



audioid broadcast monitoring

White paper

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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

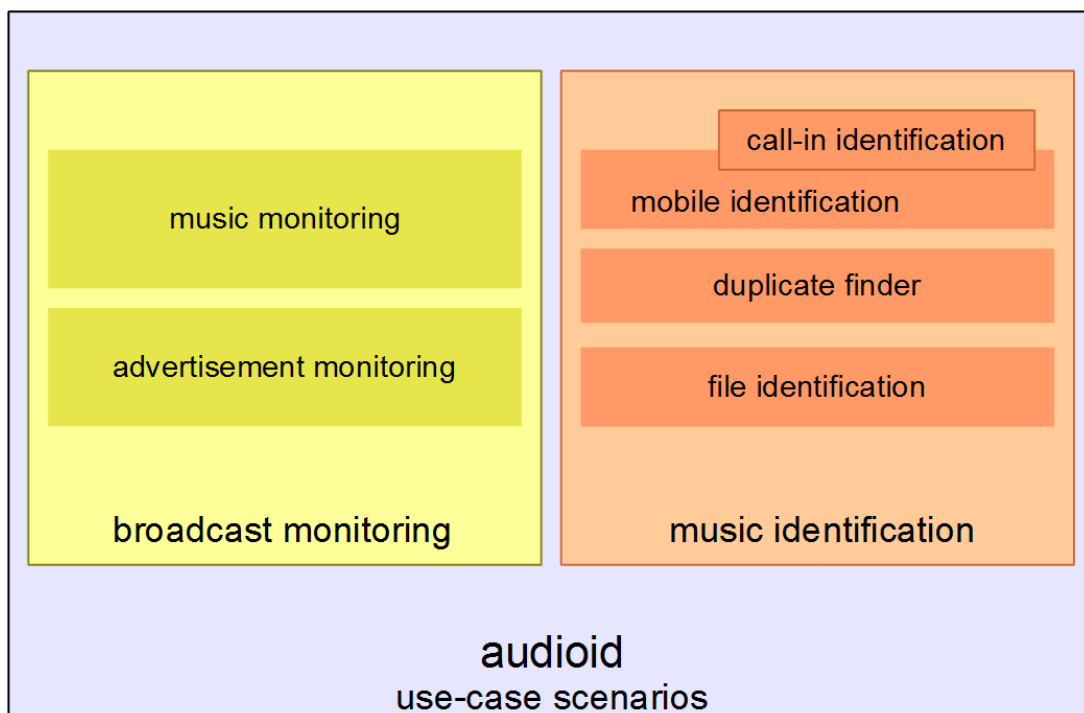
About audioid

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:

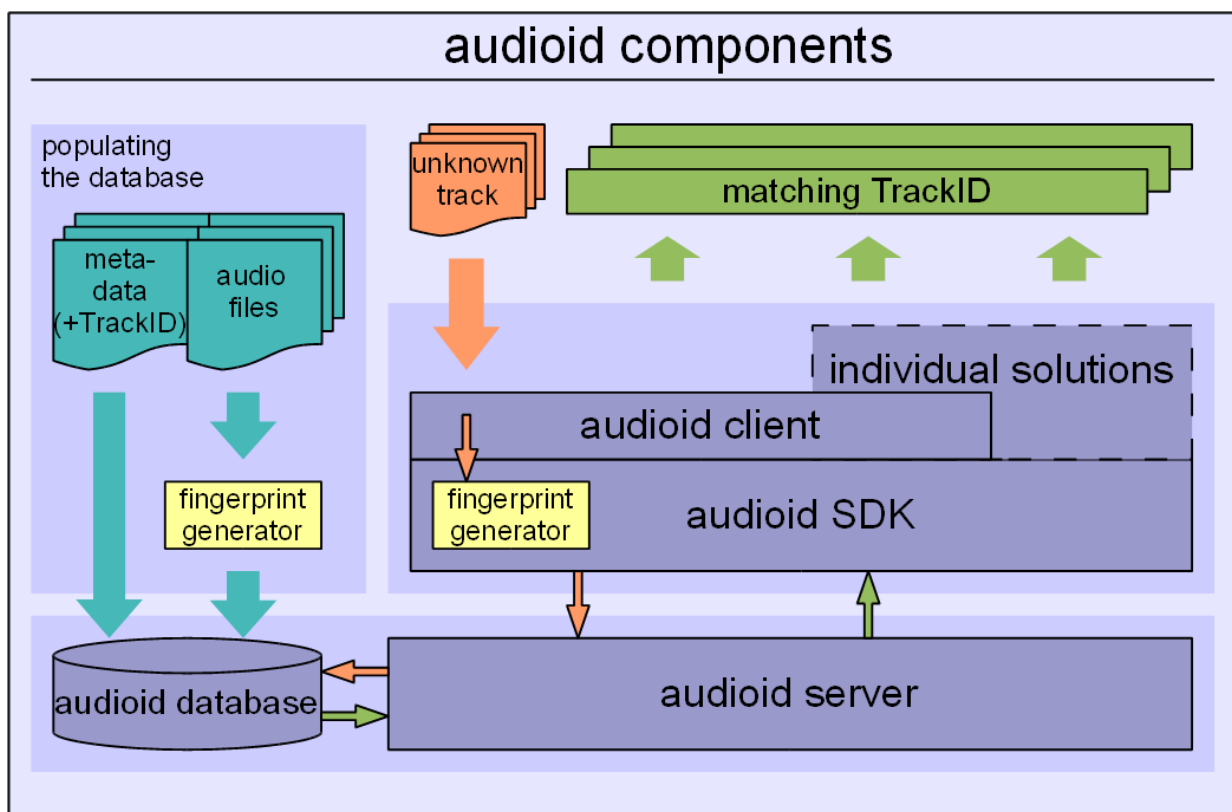
- Identification
 - Identification of local files with music and spoken content
 - Duplicate audio files will be found easily
 - Solutions for mobile devices exist
- Monitoring
 - Automatic capture of music within radio streams for payoff, no watermarking necessary
 - Solutions for advertisement monitoring



