



audioid music identification

White paper

Version:	1.2.1
Date:	2010-12-23



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mufin technology overview

mufin is a leading provider of advanced music recommendation and music identification solutions. Our solutions power music services and music applications all over the world.

<p>audioid music identification</p> 	<ul style="list-style-type: none"> • retrieve metadata for unknown tracks • repair tag information • identify music on mobile platforms • find duplicates in music collections
<p>audioid broadcast monitoring</p> 	<ul style="list-style-type: none"> • track radio streams • observe advertisements • analyse music charts
<p>audiogen offline solutions</p> 	<ul style="list-style-type: none"> • generate music attributes (auto-tags) • analyse song similarity • generate mufin vision coordinates
<p>audioscout online webservice</p> 	<ul style="list-style-type: none"> • search music • retrieve editorial metadata • retrieve music attributes (auto-tags) • get song similarity • get artist similarity • retrieve mufin vision coordinates
<p>mufin white label solutions</p> 	<ul style="list-style-type: none"> • utilize desktop player • access music cloud storage • utilize web-based player • utilize mobile player
<p>unified media database</p> 	<ul style="list-style-type: none"> • contains editorial metadata (tracks, artists, labels, etc.) • contains rich metadata(fingerprints, visualization, cover-art, shop-links, etc.) • powers other mufin services such as audioscout webservice or audioid

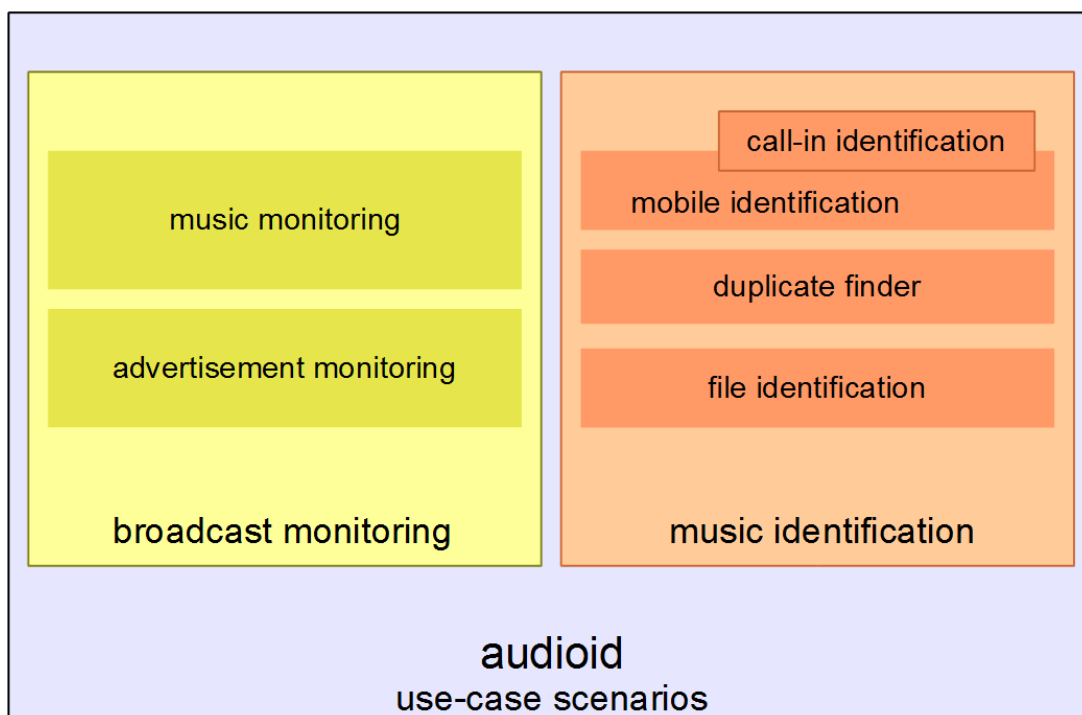
About audioid

The audioid technology enables the identification of unknown audio material by comparing a temporary fingerprint to a reference fingerprint database. A fingerprint is a compact and unique representation of a particular piece of audio. A temporary fingerprint is generated from an excerpt of the unknown audio material.

By making use of the scaling features of the system, an optimal compromise can be achieved between hardware requirements, memory demands and search speed.

