships between low-level spectral/temporal audio features and higher level representations such as perceptual (intensity, pitch, timbre ...), cognitive (melody, rhythm, genre, etc...) or semantic (source classification, etc.) descriptors. A key assumption of the project is that relevant descriptors for music can rely on robust lower level audio descriptors. Combining these two levels ensures the reliability and grounding of the description.
3. Implement a system architecture for integrating targeted services Storing a large set of audio/music data together with their descriptor metadata, making them accessible in an acceptable response time to a sufficient number of simultaneous users and delivering them by means of online services taking into account user specific information requires the implementation of a dedicated system architecture, including specific data structures and communication protocols. Database technology plays a key role in this project, in order to enable an appropriate modelling of dedicated data and metadata structures at all levels, and to manage large amounts of data efficiently. Another key issue is the already mentioned interactivity of user interfaces, which requires adapted bi-directional communication protocols between the user interface and online services. This includes the transfer of various kinds of data using appropriate formats (e.g. XML for metadata, streamed audio for sound files, ...) and their representation at the user side through dedicated graphical interfaces. The system architecture also includes a transaction system, which enables to store user profiles, to manage security and check right access, etc.

Expected deliverables

The project is organized around the development of two applications, the Music Browser and the Sound Palette, whose complementary features illustrate new possibilities of

content-based browsing and manipulation of music pieces/audio sample stored in databases. Descriptor-related scientific background is developed according to target application features, as well as all required technical modules for building full-functional applications, which appear as experimental platforms for validating this technology. The work schedule includes 7 main milestones : M1 : Working method and specifications (End of May 2001) providing agreed online quality control and involving user groups M2 : Preliminary descriptor modules for application prototypes (End of February 2002) M3 : Application prototypes (End of July 2002) for first user validation and specs revision M4 : Final middleware technical modules (End of March 2003) documented and reusable in several applications M5: Final feature extraction technical modules (End of August 2003) documented and reusable in several applications M6 : Final applications (End of November 2003) M7 : Validation/dissemination of results with strong contributions to MPEG7 (End of December 2003) The project is made of 11 workpackages divided into 4 main groups : Group 1: Management and specifications Project management and Consortium coordination (WP1.1). Specifications (WP1.2) : the project involves music creators and consumers, online quality control and regular specification update according to MPEG7 inputs. Main deliverables : - Initial and updated specifications - User feed-back methodology Group 2 : Reusable technical modules Workpackages as part of this group aim at delivering technical modules providing the main features of targeted applications, but in a modular and reusable form which enables easy integration into other applications. - Audio features extraction (WP2.1) provides content descriptors to the other modules, first derived from current Instrument Timbre Description proposed in MPEG 7 by the CUIDAD Group (Esprit 28793) and then from signal analysis and perceptual studies following MPEG 7 Multimedia Description Scheme. - Music content description and transformation(WP2.2) derives high-level descriptors (such as music style or genre) from previous task audio descriptors and MIDI files. - Database management system (WP2.3) specifically designed for large audio & descriptors databases using adequate metadata structures (Mpeg7-DDL or XML), as well as user and access right management to all kinds of data. – Sound processing and networking modules (WP2.4) for access to audio data and conversion on appropriate user formats - Music sequence generation applies constraints on music titles/audio descriptors (WP2.5). - A global architecture, which integrates all modules and operates them in a client-server application, using appropriate middleware. Main deliverables: - Web download/storage system - Final audio software architecture - Final descriptors - Sound Palette extraction modules - Web monitoring extraction modules - Final music content description module - Final transformation modules - Final music descriptors Group 3 : Module integration in pilot applications The two WPs of this group aim at developing the two targets applications, by integrating modules issued from Group 2 WPs and developing remaining functions such as user interfaces: – The Music Browser (WP3.1) includes sound similarity search, constraint based music selection, personal keyword use and user's profiling. One version is tied to Web music monitoring and another to Web music sales and customized radios. – The Sound Palette (WP3.2) has an online version with retrieval and processing features scalable to the network performances and an offline version which features content-based editing/processing in an existing professional authoring environment. Main deliverables : - Final Web Music Monitoring System - Final Web Music Store application - Online Sound Palette final application - Sound authoring tool final application Group 4 : User validation, assessment, standardization and dissemination - User groups for requirements, creativity and validation will gather music creators and consumers but also record labels, sound archives and copyright societies using a feed-back loop methodology (WP4.1). - Standardization in MPEG7 and dissemination to content providers, scientific communities, potential users, etc., is a key issue (WP4.2). Main deliverables : - Final User group Report - Competitors' systems - Final Dissemination Report and Technology Implementation Plan - Final Public Report

Project's actual outcome

The project's actual outcome conform to the initial objectives in terms of - design of low- and high level audio/music descriptors adapted to targeted application features, together

with low-level descriptor extraction and similarity computation software modules, with a systematically MPEG7 compliant approach, - design of a generic software architecture including database management system, access to audio/music material, user and user right management, client-server middleware, etc. - development of targeted applications : Music Browser, Online Sound Palette, Offline Sound Authoring Tool, Web Music Monitoring System, - scientific, professional and public dissemination of the project results through various media : publications, conferences, workshops, shows and exhibitions, etc. Resulting innovations related to audio/music content management features include : - automatic audio sample classification, - content-based sample editing - intelligent title play-list generation, - automatic audio summary generation, - identification of unknown audio excerpts from reference copyrighted databases (fingerprinting), - new navigation interfaces in sample and music title databases, - etc. These innovative features are integrated into the two resulting applications: 1) The Music Browser features musical paths and automatic compilations according to user's tastes, search for music similarities, learning systems based on user's personal choices. It also serves as a monitoring system for Web music files. This approach answers the needs of music listeners on one side, record labels and copyright societies for Information management methods for both marketing and protecting their contents on the other side. 2) The Sound Palette involves music creators for developing an authoring tool in an existing professional audio environment taking full advantage of the extracted audio features for innovative retrieval, editing and processing. CUIDADO is also a first attempt to go beyond content retrieval with an Authoring system using content features for professional musicians and studios.

Broad dissemination and use intentions for the expected outputs

The expert user groups (creators and distributors of multimedia services, IRCAM Forum User Group, Creamware users, etc.) and the EMUCAST (eContent) user group of EBU radio DJs contributed conceptual assessments of various aspects of the project applications. The CUIDADO Consortium has promoted open standards (MPEG7, MPEG21 and beyond) in all its meetings with creators and their organisations. The CUIDADO business plans also reflect this support and the value-added aspect of innovative CUIDADO products within its B2B and B2C distribution models. The first phases were dedicated to a very efficient scientific dissemination, closely following the project research activity (e.g. the ISMIR02 hosted by the Project Coordinator included three papers about CUIDADO, and a half day dedicated workshop, a JNMR special metadata issue including several articles from project partners, and the Audio Engineering Society 114th meeting admitted three more publications too). The release of the first applications prototypes at the project mid-term enables an increasing effort in professional and public dissemination. CUIDADO is presented in professional shows, such as NAMM, Frankfurt Musikmesse, AES, etc. Consumer interest in content-based music services is linked to future development of concrete innovative products and results, within a legal framework for online distribution of music and audio services in B2B, B2C and C2C "markets".

Overview of all your main project results

No.	Self-descriptive title of the result	Category A, B or C*	Partner(s) owning the result(s) (referring in particular to specific patents, copyrights, etc.) & involved in their further use
1	scientific handbook concerning sound and music browsing and searching	A	Artspages International As
2	extractor authoring tool	A	Sony France S.A.
3	musical name server	A	Sony France S.A.
4	Constraint solver and Playlist generator	A	Sony France S.A.

5	Sound authoring tool	A	Creamware Datentechnik Gmbh
6	Music Browser	A	Sony France S.A.
7	MPEG7 Timbre descriptor scheme and extractor	A	IRCAM-AS
8	Automatic classification of audio samples	A	IRCAM-AS
9	Audio fingerprinting & excerpt identification	A	IRCAM-AS
10	Music summary generation	A	IRCAM-AS
11	Music map similarity viewer	A	IRCAM-RM
12	Online Sound Palette	A	IRCAM-SEL
13	Query by Melody tool	A	Ben-Gurion University of The Negev
14	Midi and Score alignment to Audio Recording tool	A	Ben-Gurion University of The Negev
15	Audio Classification and Similarity tool	A	Ben-Gurion University of The Negev
16	Virtual Audio Mixer tool	A	Ben-Gurion University of The Negev
17	Music Description Extraction Tool	A	Universitat Pompeu Fabra
18	Music Content Transformations Tool	A	Universitat Pompeu Fabra
19	Scalable Web Pages Crawler	A	Oracle Iberica, S.r.l. Sony France S.A.
20	XML MPEG 7 Database Layer	A	Oracle Iberica, S.r.l. IRCAM-SEL
21	Generic audio data/metadata application server	A	IRCAM-SEL

*A: results usable outside the consortium / B: results usable within the consortium / C: non usable results

Quantified Data on the dissemination and use of the project results

Items about the dissemination and use of the project results (consolidated numbers)	Currently achieved quantity	Estimated future* quantity
Product innovations	3	4
Process innovations	5	8
New services (commercial)	1	3
New services (public)	0	0
New methods	3	4
Scientific breakthrough	4	4
Technical standards to which this project has contributed	1	1
EU regulations/directives to which this project has contributed	2	2
International regulations to which this project has contributed	2	2
PhDs generated by the project	0	9
Grantees/trainees including transnational exchange of personnel	2	2

* "Future" means expectations within the next 3 years following the end of the project

Comment on European Interest

Community added value and contribution to EU policies

European dimension of the problem

Information overload, inability to quickly browse through audio, poor added-value to music via Internet distribution, keyword dictatorship, inability to search for similarities among sounds: these are music consumer complaints addressed by CUIDADO. It aims at developing content-based technologies using MPEG 7 output. Due to the large uncontrolled distribution of music over Internet, the use of the best metadata to add value to the content was considered a key issue for future music distribution over Internet. The CUIDADO project results will contribute to facilitate Europe to take the lead in creating a new Music distribution scheme in the Information Society. Together with other strategic initiatives it could bring Europe to the forefront, and create opportunities for European players taking advantage of content-based platforms, and Digital Audio Broadcasting.

