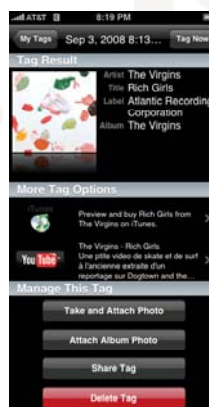




## Shazam - music discovery engine

[http://www.youtube.com/watch?v=Xy1jGtHy7AE&feature=player\\_embedded#](http://www.youtube.com/watch?v=Xy1jGtHy7AE&feature=player_embedded#)



A Wang, An Industrial-Strength Audio Search Algorithm, Proc. Int. Symp. Music Information Retrieval, Baltimore, USA, 2003.  
<http://laplacian.wordpress.com/2009/01/10/how-shazam-works/>

20. oktober 2009

2

## Spektrogram $\Rightarrow$ "stjernekart"

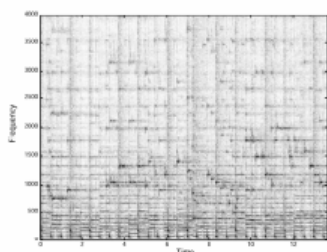


Fig. 1A - Spectrogram

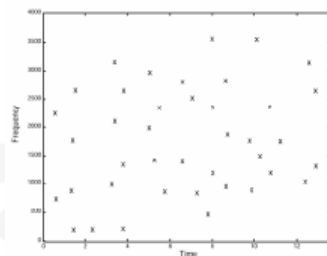


Fig. 1B - Constellation Map

### Spektrogram:

- Det akustiske fingeravtrykket er basert på spektrogram
- Forenkler det til en gruppe av frekvenser for maks intensitet

### Korrelasjon:

- Slås sammen i par, finner hash, sammenlignes med database  $\Rightarrow$  låt som matcher.

20. oktober 2009

3

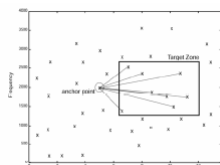


Fig. 1C - Combinatorial Hash Generation

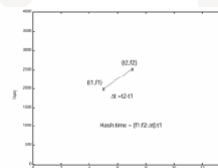
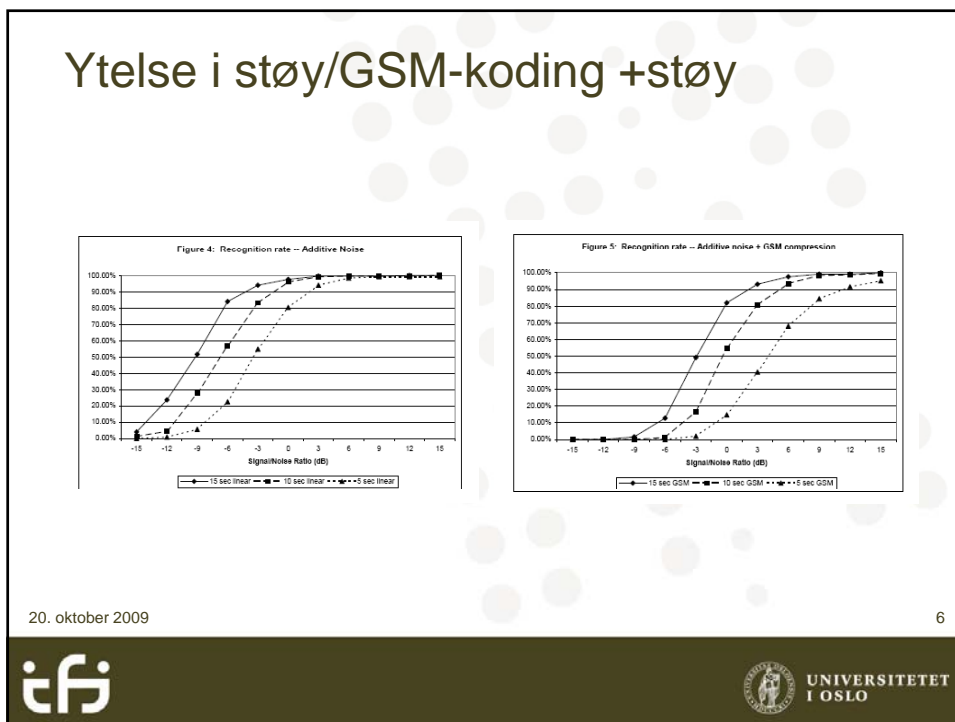
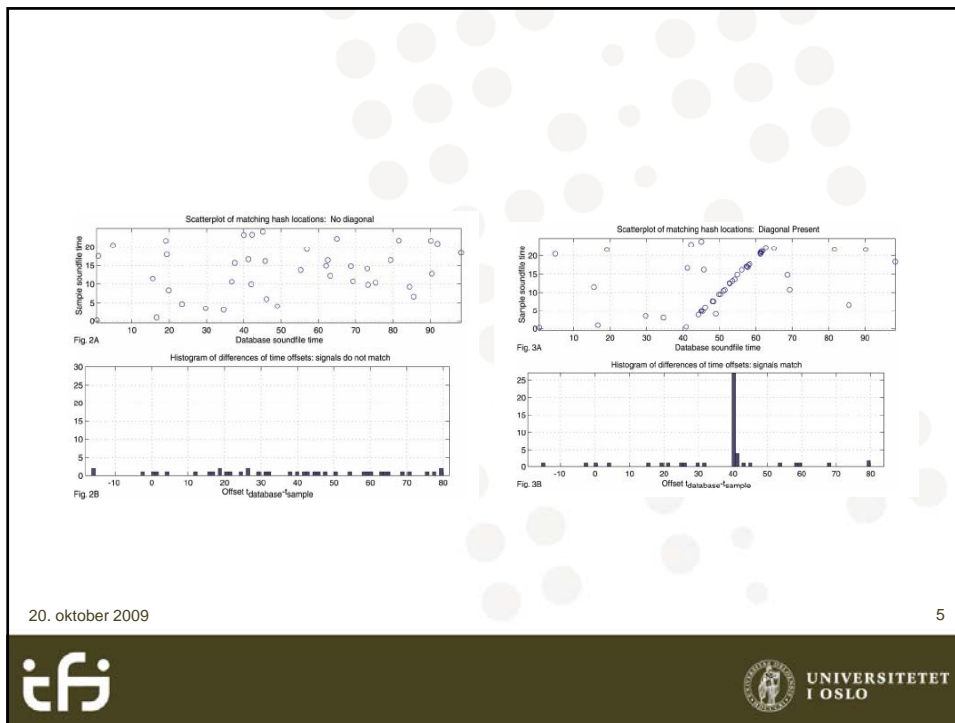


Fig. 1D - Hash details

20. oktober 2009

4



## Shazam: ytelse

- Robust mot
  - Bakgrunnsstøy (stemmer, trafikkstøy, annen musikk)
  - Etterklang
  - Koding over GSM
- Kan bare kjenne igjen akkurat samme innspilling
  - Live-opptak blir en ny match
  - Klassisk: store forskjeller mellom utøver
- Database
  - 8 millioner låter (des 2008)
  - á 4 min  $\Leftrightarrow$   $\sim 10^9$  sekunder
- Andre: [www.Midomi.com](http://www.Midomi.com) (kan nynne ...)