The application fields for the audioid technology are vast and mufin and its partners are continually enlarging the realm of possibilities. Generally speaking, audioid can be used for:

- Identification
 - Identification of local files with music and spoken content
 - Duplicate audio files will be found easily
 - Solutions for mobile devices exist
- Monitoring
 - Automatic capture of music within radio streams for payoff, no watermarking necessary
 - Solutions for advertisement monitoring





Main advantages

The feature technology audioid is part of the MPEG-7 standard. Due to the exact and standardized specification of the descriptor, interoperability is virtually guaranteed on a worldwide basis, i.e. every search engine relying on the MPEG-7 specification will be able to use compliant descriptions.

Only a few seconds regardless of the position within the track are sufficient for successfully locating and classifying the respective song and providing additional metadata, such as title, artist, label, information on where you can order it or song recommendations.

audioid is extremely robust against acoustic interference (for example, distortion, equalization, acoustic transmission, and coding). Depending on the type of signal distortion applied, the achieved recognition rates were usually more than 99%.

audioid metadata contain a wide array of standardized information (i.e. title and artist, label, EAN / UPC, ISRC, album title and artist, track number, sub genre, main genre, keywords, release date, country of origin, duration, etc.).

Additionally, access to value-added data (such as similar songs, concert tickets, shop links, cover art, pre-listening content, etc.) is granted.

mufin's large fingerprint database covers all relevant content for EMEA and North America with millions of individual tracks. (mufin is in a direct partnership with music publishers and record companies including all majors and approx. 100 indie labels.)

Thanks to the partnership with PhonoNet - a subsidiary of IFPI Germany (Federation of the Phonographic Industry) and major labels such as Sony and Universal, new releases will be integrated prior to the official street date.



audioid music identification

Business model

mufin operates audioid webservices which are powered by mufin's unified media database. Licensees pay for access to mufin's audio servers based on the number of requests. The pricing is tiered.

Additionally, audioid can also be used in the customer's own datacenter using self-procured reference content. In that case, mufin will provide client, server and fingerprinting software. Payment is based on the number of CPU cores used by the server cluster or on the number of radio channels.

All rights and patents of the audioid technology are owned by mufin GmbH.

Pricing is available upon request.

System requirements

The audioid client and server executables are available for both Windows and Linux.

General requirements:

- Intel x86 CPU
- 32-bit or 64-bit operating system
- No special hardware requirements

Windows version:

- Windows XP or higher
- Optional: Microsoft DirectShow 9 or higher

Linux version:

- Up-to-date distribution with active package support
- Linux Kernel 2.6.20 or higher
- GLIBC 2.6 or higher, C and C++ standard library 3
- Up-to-date Boost libraries

Software versions for other operating systems and software development kits (SDKs) are available upon request. In particular the mufin audioid SDK is available for several mobile platforms.

