

**Tom Gilb – Quantifying Music**

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**Claudius Link – Complexity: Human Behaviour in Complex Situations**

**Erik Schlyter – Teenage Mutant Ninja Turtles Pattern**

**Diomidis Spinellis – name !shame: Rational Naming**

**Anders Schau Knatten – AUTOMATE ALL THE THINGS**

**Andy Balaam – Implementing Tail-call Optimisation in C++**

**Klaus Marquardt – Learning From School**

**Ed Sykes & Raj Singh – Posse Programming**

**Bernhard Merkle – I Use A Dead Language**



# Quantifying Music

Tom Gilb

Lightening Talk at ACCU 2012

What is the problem,  
in quantifying music?

- *Can you quantify this  
music?*



# Lean QA Audience at ACCU

## “Surely you cannot quantify ‘Music’ ?”

- I claimed
  - we can quantify any variable quality of any system
- I replied:
  - *I’ll do it in a lightening talk here at ACCU*



# Black-Eyed Peas song "I gotta Feeling" gets 8.9 of 10 from Hit Song Science software



*Frank Micelotta/Getty Images*

The Black Eyed Peas' single "I Gotta Feeling" received a hit score of 8.9 out of 10 with Music Intelligence Solutions' new software Hit Song Science.

“There's no magic in that; it's math”



"[It's] a series of **algorithms that we use** to look at what's **the potential of a song to be sticky with a listener ... To have those patterns in the music** that would *correspond* with what **human brain waves would find pleasing”**

CEO David Meredith

A study conducted by the Harvard Business School found that the software **was accurate 8 out of 10 times**

<http://www.npr.org/templates/story/story.php?storyId=113673324>

# Measurable Attributes of Hits

Meredith says his software evaluates songs over sixty elements including

**Melody**

**Harmony**

**Tempo**

**Pitch**

**Octave**

**Beat**

**Rhythm**

**Fullness of sound**

**Noise**

**Brilliance**

**Chord progression**



# Evaluation by what people buy and industry awards

Top Ten

Scale: Number of sales in a given time period

iTune Downloads

Scale: Number of sales in a given time period

Silver, Gold and Platinum Discs

Awarded when total number of sales reach specific levels

Industry Awards

Scale: Percentage of the major awards recognising the  
music in a defined [manner: default=won]




# So How Did "I Gotta Feeling" Do?

- The song reached number one on the US charts and 20 charts worldwide
- "I Gotta Feeling" spent fourteen consecutive weeks atop the Billboard Hot 100, the longest-running number-one single of 2009
- "I Gotta Feeling" was 5th on the Billboard Hot 100 Songs of the Decade
- In March 2011, it became the first song in digital history to sell over 7 million digital copies in the United States. Worldwide it has sold over 14 millions units, becoming one of the most successful songs in the history of popular music
- "I Gotta Feeling" holds the record as the most downloaded song on iTunes of all time
- The song was nominated for Record of the Year at the 52nd Grammy Awards and won the Grammy for Best Pop Performance by a Duo or Group with Vocals
- The song was nominated as Song of the Year at the 2009 World Music



# YouTube Measures

- Number of Likes and Dislikes  
11,021 Likes, 371 Dislikes (April 26, 2012)
- Number of times video has been viewed  
5,942.649 Views (April 26, 2012)



I gotta feeling that tonight's gonna be a good night  
that tonight's gonna be a good night  
that tonight's gonna be a good good night (x4)

Download Google Chrome  
A free browser that lets you do more online. Download instantly!  
[www.google.com/chrome](http://www.google.com/chrome) Ads by Google

0:34 / 4:24

Like Share

5,942,649

Uploaded by CoolChick140150 on Jul 12, 2009  
lyrics from musiccovers.net. subscribe and enjoy! please comment!

11,021 likes, 371 dislikes  
Artist: The Black Eyed Peas



# Jeremy Yudkin

Boston University Professor

Great music is about

- Deception: the creating and violating of expectations
- Concision: content against time

“Not a note too many, not a second too long”

<http://www.bu.edu/cfa/music/faculty/yudkin/>

# By Survey: Most Wanted Attributes

- Yudkin reports on a web-based survey into American musical tastes conducted by Komar and Melamid in 1996
- If you want to please the greatest number of Americans (72% ± 12%) consider
  - Male and female solo voices
  - R&B with a love theme
  - Small ensemble of musicians
  - Length of about 5 minutes
  - Moderate pitch, tempo and volume