Contribution to developing S&T co-operation at international level. European added value

Within the project are three research entities (IRCAM, UPF, BGU), one industrial partner world leader in database systems (Oracle) and three industrial partners involved in the industrialization of the project results (Sony, CreamWare, ArtsPages). It is the first time Ircam coordinated an IST project, and the project enabled it to take a world leading position in music information retrieval. The Consortium has managed to involve CreamWare, one of the most innovative professional audio company in Europe despite the lack of European companies in this field. SONY, as the well known music major warrants the visibility and marketability of the developed technologies associated with its music contents and its own research in the field (SONY CSL). ORACLE has the leading database developer investing research at the European level shows the strategic importance of content based technologies.

Contribution to policy design or implementation

Besides the contributions of CUIDADO to the IST program's objectives further relevant contribution to EC policies can be identified that are as follows: - contribution at enhancing competitiveness and new market opportunities. This is in line with the main objective of the EC's White Paper on "Growth, Competitiveness, Employment - The challenges and ways forward into the 21st century" - European Audio Standardisation supporting existing efforts of organizations like EBU (European Broadcast Union) or AES (Audio Engineering Society - contribution to the improving of the quality of life through inclusion in the Information Society. It means that individuals can reap the benefits of digital content, e-commerce, online education, access to culture and arts, and other forms of services. - contribution to the stimulation of Europe's cultural heritage, according to the EC policy document "Europe's Way to the Information Society. An Action Plan".

Contribution to Community social objectives

Improving the quality of life in the Community:

By diminishing the risk of exclusion from the Information Society, European citizens can experience an improved quality of life through inclusion in the Information Society. It means that individuals can reap the benefits of digital content, e-commerce, online education, access to culture and arts, and other forms of services. The dangers of rejection and isolation from the Information. CUIDADO will also be effective in: - increasing culture of music, since the distribution of music will be much easier by using the results of the CUIDADO project. - increasing the possibilities of distributing culture since CUIDADO is a new form for music distribution. - valorizing the cultural heritage of music that Europe provides. - producing new forms of leisure and entertainment.

Provision of appropriate incentives for monitoring and creating jobs in the Community (including use and development of skills):

The CUIDADO project will contribute directly to the competitiveness and job creation in European music content and e-commerce industries, by opening up new markets in Europe and at the global scene, through totally new and innovative distribution channels with a wide spread user potential. Job creation is particularly important in the digitisation and indexing of the music contents at the present time. Although automatic extraction of content features or automatic indexing is bringing new content descriptions, manual indexing is still needed for a large number of metadata such as authors, titles, etc. Finally in the long term, jobs created for content databases will slightly shift from unqualified indexing jobs to higher-level job profiles able to use automatic or semi-automatic indexing tools.

Supporting sustainable development, preserving and/or enhancing the environment (including use/conservation of resources):

On the social level, this project obviously promotes home business and telework for a large professional population but might also benefit the education sector. Universities, conservatories and new media centers are looking for easily accessible sound materials and tools. It is also the reason why training centers can play a social role by using the developed interfaces with their own databases for pedagogical activities and autonomous services where no audio facilities exists yet. The developed system can also be considered as a new interactive support for new ways of teaching, learning and discovering music. Furthermore the project is for new distance teaching methods (tele-learning).

Expected project impact (to be filled in by the project coordinator)

EU Policy Goals	I SCALE OF EXPECTED IMPACT OVER THE NEXT 10 YEARS -1 0 1 2 3	II	
		other	
		Not applicable to project	Project Impact too difficult to estimate
1. Improved sustainable economic development and growth, competitiveness	2		
2. Improved employment	1		
3. Improved quality of life and health and safety	2		
4. Improved education	2		
5. Improved preservation and enhancement of the environment	1		
6. Improved scientific and technological quality	3		
7. Regulatory and legislative environment	2		
8. Other	2		

1. Economic development and growth, competitiveness	Scale of Expected Impacts over the next 10 years (2)
	By Project End After Project

	-1 0 1 2 3	End -1 0 1 2 3
a) Increased Turnover for project participants - national markets		
b) Increased Turnover for project participants - international markets		
c) Increased Productivity for project participants		
d) Reduced costs for project participants		
e) Improved output quality/high technology content		

2. Employment	Scale of Expected Impacts over the next 10 years (2)	
	By Project End -1 0 1 2 3	After Project End -1 0 1 2 3
a) Safeguarding of jobs		
b) Net employment growth in projects participants staff		
c) Net employment growth in customer and supply chains		
d) Net employment growth in the European economy at large		

3. Quality of Life and health and safety	Scale of Expected Impacts over the next 10 years (2)	
	By Project End -1 0 1 2 3	After Project End -1 0 1 2 3
a) Improved health care		
b) Improved food, nutrition		
c) Improved safety (incl. consumers and workers safety)		
d) Improved quality of life for the elderly and disabled		
e) Improved life expectancy		
f) Improved working conditions		
g) Improved child care		
h) Improved mobility of persons		

4. Improved education	Scale of Expected Impacts over the next 10 years (2)	
	By Project End -1 0 1 2 3	After Project End -1 0 1 2 3
a) Improved learning processes including lifelong learning		

b) Development of new university curricula		
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5. Preservation and enhancement of the environment	Scale of Expected Impacts over the next 10 years (2)	
	By Project End -1 0 1 2 3	After Project End -1 0 1 2 3
a) Improved prevention of emissions		
b) Improved treatment of emissions		
c) Improved preservation of natural resources and cultural heritage		
d) Reduced energy consumption		

6. S&T quality	Scale of Expected Impacts over the next 10 years (2)	
	By Project End -1 0 1 2 3	After Project End -1 0 1 2 3
a) Production of new knowledge	3	2
b) Safeguarding or development of expertise in a research area	3	2
c) Acceleration of RTD, transfer or uptake	2	1
d) Enhance skills of RTD staff	2	1
e) Transfer expertise/know-how/technology	2	1
f) Improved access to knowledge-based networks	2	2
g) Identifying appropriate partners and expertise	2	2
h) Develop international S&T co-operation	2	2
i) Increased gender equality	0	0

7. Regulatory and legislative environment	Scale of Expected Impacts over the next 10 years (2)	
	By Project End -1 0 1 2 3	After Project End -1 0 1 2 3
a) Contribution to EU policy formulation		
Contribution to EU policy implementation		

8. Other (please specify)	Scale of Expected Impacts over the next 10 years (2)	
	By Project End -1 0 1 2 3	After Project End -1 0 1 2 3

Description of Results

No.	Title
1	scientific handbook concerning sound and music browsing and searching

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Specific Result URL	www.cuidado.mu

SUMMARY

The basic purpose of this result is dissemination. In itself it has no commercial viability nor any concrete scientific impact. The main idea is to build a simple guide to promote the use of interactive content-based Search & Retrieval tools, of which CUIDADO is in a leading position. This guide will therefore act as means to incentivise users from the general public as well as the "creative communities" of content creators and producers to understand and use clear and open standards - such as MPEG7 and the W3C Semantic Web - when using and digitising content. The current status (June '03) is that we are waiting for the final results from the technical partners before writing this guide which will be in the form of a CDrom and flyers.

SUBJECT DESCRIPTORS CODES

53 AUDIOVISUAL COMMUNICATION

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential

INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details (reference numbers, etc) if appropriate	Pre-existing know-how Tick a box and give the corresponding details (reference numbers, etc) if appropriate

	Current			Foreseen	Tick	Details
	Tick	NoP ¹⁾	NoI ²⁾			
Patent applied for						
Patent granted						
Patent search carried out						
Registered design						
Trademark applications						
Copyrights						
Secret know-how						
Other - please specify:	√					This result is based on Open Standards (MPEG4,7,21) and therefore has no IPR

1) Number of **P**riority (national) applications/patents

2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
92 Recreational, cultural and sporting activities
99 Extra-territorial organisations and bodies

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Other (please specify.):
Other:	Guide to CUIDADO results

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)	6	36
Number of (public or private) entities potentially involved in the implementation of the result:	10	10000
of which: number of SMEs:	8	9500
of which: number of entities in third countries (outside EU):	2	1500
Targeted user audience: of reachable people	100	100000
S&T publications (referenced publications only)	0	0
publications addressing general public (e.g. CD-ROMs, WEB sites)	5	50
publications addressing decision takers / public authorities / etc.	10	50
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development	✓	FIN	Financial support	
LIC	Licence agreement		VC	Venture capital/spin-off funding	
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	✓
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	✓
Other	(please specify)	✓			
Details:	As described, the result is a dissemination tool. We seek cross-media collaborations and input to improving both public and professional understanding of content-based S&R browsing tools. In other words, we are keen to find partners from outside the music sector to try and find innovative ways to promote the CUIDADO solution (which is an Audio-based set of applications) and to investigate other non-music solutions to the same problems - again for cross-media puposes. We are also looking for a global approach that takes into account language barriers and language technologies to make sure that the result is available to all cultures within Europe (i.e. not just English) and therefore are open to partners who have skills in localisation and interface design.				

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

Our input to this result is primarily one of collation of the different approaches from the different content creators (the "creative communities") and to try and get their concerns placed at the centre of the CUIDADO consortium's efforts. The main entities involved are European associations of Music Producers (IMPALA) and Multi-Media (EMF) of which SMEs comprise 99% of the membership. The 2 non-SMEs mentioned at present are NRK (Norway) and RBB (Germany) which are 2 leading European broadcasters and members of the EBU. We also have some experience and connections outside of Europe - notably in China (e.g. SOHU with 70m+ broadband subscribers in the Shanghai region and via Artspages exclusive agreement from the Chinese authorities for B2B services); Brasil (license agreement with independent SME music producers); South Africa (via a NORAD-funded scheme to set up online music distribution system controlled by SAMRO the South African Music Rights Organisation); USA (via agreements with Globalsound a subsidiary of the Smithsonian Institute and other labels such as Sub-Pop). We hope to be able to bring all this valuable input to the final CUIDADO applications which are themselves valued by us as the first steps towards a global means of navigation and browsing the disparate global archives of digitised content that will inevitably emerge in the coming years.