File identification

Usage

Metadata retrieval

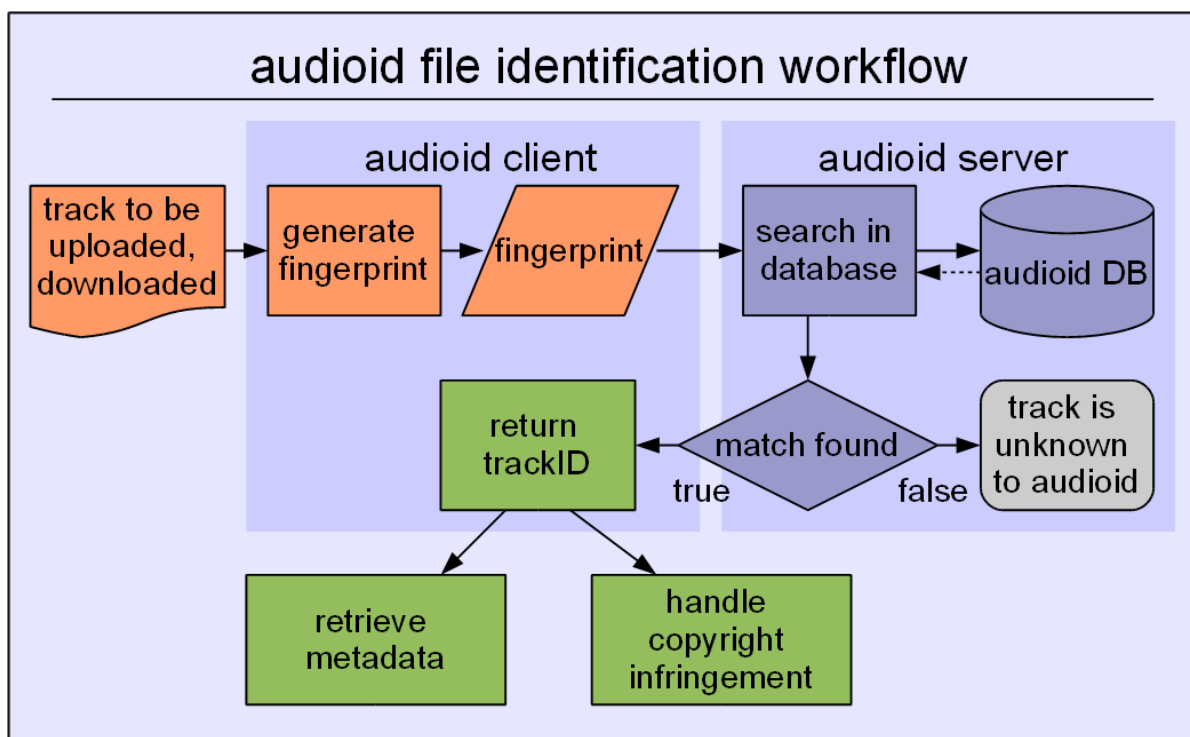
A personal music collection may contain several hundred audio files on a computer with limited or inaccurate metadata. Some audio CDs do not contain any track information.

audioid will identify unknown tracks in real time and automatically update it with the correct and fully consistent metadata. The metadata consist of any known information about the track including artist and label information. Technically, even cover-art and prelistening urls can be delivered for the track, however this requires a valid license.

Copyright detection

A user tries to upload an audio or video file that contains excerpts of copyright-protected material that he used as background music in parts of the video. The upload platform uses audioid to identify contained music in order to detect copyrighted material within the video. The vendor system can now deal with this information accordingly.

