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CSC461 - Multimedia Systems

Overview of audio fingerprinting technology and its applications in Shazam & SoundHound

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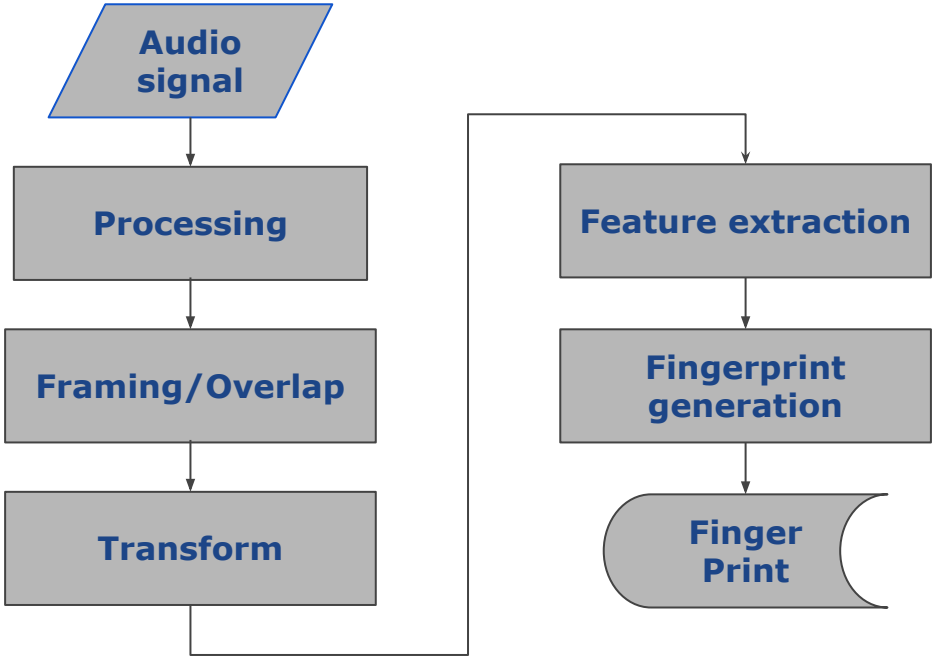
- Overview of fingerprinting algorithm
- Application algorithm in SoundHound
- Application algorithm in Shazam
- Defect of algorithm and improvement

1. Overview of fingerprinting algorithm

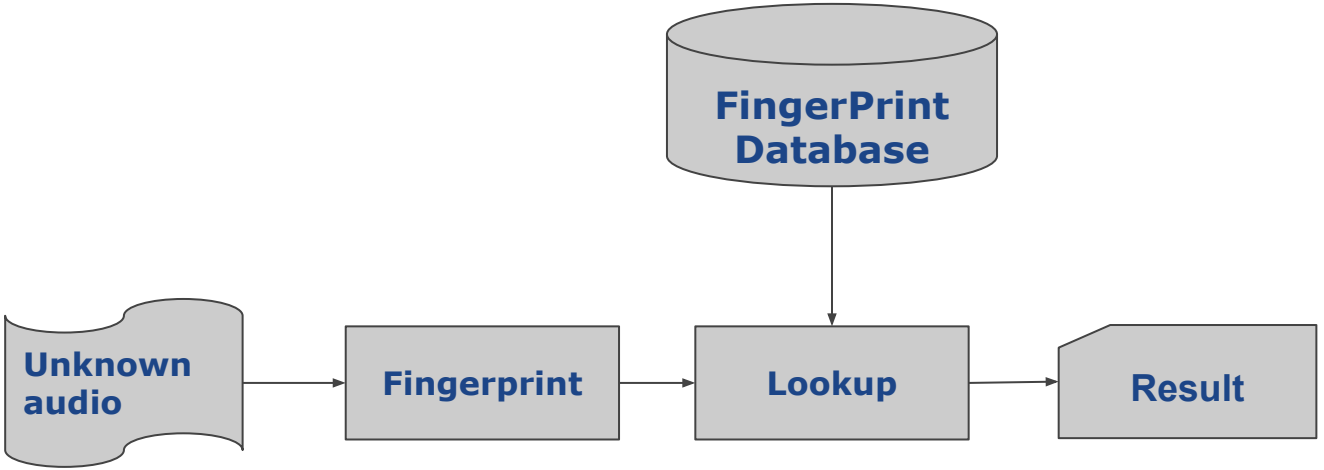
1.1 Process to convert audio to a fingerprint