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

We are looking for 2 areas of colloboration. 1. Language technolgies, multilingual interface designers, localisation experts, knowledge engineers in particular in Semantic Web etc. 2. Trade associations of content producers, copyright Collection Societies and Artists Organisations from all sectors (dance, music, theatre, animation etc.). This input is hopefully going to improve the result by increasing the understanding of the highly innovative aspects of CUIDADO.

No.	Title
2	extractor authoring tool

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Specific Result URL	

SUMMARY

PRESENTATION The exploding field of Music Information Retrieval has recently created extra pressure to the community of audio signal processing, for extracting automatically high level music descriptors. Indeed, current systems propose users with millions of music titles (e.g. the peer-to-peer systems such as Kazaa) and query functions limited usually to string matching on title names. The natural extension of these systems is content-based access, i.e. the possibility to access music titles based on their actual content, rather than on file names. Existing systems today are mostly based on editorial information (e.g. Kazaa), or metadata which is entered manually, either by pools of experts (e.g. All Music Guide) or in a collaborative manner (e.g. the MoodLogic). Because these methods are costly and do not allow scale up, the issue of extracting automatically high-level features from the acoustic signals is key to the success of online music access systems. Although there is a long tradition in extracting information from acoustic signals, the field of music information extraction is largely heuristic in nature. We have built a heuristic-based system for extracting automatically high-level music descriptors from acoustic signals. This approach is based on Genetic Programming, that is used to build extraction functions as compositions of basic mathematical and signal processing operators. The search is guided by specialized heuristics that embody knowledge about the signal processing functions built by the system, and signal processing patterns are used in order to control the general function extraction methods.

DESCRIPTION Our system called EDS (for Extractor Discovery System) is able to provide automatically relevant extractors for audio descriptors, and to handle both regression and supervised classification problems. EDS takes as input a database of audio signals, labelled with their actual description value (typically a normalised numeric value for a regression problem, or class number for a classification problem). EDS provides as output an optimal regression [classification] model for the considered description problem, together with an executable function that predicts the description value [class] of any new signal, using this model. Running EDS consists in two parts: Firstly, EDS runs a genetic algorithm that builds automatically a population of signal processing functions, out of signal and mathematical operators. Then EDS evaluates if the functions of the population are relevant to help solving the descriptive problem on the input database, and tries to improve the functions by applying genetic transformations on them, such as mutations, insertions, deletions, crossovers, or variations of numeric constants, to build a new population of functions (next generation). This process is applied on all successive generations of functions until a perfect function is found, or the research is stopped manually. Secondly, EDS builds the descriptive model, by selecting the most relevant features found in first part, and finding the optimal combination of these features, ie the combination that provides the closest results to the actual descriptive values of the input database. Finally, EDS provides an executable function that computes the descriptive model on any audio signal, and saves the predictive result in a text file.

EXAMPLES An example of regressive problem solved by EDS is the evaluation of the Global Intensity of Music Titles, that is the subjective impression of energy that music titles convey, independently of the RMS volume level: with the same volume, a Hard-rock music title conveys more intensity than an acoustic guitar ballad with a soft voice. The input database consists in 200 musical extracts, together with their "Intensity", that has been statistically evaluated during previous perceptive tests. After running EDS, the system

finally provided a regressive model of "Intensity" with an error of 11%, which is close to the statistical error of the perceptive test. The associated executable takes a wav file as input, applies the model on it, and writes its predicted Intensity value in a text file. An example of classification problem solved by EDS is the detection of Singing Voice in Polyphonic Music. The input database consists in 200 musical extracts, 100 of which are sung and 100 instrumental. After running EDS, the system finally provided a classification model of "Singing Voice" with an performance of 85% of good classifications. The associated executable takes a wav file as input, applies the model on it, and writes its predicted class (Sung or Instrumental) in a text file. EDS can be used for the automatic computation of descriptors on a large database using a small set of hand-labelled music titles. Integrated in a music browser, EDS would allow the users to specify their own relevant descriptors and compute them automatically on their music collection.

SUBJECT DESCRIPTORS CODES

47 ARTIFICIAL INTELLIGENCE
 129 COMPUTER SCIENCE/ENGINEERING, NUMERICAL ANALYSIS, SYSTEMS, CONTROL
 411 MULTIMEDIA
 563 SIGNAL PROCESSING

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential

INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details(reference numbers, etc) if appropriate				Pre-existing know-how Tick a box and give the corresponding details(reference numbers, etc) if appropriate		
	Current				Foreseen	Tick	Details
	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick		
Patent applied for	✓						
Patent granted							
Patent search carried out							
Registered design							
Trademark applications							
Copyrights							
Secret know-how							
Other - please specify:							

1) Number of Priority (national) applications/patents

2) Number of Internationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
22 Publishing, printing and reproduction of recorded media 72 Computer and related activities 73 Research and development

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Prototype/demonstrator available for testing
Other:	

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)	12	
Number of (public or private) entities potentially involved in the implementation of the result:	1	
of which: number of SMEs:		
of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people	5000	
S&T publications (referenced publications only)		
publications addressing general public (e.g. CD-ROMs, WEB sites)		
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result**COLLABORATIONS SOUGHT**

R&D	Further research or development	✓	FIN	Financial support	
LIC	Licence agreement		VC	Venture capital/spin-off funding	
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:	Further experiments are needed				

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

--

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

--

No.	Title
3	musical name server

CONTACT PERSON FOR THIS RESULT

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URL	
Specific Result URL	

SUMMARY

To promote universality and accessibility of metadata we have designed a tool to design and exploit editorial metadata over the Internet. More precisely, an editorial metadata server has been set up and is useable with a simple query system. This server provides editorial metadata for artists and songs based on textual data gathered from file names, ID3 tag from mp3 files, duration of songs and manually provided information. Once a song is recognized by the server, its ID in the Cuidado database is returned. This ID can be used for several purposes including querying the server again to retrieve metadata about the recognized artist/song. The server also accepts incoming information and store them for further use.

We have designed and implemented two main tools to this aim:

- 1)A php server,
- 2)A servlet server.

Both servers use Free middleware components -EasyPhp and Tomcat. These components allow the design of a flexible architecture in which the Cuidado server (both PHP and servlet) store all information either computed (descriptors), manually entered (editorial data) or automatically gathered (mp3 ID tags). Users do not need to store locally large amount of metadata. If computed data are available, the MusicBrowser retrieves them automatically when a song is added to the database and costly computation (distance matrix for example) are made on the Cuidado server once for all.

Inputs/Outputs: Inputs and outputs are all based on text. Here under you will find 2 exemples of queries. Servlet: <http://TheSonyServer:8080/ClosestSongs?TitleName=mannix&ArtistName=Schifrin&Duration=90> Php: <http://TheSonyServer/allArtistProp.php?id=1354>. The arguments used depend on the nature of the query. Moreover, for security reasons, we can not reveal the exact adress of the server, as well as, the exact list of arguments useable for queries.

Answers are text files parsed by the MusicBrowser. Here under are two lines of answers coming from the servlet server: 17360 SCHIFRIN, Lalo mannix 3.0 2545 CREOLE, Kid & COCONUTS, The Annie, I'm Not Your Daddy 5.0

This kind of services could be available either through a complete software suite (like Music Browser) or directly with simple subscriptions. The target audiences are:

- music lovers
- broadband access subscribers
- mp3 fans
- Music networks

- On-line sound libraries

SUBJECT DESCRIPTORS CODES
150 DATABASES, DATABASE MANAGEMENT, DATA MINING 337 INTELLIGENT AGENTS 342 INTERNET TECHNOLOGIES 510 PROGRAMMING/INFORMATION SYSTEMS 160 DIGITAL SYSTEMS, DIGITAL REPRESENTATION

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential
Editorial metadata in the cuidado music browser: between universalism and isolationism	WEDEL MUSIC, A.La Burthe, F. Pachet , JJ. Aucouturier, Sept 15-17, 2003	Public

INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details(reference numbers, etc) if appropriate				Pre-existing know-how Tick a box and give the corresponding details(reference numbers, etc) if appropriate	
	Current			Foreseen	Tick	Details
	Tick	NoP¹⁾	NoI²⁾	Details	Tick	
Patent applied for						
Patent granted						
Patent search carried out						
Registered design						
Trademark applications						
Copyrights						
Secret know-how						
Other - please specify:						

1) Number of **P**riority (national) applications/patents

2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
22 Publishing, printing and reproduction of recorded media

72 Computer and related activities
73 Research and development
80 Education
92 Recreational, cultural and sporting activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	
Other:	

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)		
Number of (public or private) entities potentially involved in the implementation of the result:		
of which: number of SMEs:		
of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people		
S&T publications (referenced publications only)	1	
publications addressing general public (e.g. CD-ROMs, WEB sites)		
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development		FIN	Financial support	
LIC	Licence agreement		VC	Venture capital/spin-off funding	
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:					

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

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PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