Components

Mobile and PC clients as well as SDKs are available for various operating systems. The porting to other OS including proprietary systems is as easily done as implementing audioid in applications.

Customers can setup audioid on their own premises or use the mufin audioid online service. The mufin server infrastructure consists of a number of independently working clusters. Incoming requests are distributed between these clusters. If one cluster happens to be offline, e.g. due to maintenance purposes, the other clusters will automatically take over its workload.



The following components are available:

- audioid SDK: client-side API for audioid
- audioid client: command-line utility for (batch) file identification
- audioid server: server for identifying audio content
- Fingerprint generator: solution for extracting fingerprints from audio files
- Duplicate finder: solution for finding duplicates in music collections
- Monitoring client: solution for music and 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 broadcast monitoring

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

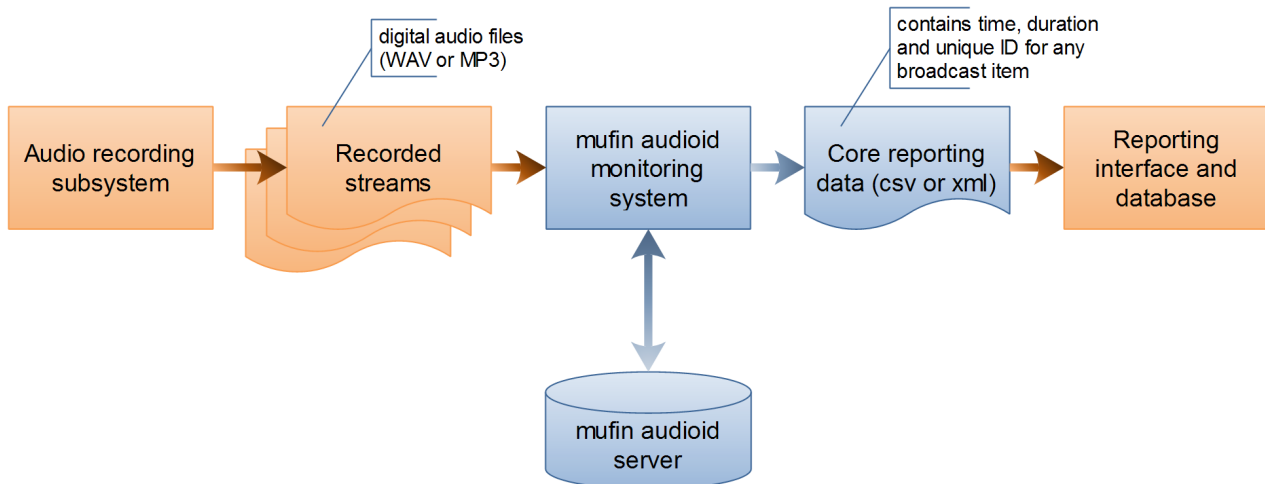
Linux version:

- 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.

Introduction

audioid allows to automatically trace and analyze audio streams. By continuously monitoring radio broadcasts and identifying songs, advertisements or other pieces of information transmitted therein, audioid serves as the basis for new content-based billing models in the broadcasting market.



Music monitoring

audioid makes it possible to automatically analyze audio streams and create a detailed protocol of all songs that have been played including complete metadata, timestamps and durations.

This allows e.g. to

- Augment royalty distribution systems of collecting societies to ensure right holder's royalties
- Fair royalty statements of collecting societies and/or music publishers on a per title basis
- Measure music performance (chart analysis)

audioid's main advantages:

- High-performance monitoring with superior accuracy
- Generates minimum network traffic due to small fingerprint size



Advertisement monitoring

audioid keeps track of specific commercials within a stream. The collected data can be used for statistical evaluations to optimize ad placement and to verify broadcast fulfillment.

- Verify scheduled transmissions of commercials and motion pictures
- Statistical evaluation of broadcasts

From a technical perspective, advertisement monitoring is very similar to music monitoring.



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'