<http://www.bu.edu/cfa/music/faculty/yudkin/>

# Most Unwanted Attributes

To appeal to only about 200 Americans

- Extreme length
- Wide range of dynamics, tempo and pitch in abrupt succession
- An operatic soprano singing atonally
- A cowboy song with political slogans
- A children's choir singing holiday songs
- Large orchestra featuring harp, accordion and bagpipes

<http://www.bu.edu/cfa/music/faculty/yudkin/>

*There are samples of two songs written by David Soldier with lyrics by Nina Mankin to these wanted and unwanted guidelines about 19 minutes into Yudkin's lecture*

# Stakeholders and Context

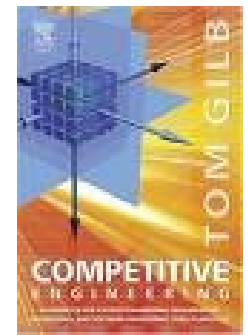
Yudkin stresses the importance of the listener

Tastes change

- Over historical time
  - Bach was thought less of in his day than some other musicians we have forgotten
  - People used to have more time - concerts could last four hours
  - Less technology – limited access and not the ability to listen to background music so easily
- Over personal time (during one's lifetime and its influenced by experience)

<http://www.bu.edu/cfa/music/faculty/yudkin/>

# Some potentially quantifiable Quality dimensions of Music



Brainstormed by Steve F. and  
Rachel D. At lunch

Examples in Planguage

- In tune
  - Applause
  - Moving
  - Encores
  - Repeat Gigs
  - Busking Hat Collection
  - MRI Brain Scan
  - Downloads
  - Utube Reviews
  - Royalties
  - ... (many more!!)
- **Music.Moving:**
  - **Type: primary music quality attribute**
  - **Ambition Level: the majority of listeners feel moved to tears or strong physical emotional reactions.**
  - **Scale: the % of defined [Listeners] hearing defined [Music] under defined [Environments] who reports a defined [Emotion] at a defined [Strength]**
  - **Goal [1<sup>st</sup> UK Release, Music = Hip Hop, Environment = Itunes, Emotion = {Tears, Sadness}, Strength = Powerful]**

# Conformance to music standards

- In tune
- Standard tempo
- Fit to genre



# Worrying about the **Process**

## - the Qualities of the Performance

- The musicians involved
- The conductor
- The instruments
- The version of the music
- The location's acoustics
- The accuracy of the recording
- The accuracy of the playback