--

No.	Title
4	Constraint solver and Playlist generator

CONTACT PERSON FOR THIS RESULT

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Specific Result URL	

SUMMARY

We address the problem of building automatically sequences of musical items, such as music titles or sound samples, taken from a large database. Indeed, building manually interesting playlists (sequences of music titles) out of large catalogues of songs, requires a expert musical knowledge of the database that most users do not have. Similarly, musical composition using sound samples requires an expert knowledge and musical sense of the sounds at your disposal. We have implemented a general sequencing algorithm which allows to build these sequences automatically, in a computer-assisted way (see D2.5.3). This can handle both problems (items retrieval and sequence generation) at the same time: the user specifies the sequence properties and the system is able to build automatically the sequence out of musical items taken from very large databases. Indeed, the system we propose is able to scale up on databases containing more than 100.000 items, using a local search method based on constraint solving, called adaptive search. The way the sequence is built is controlled by providing high-level properties, set by the user. The properties of the sequence are translated automatically into constraints holding on descriptors of the audio items. These constraints can be generic, such as "all items in the sequence should be different", or can hold on properties of specific attributes of the items called "metadata", such as "genre" or "duration" for music titles, and "pitch" or "percussivity" for sound samples. They can be local, holding on a specific item in the sequence, or can be global, holding on a part or even on the whole sequence. This formulation yields a hard combinatorial problem, as soon as the size of the database gets very large. Thus filtering procedures have to be designed to find solutions in a reasonable time. We have implemented a constraint satisfaction method based on a local search technique, called adaptive search, that is able to handle arbitrary complex constraints, and to scale up to large databases. It is an incomplete search algorithm that can yield approximate solutions very efficiently, and that is proven to be well adapted for musical applications. The 2 specific applications of this general sequencing algorithm are: - for sound samples: the musical mosaicing ("Musaicing") of the Sound Palette - for music titles: the playlists generator of the Music Browser

SUBJECT DESCRIPTORS CODES

47 ARTIFICIAL INTELLIGENCE
129 COMPUTER SCIENCE/ENGINEERING, NUMERICAL ANALYSIS, SYSTEMS, CONTROL
411 MULTIMEDIA
563 SIGNAL PROCESSING

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public
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		CO=Confidential
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INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details (reference numbers, etc) if appropriate				Pre-existing know-how Tick a box and give the corresponding details (reference numbers, etc) if appropriate		
	Current				Foreseen	Tick	Details
	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick		
Patent applied for							
Patent granted							
Patent search carried out							
Registered design							
Trademark applications							
Copyrights							
Secret know-how							
Other - please specify:							

1) Number of Priority (national) applications/patents

2) Number of Internationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
22 Publishing, printing and reproduction of recorded media
72 Computer and related activities
73 Research and development

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Prototype/demonstrator available for testing
Other:	

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)	12	
Number of (public or private) entities potentially involved in the implementation of the result:		
of which: number of SMEs:		

of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people	1000	
S&T publications (referenced publications only)		
publications addressing general public (e.g. CD-ROMs, WEB sites)		
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development		FIN	Financial support	
LIC	Licence agreement	✓	VC	Venture capital/spin-off funding	
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:					

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

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PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

--

No.	Title
5	Sound authoring tool

CONTACT PERSON FOR THIS RESULT

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URL	
Specific Result URL	

SUMMARY

The Sound Palette Offline application offers recording, editing & mixing of existing sound samples and also contributes various signal processing features like analysis, transformation and synthesis functions and also Time stretching (compression and

expansion without frequency shifting), Transposition (frequency shifting without time modification) and Filtering & morphing of sounds and audio content. Integrated part of the application will be an offline database browser based on the Oracle Database Engine to allow access to sample based sound libraries and to edit them on a PC based computer system. The Sound Palette Offline has a grafical user interface where different sound samples can be arranged separately plus various windows to perform the sound processing modules with generated display data for highly ergonomic handling of processed data. The included sound processing features can be used within music production studio environment to create new musical items, modify existing audio material or show results on similarity queries for further editing.

SUBJECT DESCRIPTORS CODES

130 COMPUTER TECHNOLOGY/GRAPHICS, META COMPUTING
 160 DIGITAL SYSTEMS, DIGITAL REPRESENTATION
 411 MULTIMEDIA
 583 SOUND ENGINEERING/TECHNOLOGY
 53 AUDIOVISUAL COMMUNICATION
 563 SIGNAL PROCESSING

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential
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INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details(reference numbers, etc) if appropriate				Foreseen	Pre-existing know-how Tick a box and give the corresponding details(reference numbers, etc) if appropriate	
	Current			Details		Tick	Details
	Tick	NoP¹⁾	NoI²⁾				
Patent applied for							
Patent granted							
Patent search carried out							
Registered design							
Trademark applications						✓	SCOPE Nr.30123507 SCOPE Fusion Platform Nr. 39845931
Copyrights							
Secret know-how						✓	SCOPE SCalable Objects Processing Engine

Other - please specify:						
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- 1) Number of **P**riority (national) applications/patents
- 2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
22 Publishing, printing and reproduction of recorded media
72 Computer and related activities
73 Research and development
80 Education
92 Recreational, cultural and sporting activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Prototype/demonstrator available for testing
Other:	

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)		12
Number of (public or private) entities potentially involved in the implementation of the result:		500
of which: number of SMEs:		
of which: number of entities in third countries (outside EU):		250
Targeted user audience: of reachable people		3000
S&T publications (referenced publications only)		
publications addressing general public (e.g. CD-ROMs, WEB sites)		
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	NO	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development	✓	FIN	Financial support	
LIC	Licence agreement	✓	VC	Venture capital/spin-off funding	
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement	✓	INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:					

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

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PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

--

No.	Title
6	Music Browser

CONTACT PERSON FOR THIS RESULT

Name	PACHET Francois
Position	Head of Music Unit
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Fax	+ 33-1-45878750
E-mail	pachet@csl.sony.fr
URL	www.cuidado.mu
Specific Result URL	www.csl.sony.fr

SUMMARY

The Music Browser is a complete software suite aimed at management of collections of songs. It uses a database of songs along with editorial and computed metadata. This software suite allows users to create and edit databases of music titles. More precisely this software suite includes: 1) An editorial metadata management tool. This tool allows user to edit editorial information on the artists of titles in the database. The Music Browser queries a central database of 20.000 songs and 12.600 artists (this database is referred in this ETip as musical name server - 3971). When a song/artist is recognized, all associated metadata can be automatically imported to the client side. 2) A tool to compute extractors on the titles of the database. Extractors can be any executable program, augmented with an information file (.inf) describing its input and output types. Additionally, extractors can be produced automatically from the extractor authoring tool - 3970. 3) A query system enabling to issue complex queries on the titles and artists, 4) A similarity query system: users can get similar songs according to selected parameters (timbre, genre, energy, tempo) 5) A powerful playlist generation panel based on constraints: the system generates playlists using rules like: I want 50% of rock songs with an increasing energy. All functions to create and manage database are available through this software suite.

SUBJECT DESCRIPTORS CODES

150 DATABASES, DATABASE MANAGEMENT, DATA MINING
 160 DIGITAL SYSTEMS, DIGITAL REPRESENTATION
 411 MULTIMEDIA
 583 SOUND ENGINEERING/TECHNOLOGY
 129 COMPUTER SCIENCE/ENGINEERING, NUMERICAL ANALYSIS, SYSTEMS, CONTROL

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public

		CO=Confidential
The Sony Music Browser	JASIS - Journal of american society for information 2003) F. Pachet, A.La Burthe, A. Zils, JJ. Aucouturier 2003	Public
Editorial metadata in the cuidado music browser: between universalism and isolationism	WEDEL MUSIC, A.La Burthe, F. Pachet , JJ. Aucouturier, Sept 15-17, 2003	Public
The CUIDADO Project	International Conference on Music Information Retrieval. Paris : Octobre 2002	Public
The CUIDADO Project	International Conference on Music Information Retrieval. Paris : Octobre 2002	Public

INTELLECTUAL PROPERTY RIGHTS

<u>Type of IPR</u>	KNOWLEDGE: Tick a box and give the corresponding details(reference numbers, etc) if appropriate				Pre-existing know-how Tick a box and give the corresponding details(reference numbers, etc) if appropriate		
	Current				Foreseen	Tick	Details
	Tick	NoP¹⁾	NoI²⁾	Details	Tick		
Patent applied for							
Patent granted							
Patent search carried out							
Registered design							
Trademark applications							
Copyrights	✓			Sony			
Secret know-how							
Other - please specify:							

1) Number of **P**riority (national) applications/patents

2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
22 Publishing, printing and reproduction of recorded media
72 Computer and related activities
73 Research and development
80 Education
92 Recreational, cultural and sporting activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Experimental development stage (laboratory prototype)
Other:	

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)	12	12
Number of (public or private) entities potentially involved in the implementation of the result:	50	100
of which: number of SMEs:		
of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people	10000	100000
S&T publications (referenced publications only)	2	2
publications addressing general public (e.g. CD-ROMs, WEB sites)		
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result**COLLABORATIONS SOUGHT**

R&D	Further research or development	✓	FIN	Financial support	
LIC	Licence agreement		VC	Venture capital/spin-off funding	✓
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement	✓	INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:	Further development and collaborations with music labels, music portals, radios, metadata providers, search engines.				

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

Prototype include database implementation, online server and browsing interfaces. Extraction modules or music summary modules can be provided by Sony CSL and Ircam.

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

Music Labels, Radios broadcasters, Music portals, Search engines, Music distribution, Music shops.

No.	Title
7	MPEG7 Timbre descriptor scheme and extractor

CONTACT PERSON FOR THIS RESULT

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Fax	33 1 44 78 43 55
E-mail	puig@ircam.fr
URL	www.ircam.fr
Specific Result URL	www.ircam.fr/cuidado

SUMMARY

- Description Scheme in MPEG7 XML Schema for audio timbre (instruments, effects) independant of pitch, intensity and rhythm - Related extraction software in Matlab. Dissemination : - MPEG7 industry forum - MPEG7 patent consortium - CUIDADO and other IST projects - Music fairs. Innovative features : - Automatic extraction - High accuracy in sound description. Current status : - Implemented in IRCAM Sound Palette - Patent and software licenses available.