Workflow



Duplicate finder

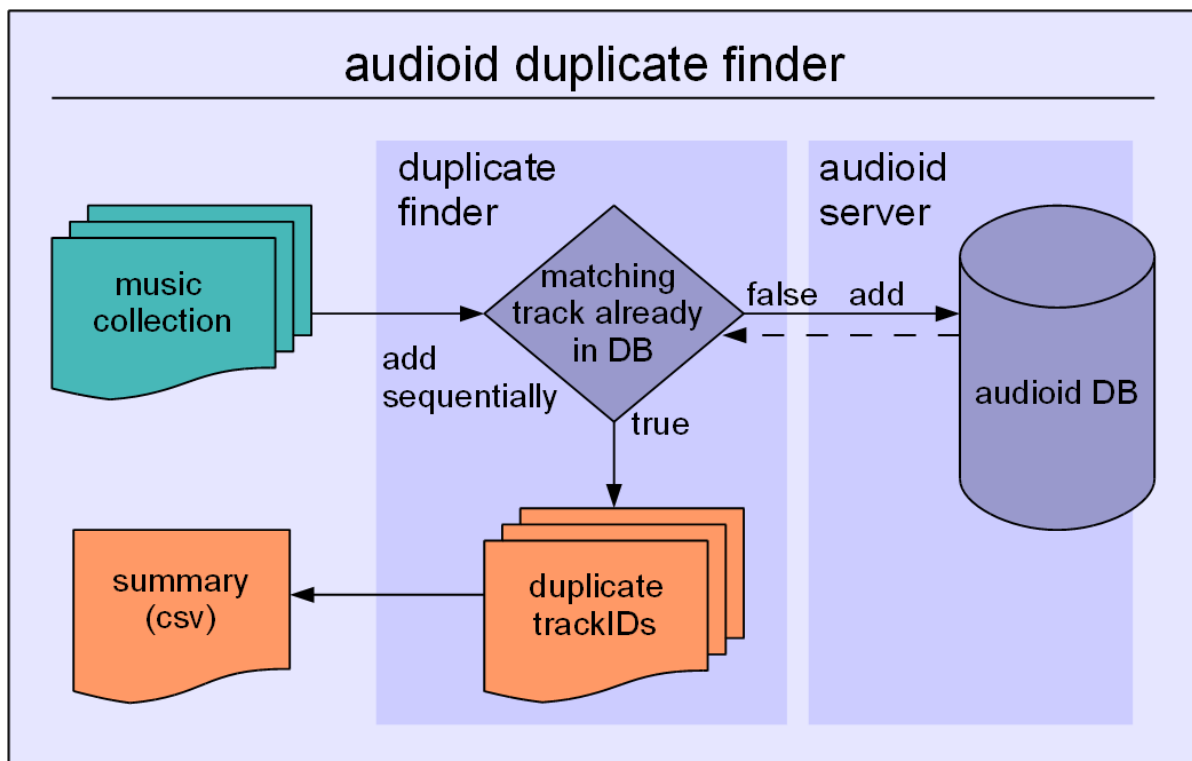
Usage

A music catalog may contain thousands or even millions of songs from different sources. For cleaning up, it may be necessary to erase redundant audio files from the storage. In another scenario, there may be the need to create links between the same songs on different albums or between songs in different qualities. audioid helps to find duplicate audio files which then can be safely deleted or linked to each other.

A library or an archive may contain different recordings of the same audio content which is stored for several time periods. audioid can find the related files so that they can be referenced against each other.

Workflow

The duplicate finder software consists of an audioid server component and a command line solution which processes a music collection and outputs any file that matches another file within the collection.

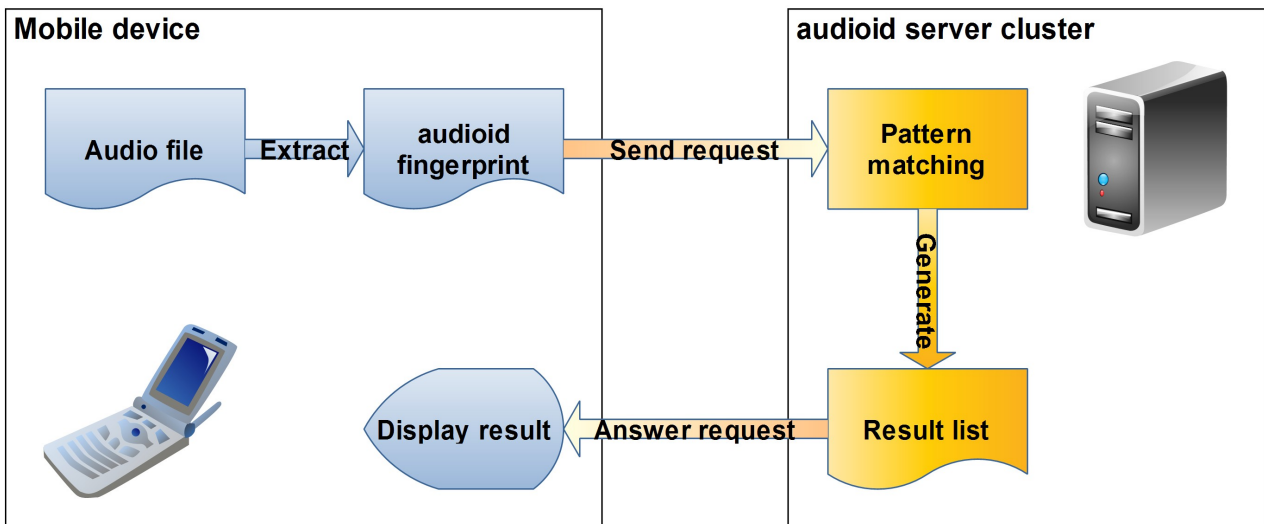


Mobile identification

Usage

A consumer hears a new song on the radio or in a bar but he does not know its song title or artist. An audioid-enabled mobile client can identify song and artist thanks to the audioid database. With an attached online shop, the song can be bought immediately.