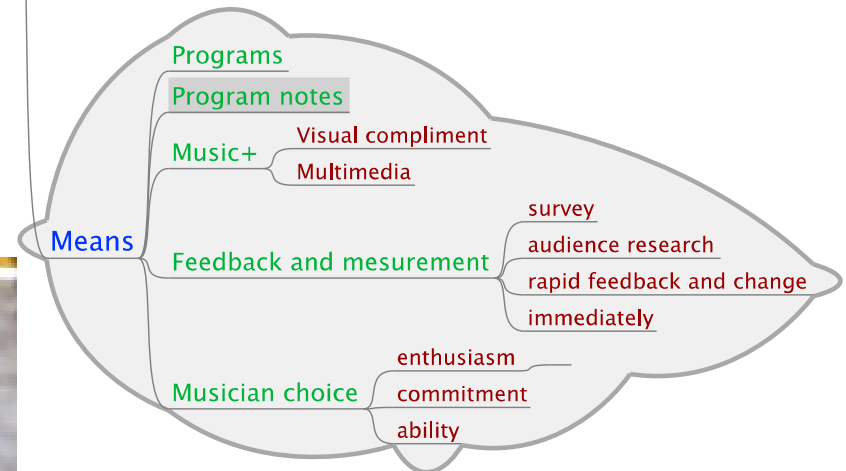
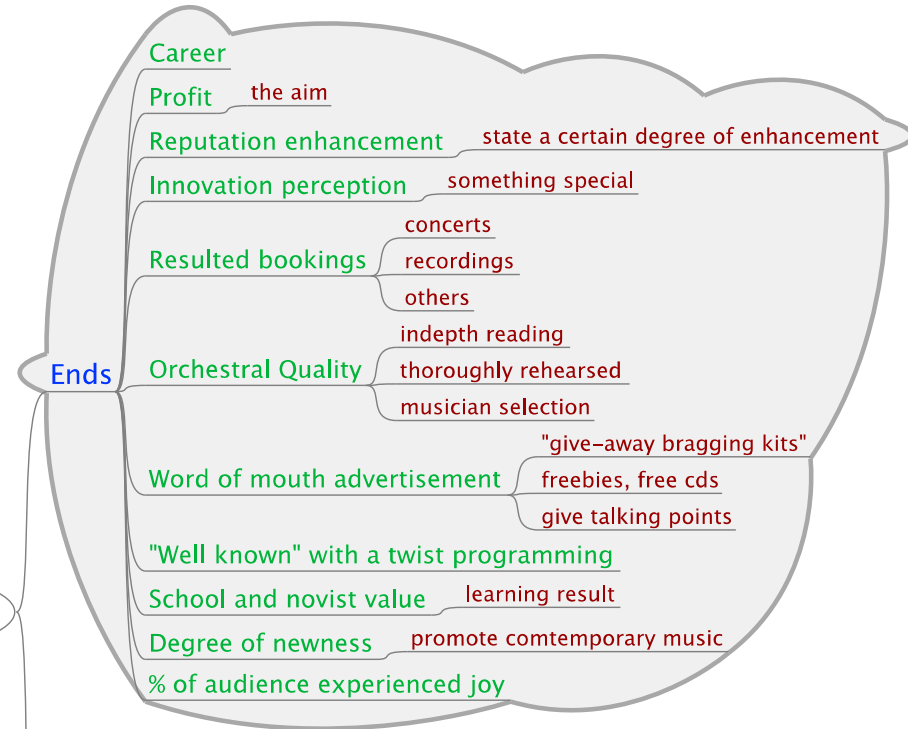
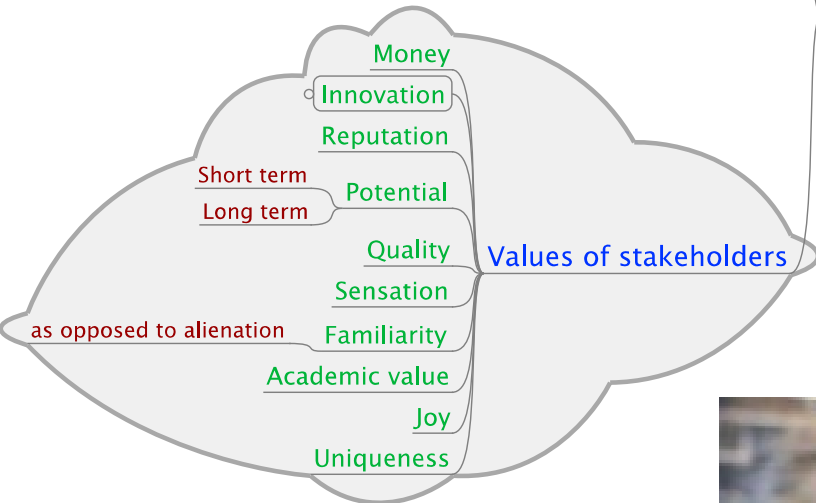
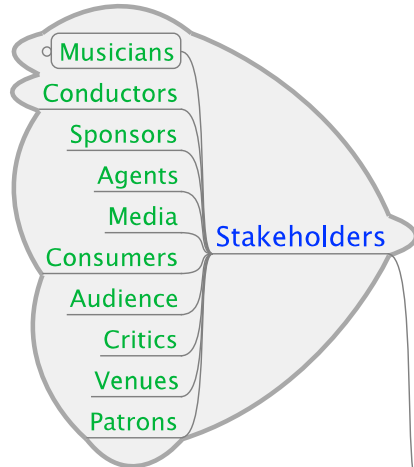
# The Costs and Budgets

- What will people pay?

- What price to set up a performance?
- What will you pay for a ticket to attend?
- How far will you travel?
- How much do you spend on your hi-fi?

# My friend "Uyen" The Conductor

Verdandi Camerata



# Qualities of the Music

- The musicians involved
- The conductor
- The instruments
- The version of the music
- The location's acoustics
- The accuracy of the recording
- The accuracy of the playback

# The Music Conductor's Quantifiable 'Music' Objectives: Uyen's Goals



# Uyens Concert Sunday



# Uyen taking Applause at Concert



# What is the problem, in quantifying music?

- Next!





So who was the man who  
challenged me to quantify music?

Are you happy yet?

# Thanks

- To [neil.hankey@igence.com](mailto:neil.hankey@igence.com)

For immediately finding me some of these examples, as our class ended!

- To Steve F. and Rachel D.

For brainstorming some ideas over lunch