SUBJECT DESCRIPTORS CODES

150 DATABASES, DATABASE MANAGEMENT, DATA MINING
160 DIGITAL SYSTEMS, DIGITAL REPRESENTATION
411 MULTIMEDIA
563 SIGNAL PROCESSING
583 SOUND ENGINEERING/TECHNOLOGY

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	S P C
Automatically selecting signal descriptors for Sound Classification	Article published at ICMC 2002 http://www/anasynt/peeters/ARTICLES/Peeters_2002_ICMC_SoundClassification.pdf	P
MPEG-7 Audio - What is it about? Musical Timbre Similarity	AES conference in Amsterdam, may 2001 http://www.tnt.uni-hannover.de/project/mpeg/audio/general/aes110_4_TimbreSimilarity.pdf	P

INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details(reference numbers, etc) if appropriate	Pre-existing know-how Tick a box and give the corresponding details(reference numbers, etc) if appropriate
	Current	Foreseen
		Tick
		Details

	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick		
Patent applied for							
Patent granted	√	1	3	2,830,118			
Patent search carried out							
Registered design							
Trademark applications							
Copyrights	√			IRCAM			
Secret know-how							
Other - please specify:							

1) Number of **P**riority (national) applications/patents

2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors

22 Publishing, printing and reproduction of recorded media

72 Computer and related activities

73 Research and development

80 Education

92 Recreational, cultural and sporting activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Prototype/demonstrator available for testing
Other:	MPEG7DS + Extraction software

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)	4	4
Number of (public or private) entities potentially involved in the implementation of the result:	5	5
of which: number of SMEs:		
of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people	500	1000
S&T publications (referenced publications only)	1	1
publications addressing general public (e.g. CD-ROMs, WEB sites)	1	1
publications addressing decision takers / public authorities / etc.	0	0
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result**COLLABORATIONS SOUGHT**

R&D	Further research or development	✓	FIN	Financial support	✓
LIC	Licence agreement	✓	VC	Venture capital/spin-off funding	✓
MAN	Manufacturing agreement	✓	PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:	The timbre description is available in MPEG7. The Ircam extractor is available for licence.				

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

High and direct potential in instrumental sound databases. Useful when combined with other musical descriptors for music titles retrieval.

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

Sound sample collection publishers, Sound Editing software manufacturers.

No.	Title
8	Automatic classification of audio samples

CONTACT PERSON FOR THIS RESULT

Name	Vincent PUIG
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Fax	33 1 44 78 43 55
E-mail	puig@ircam.fr
URL	http://www.ircam.fr
Specific Result URL	http://www.ircam.fr/cuidado

SUMMARY

Automatic audio samples classification system based on in a finite class set trained reference collection such as the instrumental sounds Ircam Studio Online database. Database owners can implement this software in their system or products such as : - online or local classification server sharable with authorized users - preparation of sound catalogues or sound collections - software for sound editing, classification and retrieval.

SUBJECT DESCRIPTORS CODES

150 DATABASES, DATABASE MANAGEMENT, DATA MINING
583 SOUND ENGINEERING/TECHNOLOGY
579 SOFTWARE ENGINEERING, MIDDLEWARE, GROUPWARE
309 IDENTIFICATION SYSTEMS

590 STATISTICS

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Statu PU=I CO=0
http://www.anasyn/peeters/ARTICLES/Peeters_2002_ICMC_SoundClassification.pdf	Article published at ICMC 2002	Public

INTELLECTUAL PROPERTY RIGHTS

<u>Type of IPR</u>	<u>KNOWLEDGE:</u> Tick a box and give the corresponding details (reference numbers, etc) if appropriate				<u>Pre-existing know-how</u> Tick a box and give the corresponding details (reference numbers, etc) if appropriate		
	Current				Foreseen	Tick	Details
	Tick	NoP¹⁾	NoI²⁾	Details	Tick		
Patent applied for							
Patent granted							
Patent search carried out							
Registered design							
Trademark applications							
Copyrights	✓			IRCAM			
Secret know-how	✓			IRCAM			
Other - please specify:							

1) Number of **P**riority (national) applications/patents

2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
22 Publishing, printing and reproduction of recorded media
72 Computer and related activities
73 Research and development
92 Recreational, cultural and sporting activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Prototype/demonstrator available for testing
Other:	

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)	6	6
Number of (public or private) entities potentially involved in the implementation of the result:	5	50
of which: number of SMEs:	5	50
of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people	3000	5000
S&T publications (referenced publications only)		
publications addressing general public (e.g. CD-ROMs, WEB sites)		
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development	✓	FIN	Financial support	
LIC	Licence agreement	✓	VC	Venture capital/spin-off funding	
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:	Other sound samples database owners are searched for back office exploitation or direct implementation in online and offline sound collections				

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

The technology is mature and already implemented in Ircam's Studio Online sound database (20.000 samples)

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

sound collections on CD/DVD, online sound repositories, sound sample production, studios, game industry, Sound sampler manufacturers,

No.	Title
9	Audio fingerprinting & excerpt identification

CONTACT PERSON FOR THIS RESULT

Name	Vincent PUIG
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	75004, Paris France
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E-mail	puig@ircam.fr
URL	www.ircam.fr
Specific Result URL	www.ircam.fr/cuidado

SUMMARY

Audio identification through a highly-compressed audio fingerprint. This patented algorithm has been successfully tested in the CUIDADO project on a database of several thousand of music titles of different genres and styles. Compared to others audio fingerprint technologies it is considerably more compressed and thus is allowing faster retrieval of large databases.

SUBJECT DESCRIPTORS CODES

150 DATABASES, DATABASE MANAGEMENT, DATA MINING
 160 DIGITAL SYSTEMS, DIGITAL REPRESENTATION
 583 SOUND ENGINEERING/TECHNOLOGY
 309 IDENTIFICATION SYSTEMS
 550 SAFETY TECHNOLOGY

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential
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INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details(reference numbers, etc) if appropriate				Foreseen	Pre-existing know-how Tick a box and give the corresponding details(reference numbers, etc) if appropriate	
	Tick	NoP ¹⁾	NoI ²⁾	Details		Tick	Details
Patent applied for	✓	2	2			✓	WO 03/056455
Patent granted	✓	1	3			✓	2,834,363
Patent search carried out							
Registered design							
Trademark applications							
Copyrights	✓			IRCAM			Matlab and C code
Secret know-how	✓			IRCAM			Prototype with interface

Other - please specify:						
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- 1) Number of **P**riority (national) applications/patents
- 2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
22 Publishing, printing and reproduction of recorded media
72 Computer and related activities
73 Research and development
92 Recreational, cultural and sporting activities
93 Other service activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Prototype/demonstrator available for testing
Other:	Matlab code and interface + C++ code

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)	6	6
Number of (public or private) entities potentially involved in the implementation of the result:	10	50
of which: number of SMEs:	0	0
of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people	1000000	1000000
S&T publications (referenced publications only)	3	10
publications addressing general public (e.g. CD-ROMs, WEB sites)		
publications addressing decision takers / public authorities / etc.		1
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development	✓	FIN	Financial support	✓
LIC	Licence agreement	✓	VC	Venture capital/spin-off funding	✓
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement	✓	INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership	✓	CONS	Available for consultancy	
Other	(please specify)				
Details:	The technology is mature, tested and implemented in a prototype. Copyright				

societies, DRM companies, Media monitoring companies are searched.
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POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

Testing and implementation of the software is possible in different contexts : DRM, Media monitoring, Electronic Music Distribution

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

Copyright societies, DRM companies, Media monitoring companies, Music labels, Music distribution systems providers, Copy protection software companies, Audio player manufacturers.

No.	Title
10	Music summary generation

CONTACT PERSON FOR THIS RESULT

Name	Vincent PUIG
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Fax	33 1 44 78 43 55
E-mail	puig@ircam.fr
URL	www.ircam.fr
Specific Result URL	www.ircam.fr/cuidado

SUMMARY

Automatic audio and visual summary generation of a music piece from signal analysis. Automatic Music summary generation brings two new dimensions to users for fast music browsing : - a visual representation presenting clearly the different part of music piece (for instance phrase and verse) and the parts which are similar - a sound "remix" which generate a short audio summary (for instance 10 seconds for a 3 minutes title) which is not just the addition of the most recurrent parts but a real combination of them giving a "global view" of the piece. This technology is expected to bring new usage not only in term of music consumption (faster browsing before purchase) but also in terms of new personal publishing and creative tools.

SUBJECT DESCRIPTORS CODES

191 ELECTRONIC PUBLISHING, AUTHORING TOOLS 160 DIGITAL SYSTEMS, DIGITAL REPRESENTATION 411 MULTIMEDIA 150 DATABASES, DATABASE MANAGEMENT, DATA MINING 583 SOUND ENGINEERING/TECHNOLOGY
--

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Stat PU= CO=
Toward Automatic Music Audio Summary Generation from	Article published at ISMIR 2002 http://www/anasynt/peeters/ARTICLES/Peeters_2002_ISMIR_AudioSummary.pdf	Publi

Signal Analysis		
Deriving Musical Structures from Signal Analysis for Music Audio Summary Generation	CMMR, Montpellier, May 2003	Publi

INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details(reference numbers, etc) if appropriate				Pre-existing know-how Tick a box and give the corresponding details(reference numbers, etc) if appropriate		
	Current				Foreseen	Tick	Details
	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick		
Patent applied for	✓	1	3	03/07667			
Patent granted					✓		
Patent search carried out							
Registered design							
Trademark applications							
Copyrights	✓			IRCAM			
Secret know-how	✓			IRCAM			
Other - please specify:							

1) Number of Priority (national) applications/patents

2) Number of Internationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
22 Publishing, printing and reproduction of recorded media
32 Manufacture of radio, television and communication ...
72 Computer and related activities
80 Education
92 Recreational, cultural and sporting activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Prototype/demonstrator available for testing
Other:	Matlab and C++ software + Interface

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)	3	3
Number of (public or private) entities potentially involved in the implementation of the result:	50	100
of which: number of SMEs:	800	8000
of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people	10000	1000000
S&T publications (referenced publications only)	2	10
publications addressing general public (e.g. CD-ROMs, WEB sites)	1	5
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development	✓	FIN	Financial support	✓
LIC	Licence agreement	✓	VC	Venture capital/spin-off funding	✓
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement	✓	INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:	This technology is going to be further developed in the direction of music creativity and composition but is already available for music representation and electronic music distribution.				