Workflow



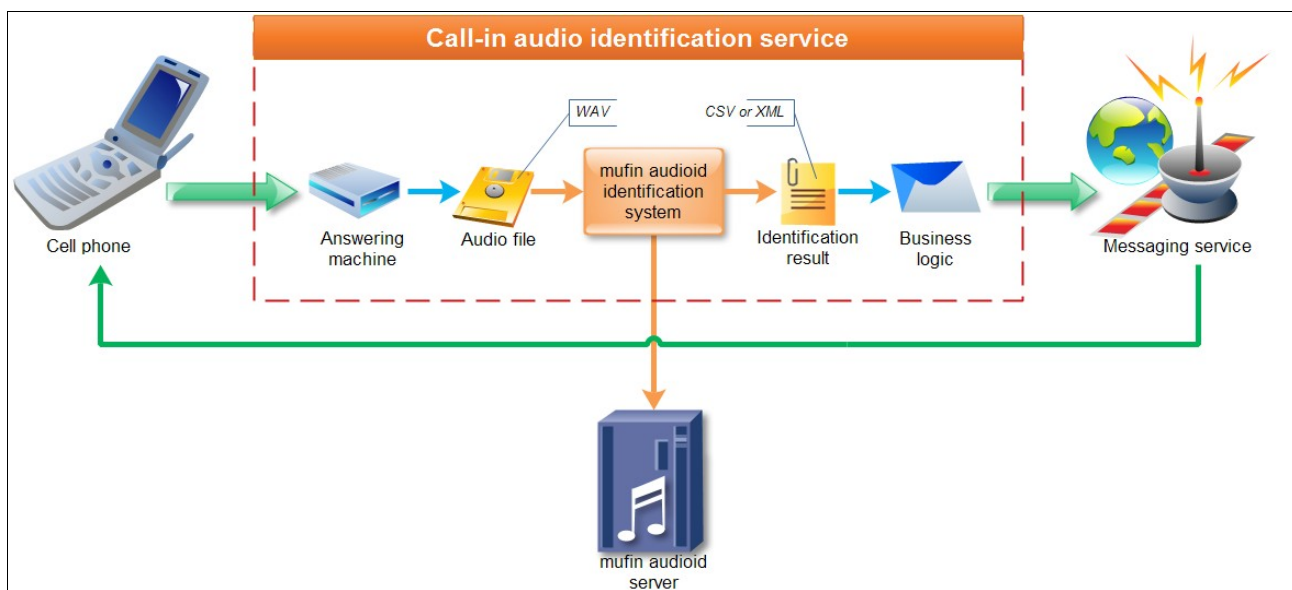
Call-in identification

Usage

A call-in identification system consists of an automatic answering machine attached to the mufin audio identification system. To identify a song on the go, there is no special software on the phone necessary. With a phone call to the call-in service the song will be recorded and then processed remotely by an audio file identification system. The result will be sent to the customer via SMS.

mufin does not offer such a service to the end-user but markets a solution that enables vendors to offer call-in identification.

Workflow





About mufin

Company background

mufin is the leading expert for content protection services and audio retrieval solutions based on the most advanced fingerprinting technology for the purpose of

“identifying and filtering copyrighted content on behalf of the right holders to enforce the copyright policy”

while

“adding value to music applications and devices plus stimulating music sales anywhere and anytime”.

In August 2005, mufin exclusively acquired the associated patents for audioid technology, which is an innovative system for extracting audio fingerprints from digital files and identifying them. mufin is a 100% subsidiary of MAGIX with its headquarters in Berlin, Germany.

mufin’s technology has been developed with the music consumer in mind. Our music identification and music recommendation technologies enable consumers to enjoy music anytime and anywhere.

Benefits

Our solutions help consumers

- Discover new music they might enjoy
- Listen to music that matches their mood
- Build playlists with one touch
- Navigate music libraries visually

Helping consumers directly benefits your business, since

- Newly discovered music presents new purchase options
- Engaging music experiences increase customer browsing time and repeat visits



References (Selection)



Music recommendation for ringtones and full-track music downloads on mobile portal



Audio recognition of user uploads to avoid copyright infringements with audioID on a German music platform



Audio recognition of user uploads to avoid copyright infringements with audioID on a German video portal



Ad monitoring in Australia with mufin audioID technology



Ad monitoring in Kenya with mufin audioID technology

In the press



'I was very impressed by Vision and spent quite some time playing around with it.'



'Mufin: An Automated Music Recommendation Engine That Actually Works'



'Mufin brings better music recommendations to iTunes'