1.1 A sample fingerprint generated by Echoprint algorithm

168069 13 465942 13 52579 13 558476 13 739869 13 741460 13 380305 14
415399 14 661073 14 709215 14 74563 14 82703 14 1002532 15 1030366 15
106211 15 187156 15 348044 15 351350 15 35265 15 395259 15 403763 15
45438 15 474191 15 557925 15 793952 15 860815 15 883227 15 887181 15 90861
15 971810 15 1000650 16 405802 16 664990 16 771321 16 80513 16 949484
16 414620 38 47256 38 620886 38 63360 38 806318 38 971075 38 1007816 39
1014266 39 1022230 39 1036491 39 224005 39 340504 39 342618 39 394503 39

1.2 Process of recognizing a query

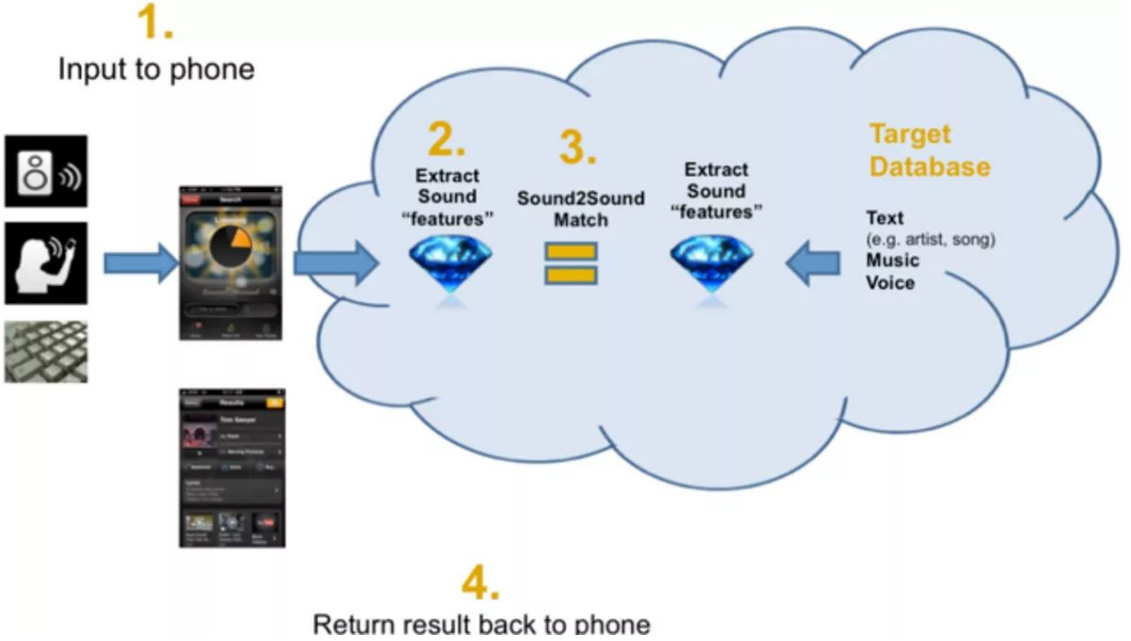


Sample output:

Your query matches the following files:

1. …..
2. …..
3. …..

2. Application algorithm in SoundHound



SoundHound

- SoundHound **database** for recorded songs
- **MARS** for humming or whistling

2. Application algorithm in Shazam

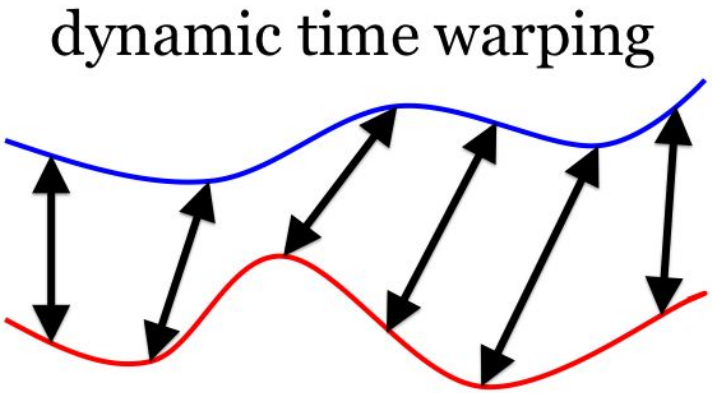
Shazam

- Analog to Digital - **Sampling** a Signal
- Recording - **Capturing** the sound
- Music Recognition - **Fingerprinting** a Song

4. Defect of the Shazam algorithm

Does **not** recognize music even with the **same singer** and background music that is **indistinguishable to the OST** by human perception.

4. Improvement



Originally, a scatter plot of matching hash locations is used to determine the best match among all candidate tracks.

Suggestion, use Dynamic Time Warping (DTW) to stimulate a Query by humming system for recognition if the 10 second query does not match any results.

Thank you for watching

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We look forward to your feedback !

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