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

Impact and visibility of the technology may be high for music labels, music portals, music shops, web radios and all audio content providers and broadcasters. Ircam is already planing to use it for education and publishing projects and for its own musical archives.

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

Music labels, music excerpts publishers, music and multimedia publishing, music portals, web radios and web TVs, ...

No.	Title
11	Music map similarity viewer

CONTACT PERSON FOR THIS RESULT

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	France
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E-mail	puig@ircam.fr
URL	www.ircam.fr
Specific Result URL	www.ircam.fr/cuidado

SUMMARY

Music map based on similarity relationships between different regions of the music sequence Music Map is an innovative way for extracting and representing musical structures of MIDI files. It is intended for advanced listening and browsing through music, for music analysis purposes and for composition. Potential use of the software: - automatic extraction of the tempo (tempo value + temporal positions of the beat) and the metrics - automatic extraction and representation in a similarity matrix of the motivic repetitions and variations - selection of a polyphonic motive and search for similar ones in any MIDI database Softwares that can analyse polyphonic music are very rare. The model we use relies on different features such as pitch intervals, contour and rhythm which offers multiple viewpoints on the sequence. Special importance is granted to perceptive considerations so that features specific to music are taken into account. The model has been tested on several music corpus such as jazz, classical or contemporary music. It is currently implemented in Ircam's OpenMusic environment and available to Forum Ircam members (approx. 1300 users currently). Implementation in other music software environment such as Finale or Sibelius is foreseen. A stand alone implementation upon industrial partner of publisher specification can be started if funding is provided.

SUBJECT DESCRIPTORS CODES

160 DIGITAL SYSTEMS, DIGITAL REPRESENTATION
184 EDUCATIONAL MULTIMEDIA
320 INFORMATION MANAGEMENT

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential
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INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details(reference numbers, etc) if appropriate				Pre-existing know-how Tick a box and give the corresponding details(reference numbers, etc) if appropriate		
	Current			Foreseen	Tick	Details	
Tick	NoP ¹⁾	NoI ²⁾	Details				Tick
Patent applied for							
Patent granted							
Patent search carried out							
Registered							

design						
Trademark applications						
Copyrights	√		IRCAM			
Secret know-how						
Other - please specify:						

- 1) Number of **P**riority (national) applications/patents
2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
22 Publishing, printing and reproduction of recorded media
72 Computer and related activities
73 Research and development
80 Education
92 Recreational, cultural and sporting activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Prototype/demonstrator available for testing
Other:	IRCAM OpenMusic Library

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)	12	6
Number of (public or private) entities potentially involved in the implementation of the result:	5	50
of which: number of SMEs:	10	20
of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people	500	1000
S&T publications (referenced publications only)	4	10
publications addressing general public (e.g. CD-ROMs, WEB sites)		1
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development	√	FIN	Financial support	√
LIC	Licence agreement	√	VC	Venture capital/spin-off funding	

MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement	✓	INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:	Development financing or further R&D is searched in order to implement the technology in music publishing environment or in music web sites.				

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

Can be provided : Implementation in Ircam's OpenMusic. Experience and expertise for Finale plug-in implementation. Assistance for development in dedicated software application.

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

Music software publishers, Multimedia publishers, Music portals designers, Music databases and archives, Music Libraries, MIDI sequencer manufacturers.

No.	Title
12	Online Sound Palette

CONTACT PERSON FOR THIS RESULT

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URL	www.ircam.fr
Specific Result URL	www.ircam.fr/cuidado

SUMMARY

The Online Sound Palette is conceived as an online system providing access, either in intranet or over the web, to large, centralized databases of sound samples. In order to provide efficient browsing and searching features among these data, the application heavily relies on descriptions of the audio material; these descriptions mostly follow the Mpeg7 formalisation. They include structured textual (taxonomic) descriptions, as well as numerical information automatically processed from the signal. Innovative functionalities such as automatic classification of samples, or similarity search, are developed on top of these descriptions of the audio content. Taking advantage of the intranet/Internet technology it relies on, the Online Sound Palette also aims at being a tool for online, collaborative work: users can share their own audio samples, on the basis of user groups and access rights definitions.

SUBJECT DESCRIPTORS CODES

150 DATABASES, DATABASE MANAGEMENT, DATA MINING
184 EDUCATIONAL MULTIMEDIA
191 ELECTRONIC PUBLISHING, AUTHORING TOOLS
583 SOUND ENGINEERING/TECHNOLOGY

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential
Ecrins: an audio-content description environment for sound samples	Article published at ICMC 2002	Public
Synthesis of functional feedbacks on Online Sound Palette Prototype, and main ideas for re-specification of this application	Public CUIDADO report	Public
The CUIDADO Project	Article published at ISMIR 2002	Public

INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details(reference numbers, etc) if appropriate				Pre-existing know-how Tick a box and give the corresponding details(reference numbers, etc) if appropriate		
	Current				Foreseen	Tick	Details
	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick		
Patent applied for							
Patent granted							
Patent search carried out							
Registered design							
Trademark applications	√			Studio Online			
Copyrights	√			IRCAM			
Secret know-how							
Other - please specify:							

1) Number of **P**riority (national) applications/patents

2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
22 Publishing, printing and reproduction of recorded media
72 Computer and related activities
73 Research and development
80 Education
92 Recreational, cultural and sporting activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Prototype/demonstrator available for testing
Other:	Running commercial application

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)	0	0
Number of (public or private) entities potentially involved in the implementation of the result:	10	100
of which: number of SMEs:	10	20
of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people	500	1000
S&T publications (referenced publications only)	3	5
publications addressing general public (e.g. CD-ROMs, WEB sites)		
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development	✓	FIN	Financial support	✓
LIC	Licence agreement		VC	Venture capital/spin-off funding	
MAN	Manufacturing agreement	✓	PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:	Ircam's Studio Online database already use the Online Sound Palette. Other sound archives and collections are sought.				

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

Middleware and database technologies have been integrated so that the Online Sound Palette can be easily transferred to other servers.
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PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

Database manufacturers for integration of the technology as an option for their clients providing audio content. Sound archives. Sound sample collections. Sound sample portals Studios LANs.

No.	Title
13	Query by Melody tool

CONTACT PERSON FOR THIS RESULT

Name	DUBNOV Shlomo
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URL	
Specific Result URL	

SUMMARY

A natural way for searching a musical audio database for a song is to look for a short audio segment containing a melody from the song. Most of the existing systems are based on textual information, such as the title of the song and the name of the compose. However, people often do not remember the name of the compose and the song's title but can easily recall fragments from the soloist's melody. The task of 'query by melody' attempts to automate the music retrieval task. Given a sounds database with hundreds or thousands of sounds, the user can submit a melody query to the application. The query is a symbolic representation of the sound (MIDI format). The user then gets as a result the list of sounds which best fits his query, ranked by their similarity to the query. Previous works on QBM focused on searching in MIDI database, or on monophonic recordings. Our application does not have this limitation. We search on real sounds database which contains polyphonic sounds. When dealing with real polyphonic recordings we need to address several complicating factors. Ideally, melodies can be represented as sequences of notes, each is a pair of frequency and temporal duration. In real recordings two major sources of difficulty arise. The first is the high variability of the actual durations of notes. A melody can be performed faster or slower than the one dictated by the musical score (tempo variability). Furthermore, the tempo can vary within a single performance. The second complicating factor is the high variability of the spectrum due to many factors such as differences in tone colors (timbre) of different singers/instruments. We solved these problems using state of the art algorithms. We use a generative probabilistic approach that models the temporal and spectral variations. This work was presented at SIGIR2002 " Shwartz, Dubnov, Singer and Friedman. - A robust Temporal and Spectral Modeling for Query by Melody"

SUBJECT DESCRIPTORS CODES

53 AUDIOVISUAL COMMUNICATION
129 COMPUTER SCIENCE/ENGINEERING, NUMERICAL ANALYSIS, SYSTEMS, CONTROL
583 SOUND ENGINEERING/TECHNOLOGY
587 SPEECH PROCESSING/TECHNOLOGY

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation	Details (Title, ref. number, general description)	Status:
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type	language)	PU=Public CO=Confidential
Scientific document	Shai Shalev-Shwartz, Shlomo Dubnov, Yoram Singer and Nir Friedman. "Robust Temporal and Spectral Modeling for Query by Melody" A scientific dissemination which was presented at SIGIR2002	Public

INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details(reference numbers, etc) if appropriate				Pre-existing know-how Tick a box and give the corresponding details(reference numbers, etc) if appropriate	
	Current			Foreseen	Tick	Details
	Tick	NoP¹⁾	NoI²⁾	Details	Tick	
Patent applied for						
Patent granted						
Patent search carried out						
Registered design						
Trademark applications						
Copyrights						
Secret know-how						
Other - please specify:						

1) Number of **P**riority (national) applications/patents

2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
72 Computer and related activities
73 Research and development
93 Other service activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Software code
Other:	

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
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Time to application / market (in months from the end of the research project)		
Number of (public or private) entities potentially involved in the implementation of the result:		
of which: number of SMEs:		
of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people		
S&T publications (referenced publications only)		
publications addressing general public (e.g. CD-ROMs, WEB sites)		
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development	✓	FIN	Financial support	
LIC	Licence agreement	✓	VC	Venture capital/spin-off funding	
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:					

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

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PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

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No.	Title
14	Midi and Score alignment to Audio Recording tool

CONTACT PERSON FOR THIS RESULT

Name	DUBNOV Shlomo
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E-mail	Dubnov@bgumail.bgu.ac.il
URL	
Specific Result URL	

SUMMARY

Today, a wide range of music pieces can be found in a symbolic representation and it is available both on commercial CD's and some of it is available freely over the internet. One example of symbolic representation is the MIDI format. On the other hand, there are the real music recordings where the original signal is stored on a digital media (e.g. CD, DVD). We developed a state of the art algorithm for alignment of score metadata (MIDI) to its associated real recording. We solved several challenging problems. One problem is the tempo variability between the MIDI file and the real recording. Imagine for example the beetles 'Yesterday'. The MIDI file contains the score information and the basic tempo. One can find several real recordings of this piece. Both by the beetles and by other performers. Our algorithm can do the alignment of the score information to all of these recordings. There are wide applications for this development. For example, Query By Melody tool, where the melody is given in form of MIDI and the database contains real recordings.

SUBJECT DESCRIPTORS CODES

129 COMPUTER SCIENCE/ENGINEERING, NUMERICAL ANALYSIS, SYSTEMS, CONTROL
 583 SOUND ENGINEERING/TECHNOLOGY
 587 SPEECH PROCESSING/TECHNOLOGY
 590 STATISTICS

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential
M.Sc Thesis	"Robust Temporal and Spectral Modeling for Query by Melody" Shai Shalev Shwartz The Hebrew University of Jerusalem. M.Sc. thesis. Jerusalem 2002	Public

INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details (reference numbers, etc) if appropriate				Pre-existing know-how Tick a box and give the corresponding details (reference numbers, etc) if appropriate	
	Current			Foreseen	Tick	Details
	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick	
Patent applied for						
Patent granted						
Patent search carried out						
Registered design						
Trademark applications						
Copyrights						
Secret know-						

how						
Other - please specify:						

- 1) Number of **P**riority (national) applications/patents
- 2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors

72 Computer and related activities
93 Other service activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Software code
Other:	

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)		
Number of (public or private) entities potentially involved in the implementation of the result:		
of which: number of SMEs:		
of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people		
S&T publications (referenced publications only)		
publications addressing general public (e.g. CD-ROMs, WEB sites)		
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development	✓	FIN	Financial support	
LIC	Licence agreement	✓	VC	Venture capital/spin-off funding	
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:					

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

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PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

No.	Title
15	Audio Classification and Similarity tool

CONTACT PERSON FOR THIS RESULT

Name	DUBNOV Shlomo
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Fax	+972-7-6472883
E-mail	Dubnov@bgumail.bgu.ac.il
URL	
Specific Result URL	

SUMMARY

Search by similarity in sound effects is needed for musical authoring and search by content (MPEG-7) applications. Sounds such as outdoor ambience, machine noises, speech or musical excerpts as well as many other man made sound effects (so called "Folley sounds") are complex signals that have a well perceived acoustic characteristic of some random nature. In many cases, these signals can not be sufficiently represented based on second order statistics only and require higher order statistics for their characterization. Several methods for statistical modeling of such sounds were proposed in the literature: non-gaussian linear and non-linear source-filter models using HOS, optimal basis / sparse geometrical representations using Independent Component Analysis (ICA) and methods that combine ICA-based features with temporal modeling (HMM). Our application is based on a novel algorithm which uses ICA to compute different sound models for different sound classes. We use the Mutual Information between the sound sources to classify sounds within the models. Another application is search by similarity applications for SFX databases. We use a variat of the classification algorithm to retrieve similar sound effects from SFX database.

SUBJECT DESCRIPTORS CODES

53 AUDIOVISUAL COMMUNICATION
129 COMPUTER SCIENCE/ENGINEERING, NUMERICAL ANALYSIS, SYSTEMS, CONTROL
583 SOUND ENGINEERING/TECHNOLOGY
590 STATISTICS
47 ARTIFICIAL INTELLIGENCE

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential
Scientific document	S. Dubnov and A. Ben-Shalom "Review of ICA and HOS methods for Retrieval of Natural Sounds and Sound Effects. "Fourth International Symposium on	Public

	Independent Component Analysis and Blind Source Separation. ICA 2003	
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INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details (reference numbers, etc) if appropriate				Pre-existing know-how Tick a box and give the corresponding details (reference numbers, etc) if appropriate		
	Current				Foreseen	Tick	Details
	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick		
Patent applied for							
Patent granted							
Patent search carried out							
Registered design							
Trademark applications							
Copyrights							
Secret know-how							
Other - please specify:							

1) Number of Priority (national) applications/patents

2) Number of Internationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
72 Computer and related activities
93 Other service activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Software code
Other:	

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)		
Number of (public or private) entities potentially involved in the implementation of the result:		
of which: number of SMEs:		

of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people		
S&T publications (referenced publications only)		
publications addressing general public (e.g. CD-ROMs, WEB sites)		
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development	✓	FIN	Financial support	
LIC	Licence agreement	✓	VC	Venture capital/spin-off funding	
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:					

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

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PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

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No.	Title
16	Virtual Audio Mixer tool

CONTACT PERSON FOR THIS RESULT

Name	DUBNOV Shlomo
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URL	
Specific Result URL	

SUMMARY

Over the last years there has been considerable interest in multimedia systems that allow interactive involvement of the user in the watching or listening process. Ideas such as letting the user to choose the angle of the camera during broadcasting of live sport

evente, have appeared in Interactive TV applications. Today, advanced digital music players offer only limited digital effects that allow to modify certain global sound characteristics (mostly room or sound coloration effects) to match the user's listening preferences. Providing the possibility for manipulationg a recording in a musically meaningful ways, opens new possiblilites in music entertainment, education and authoring applications. Our application, whcih we call 'a Virtual Mixer' allows a separate, detailed control over the volume of every single instrument in a recording. Normally, the balance between the insrtuments is done by the recording engineers during a Multi Track recording. Allowing the user to change the mixing parameters offers a greater involvement in the musical content and creates n enriched and active listening experience. For example, when a user listens to a musical pieca that contains several instruments, he might wish to adjust the balance between the individual instruments. Furthermore, he might wish to isolate few instruments from the rest. This is done by attaching a meta-data of precise time-pitch occurrences to musical recording. The VM system consists of two main components: a robust algorithm for score alignment of polyphonic sounds and an adaptive, high resolution filtering process.

SUBJECT DESCRIPTORS CODES

563 SIGNAL PROCESSING
 583 SOUND ENGINEERING/TECHNOLOGY
 587 SPEECH PROCESSING/TECHNOLOGY

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential
Scientific document	Adiel Ben-Shalom, Shlomo Dubnov, Shai Shalev-Shwartz, Michael Werman. "Virtual Audio mixer based on score alignment and optimal filtering."	Public

INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details(reference numbers, etc) if appropriate				Pre-existing know-how Tick a box and give the corresponding details(reference numbers, etc) if appropriate		
	Current			Foreseen	Tick	Details	
	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick		
Patent applied for							
Patent granted							
Patent search carried out							
Registered design							
Trademark applications							
Copyrights							
Secret know-how							

Other - please specify:						
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- 1) Number of **P**riority (national) applications/patents
- 2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
31 Manufacture of electrical machinery and apparatus n.e.c. 32 Manufacture of radio, television and communication ... 72 Computer and related activities 93 Other service activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	
Other:	

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)		
Number of (public or private) entities potentially involved in the implementation of the result:		
of which: number of SMEs:		
of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people		
S&T publications (referenced publications only)		
publications addressing general public (e.g. CD-ROMs, WEB sites)		
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development	✓	FIN	Financial support	
LIC	Licence agreement	✓	VC	Venture capital/spin-off funding	
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:					

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

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PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

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No.	Title
17	Music Description Extraction Tool

CONTACT PERSON FOR THIS RESULT

Name	Perfecto Herrera
Position	Team manager
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Specific Result URL	

SUMMARY

A set of extractors of music content descriptors that can be used with songs, loops or monophonic phrases. Extraction is done at the melodic-harmonic, rhythmic, and instrumental layers. Morphological description for sound samples (i.e. isolated sounds like sound effects or instrument notes) is also included. Music material is characterized in terms of tick, beat, metric, rhythmic complexity, rhythmicity, and harmonicity. The extracted descriptors are usable in music databases for expanding the retrieval capabilities towards semantic functionalities.

SUBJECT DESCRIPTORS CODES

4 ACOUSTICS
53 AUDIOVISUAL COMMUNICATION
411 MULTIMEDIA
563 SIGNAL PROCESSING
583 SOUND ENGINEERING/TECHNOLOGY

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential

INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details (reference numbers, etc) if appropriate	Pre-existing know-how Tick a box and give the corresponding details (reference numbers, etc) if

					appropriate		
	Current				Foreseen	Tick	Details
	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick		
Patent applied for							
Patent granted							
Patent search carried out							
Registered design							
Trademark applications					✓		
Copyrights	✓				✓	✓	
Secret know-how	✓				✓	✓	
Other - please specify:							

1) Number of **P**riority (national) applications/patents

2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
32 Manufacture of radio, television and communication ...
72 Computer and related activities
73 Research and development
92 Recreational, cultural and sporting activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Experimental development stage (laboratory prototype)
Other:	

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)	19	12
Number of (public or private) entities potentially involved in the implementation of the result:	4	7
of which: number of SMEs:	1	4
of which: number of entities in third countries (outside EU):	0	1
Targeted user audience: of reachable people	1000	5000
S&T publications (referenced publications only)	3	3
publications addressing general public (e.g. CD-ROMs, WEB sites)	0	1
publications addressing decision takers / public authorities / etc.	0	0
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result**COLLABORATIONS SOUGHT**

R&D	Further research or development	✓	FIN	Financial support	
LIC	Licence agreement	✓	VC	Venture capital/spin-off funding	✓
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership	✓	CONS	Available for consultancy	
Other	(please specify)				
Details:					

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

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PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

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No.	Title
18	Music Content Transformations Tool

CONTACT PERSON FOR THIS RESULT

Name	Perfecto Herrera
Position	Team manager
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URL	www.iua.upf.es/mtg
Specific Result URL	

SUMMARY

This tool combines music descriptions, signal processing tools (time-stretch and pitch transposition), and high level control structures in order to change the musical content. The tool can be included in audio editors and multitracking systems in order to achieve in real time, transformation of original recording according two dimensions: pitch and time. As long as using the usual control parameters for this type of signal processing devices, other higher-level (i.e. "semantic") controls have been incorporated. This means, for example, that the length of an audio segment can be changed by dragging a graphical handle in order to make it fit a new temporal slot. Melodic changes (i.e. adding or deleting notes, changing tonality, etc.) can be achieved also with high-level controls.

SUBJECT DESCRIPTORS CODES

4 ACOUSTICS

53 AUDIOVISUAL COMMUNICATION
 411 MULTIMEDIA
 563 SIGNAL PROCESSING
 583 SOUND ENGINEERING/TECHNOLOGY

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential
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INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details(reference numbers, etc) if appropriate				Pre-existing know-how Tick a box and give the corresponding details(reference numbers, etc) if appropriate	
	Current			Foreseen	Tick	Details
	Tick	NoP¹⁾	NoI²⁾	Details	Tick	
Patent applied for						
Patent granted						
Patent search carried out						
Registered design						
Trademark applications					✓	
Copyrights	✓				✓	✓
Secret know-how	✓				✓	✓
Other - please specify:						

- 1) Number of **P**riority (national) applications/patents
 2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
32 Manufacture of radio, television and communication ...
72 Computer and related activities
73 Research and development
92 Recreational, cultural and sporting activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Experimental development stage (laboratory prototype)
Other:	

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)	19	12
Number of (public or private) entities potentially involved in the implementation of the result:	4	7
of which: number of SMEs:	1	4
of which: number of entities in third countries (outside EU):	0	1
Targeted user audience: of reachable people	1000	5000
S&T publications (referenced publications only)	1	1
publications addressing general public (e.g. CD-ROMs, WEB sites)	0	1
publications addressing decision takers / public authorities / etc.	0	0
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development	✓	FIN	Financial support	
LIC	Licence agreement	✓	VC	Venture capital/spin-off funding	✓
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership	✓	CONS	Available for consultancy	
Other	(please specify)				
Details:					

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

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PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

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No.	Title
19	Scalable Web Pages Crawler

CONTACT PERSON FOR THIS RESULT

Name	PACHET Francois
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URL	www.oracle.com
Specific Result URL	

SUMMARY

The result is a prototype system which can perform a crawling of web pages that belong to a particular topic area (musical artists, music genres, or anyset of items) and which can then compute automatically similarity relations between these sets of items. An important characteristic of the system is its personalization. It can run on a simple PC and accumulate pages in different databases, that can then be reused to build similarity measures of different kinds. Specific mechanisms allow the focusing of the crawling (such as the use of search engines such as Google to get meaningful starting points). The system has been designed and implemented with a standard database scheme that can allow scaling of the system to high volumes of data. Specific data structures have been designed to minimize the amount of information actually sored (web page are not stored entirely, only meaningful words). The detection of co-occurrences and computation of similarities has also been optimized. An interface allows the user to specify the crawling (e.g. nb of process running simultaneously), the root pages, as well as the management of databases for storing web pages, the computation of similarities, and their export to a format understandable by the Music Browser.

SUBJECT DESCRIPTORS CODES

150 DATABASES, DATABASE MANAGEMENT, DATA MINING
 152 DECISION SUPPORT TOOLS
 337 INTELLIGENT AGENTS
 342 INTERNET TECHNOLOGIES
 510 PROGRAMMING/INFORMATION SYSTEMS

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential
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INTELLECTUAL PROPERTY RIGHTS

<u>Type of IPR</u>	<u>KNOWLEDGE:</u> Tick a box and give the corresponding details(reference numbers, etc) if appropriate				<u>Pre-existing know-how</u> Tick a box and give the corresponding details(reference numbers, etc) if appropriate	
	Current			Foreseen	Tick	Details
	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick	
Patent applied for						
Patent granted						
Patent search carried out						
Registered design						
Trademark applications						

Copyrights						
Secret know-how						
Other - please specify:						

- 1) Number of **P**riority (national) applications/patents
2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
22 Publishing, printing and reproduction of recorded media
72 Computer and related activities
73 Research and development
92 Recreational, cultural and sporting activities
93 Other service activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	
Other:	

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)		
Number of (public or private) entities potentially involved in the implementation of the result:		
of which: number of SMEs:		
of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people		
S&T publications (referenced publications only)		
publications addressing general public (e.g. CD-ROMs, WEB sites)		
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development		FIN	Financial support	
LIC	Licence agreement		VC	Venture capital/spin-off funding	
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	
JV	Establish a joint enterprise or		CONS	Available for consultancy	

	partnership			
Other	(please specify)			
Details:				

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

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PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

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No.	Title
20	XML MPEG 7 Database Layer

CONTACT PERSON FOR THIS RESULT

Name	WUST Otto
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URL	www.oracle.com
Specific Result URL	

SUMMARY

The result is a database layer for management of XML based, MPEG-7 audio descriptors and descriptions. This layer has been developed on top of Oracle's XML database (XDB) and extends the native XML and object-relational functionalities to natively cover all MPEG-7 specific aspects that have been identified within the CUIDADO project; particularly term management, reference management, relationship management, indexing and consistency management.

SUBJECT DESCRIPTORS CODES

150 DATABASES, DATABASE MANAGEMENT, DATA MINING
160 DIGITAL SYSTEMS, DIGITAL REPRESENTATION

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential
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INTELLECTUAL PROPERTY RIGHTS

<u>Type of IPR</u>	<u>KNOWLEDGE:</u> Tick a box and give the corresponding details(reference numbers, etc) if appropriate	<u>Pre-existing know-how</u> Tick a box and give the corresponding details(reference numbers, etc) if

					appropriate		
	Current				Foreseen	Tick	Details
	Tick	NoP ¹⁾	NoI ²⁾	Details	Tick		
Patent applied for							
Patent granted							
Patent search carried out							
Registered design							
Trademark applications							
Copyrights	√			Oracle/Ircam			
Secret know-how							
Other - please specify:							

1) Number of **P**riority (national) applications/patents

2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
22 Publishing, printing and reproduction of recorded media
32 Manufacture of radio, television and communication ...
72 Computer and related activities
73 Research and development

CURRENT STAGE OF DEVELOPMENT

Current stage of development	Software code
Other:	

Quantified data about the result

Items (about the results)	Actual current quantity	Estimated (or future) quantity
Time to application / market (in months from the end of the research project)	12	6
Number of (public or private) entities potentially involved in the implementation of the result:	20	50
of which: number of SMEs:		
of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people	500	1000
S&T publications (referenced publications only)	0	1
publications addressing general public (e.g. CD-ROMs, WEB sites)		
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result**COLLABORATIONS SOUGHT**

R&D	Further research or development	✓	FIN	Financial support	✓
LIC	Licence agreement	✓	VC	Venture capital/spin-off funding	
MAN	Manufacturing agreement		PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:	Implementation of this XML database architecture in several client/server applications.				

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

Assistance both at the database implementation level (Oracle) and at the MPEG7 data structure level (Ircam-SEL).

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

Database integrators, software and database consulting companies, Software services companies, Server hosts, Multimedia content providers, ...

No.	Title
21	Generic audio data/metadata application server

CONTACT PERSON FOR THIS RESULT

Name	Vincent Puig
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Fax	
E-mail	puig@ircam.fr
URL	www.ircam.fr
Specific Result URL	

SUMMARY

This software component consists in a layer built on top of the Online Sound Palette databases. It provides high-level, user-oriented services (like: connect to the system, search for audio samples, download, audio metadata authoring, etc.) through a generic Java API. It thus allows any application compliant with Java technology to interact - possibly over the web - with the online Sound Palette databases, just as a human user would do. This layer (on which current applications, among which the online Sound Palette, already rely) is thus the basic component for interoperability of external applications with the current databases. It is foreseen as an important technical basis for technology transfer and partnership in new projects.

SUBJECT DESCRIPTORS CODES

DOCUMENTATION AND INFORMATION ON THE RESULT

Documentation type	Details (Title, ref. number, general description, language)	Status: PU=Public CO=Confidential
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INTELLECTUAL PROPERTY RIGHTS

Type of IPR	KNOWLEDGE: Tick a box and give the corresponding details(reference numbers, etc) if appropriate				Pre-existing know-how Tick a box and give the corresponding details(reference numbers, etc) if appropriate		
	Current				Foreseen	Tick	Details
	Tick	NoP¹⁾	NoI²⁾	Details	Tick		
Patent applied for							
Patent granted							
Patent search carried out							
Registered design							
Trademark applications							
Copyrights	✓			IRCAM			
Secret know-how	✓			IRCAM			
Other - please specify:							

1) Number of **P**riority (national) applications/patents

2) Number of **I**nternationally extended applications/patents

MARKET APPLICATION SECTORS

Market application sectors
72 Computer and related activities
73 Research and development
80 Education
93 Other service activities

CURRENT STAGE OF DEVELOPMENT

Current stage of development	
Other:	

Quantified data about the result

Items (about the results)	Actual	Estimated
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	current quantity	(or future) quantity
Time to application / market (in months from the end of the research project)	6	6
Number of (public or private) entities potentially involved in the implementation of the result:	2	10
of which: number of SMEs:		
of which: number of entities in third countries (outside EU):		
Targeted user audience: of reachable people	5	10
S&T publications (referenced publications only)		
publications addressing general public (e.g. CD-ROMs, WEB sites)		
publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

COLLABORATIONS SOUGHT

R&D	Further research or development	✓	FIN	Financial support	✓
LIC	Licence agreement	✓	VC	Venture capital/spin-off funding	
MAN	Manufacturing agreement	✓	PPP	Private-public partnership	
MKT	Marketing agreement		INFO	Information exchange/training	
JV	Establish a joint enterprise or partnership		CONS	Available for consultancy	
Other	(please specify)				
Details:	This tool can be the starting basis for several projects targeting metadata management for media content.				

POTENTIAL OFFERED FOR FURTHER DISSEMINATION AND USE

Assistance and support can be provided.

PROFILE OF ADDITIONAL PARTNER(S) FOR FURTHER DISSEMINATION AND USE

Database manufacturers for integration of the technology as an option for their clients providing audio content. Media archives