Active music content for web pages – Intelligent Music Localisation

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Centre for Next Generation Localisation

science foundation ireland

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Overview

- Localisation for websites focuses on:
  - Translation of text (language, fonts, directionality)
  - Suitability of images (universality, offensiveness)
  - Modification of style of page (colour, layout)
  - Re-recording of any video or audio dialogue in target language
- But what about music itself?

Cultural Considerations

- Music content is often included in web sites, but how much thought goes into the cultural suitability of such music?
- Is the style, the genre, of the music in keeping with the locale of the user?
- Is the perceived emotion or mood the intended one?
- Different cultures have evolved different harmonic systems and musical scales over thousands of years
- These cultures can also derive differing meanings and understanding from music due to their cultural conditioning
- A decision to view the structures of Western Art Music as universal is a dangerous assumption to make

Possible Scenario

- A disaster-related news story presented on a website in one culture has an attached music soundtrack designed to support the sad, sombre nature of the news.
- This same website presents a sensitively-translated version of the same story for a different culture or locale, but with an unaltered soundtrack. The target audience, due to cultural conditioning, perceives the music as up-tempo or happy, and is outraged at the disregard shown by the reporting organisation for trivialising such news.

RTÉ News

serious

non-serious

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Ireland

Tallaght isolates suspected swine flu cases

Thursday, 13 August 2009 22:15

Tallaght Hospital in Dublin has said it is taking all necessary measures to ensure the safety of patients and staff as it deals with an increased number of suspected swine flu cases.

The hospital says that to date it has been in a position to isolate all suspected cases in single rooms.

All individual rooms are now occupied at the hospital.

The hospital said that it is following all national protocols and best practice.

Last Friday, an 18-year old patient at the hospital became the first person in Ireland to die from the H1N1 virus.

The Department of Health has said that 50 people have been hospitalised so far with swine flu and 21 patients remain in hospital undergoing treatment for the virus.

Advertisement

Tallaght Hospital
All suspected swine flu cases in single rooms

Related Stories

- Swine flu forces Irish college closure
- Suspected swine flu in Donegal Gaeltacht
- Swine flu closes Donegal Irish college
- Woman dies from swine flu at Tallaght Hospital
- Tallaght Hospital prepares for swine flu

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1. HSE moves to quell swine flu fears
2. Irish card data stolen in US scam
3. Rents fall 5% in three months - report

RTÉ Travel

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Suggested Solution

- Allow music to be ‘localised’ dynamically
- How?
  - Recognise the locale, culture or even IP address of the user
  - Take the music on the website and alter it dynamically to better match the target culture, either in terms of required emotional response, or perhaps by category

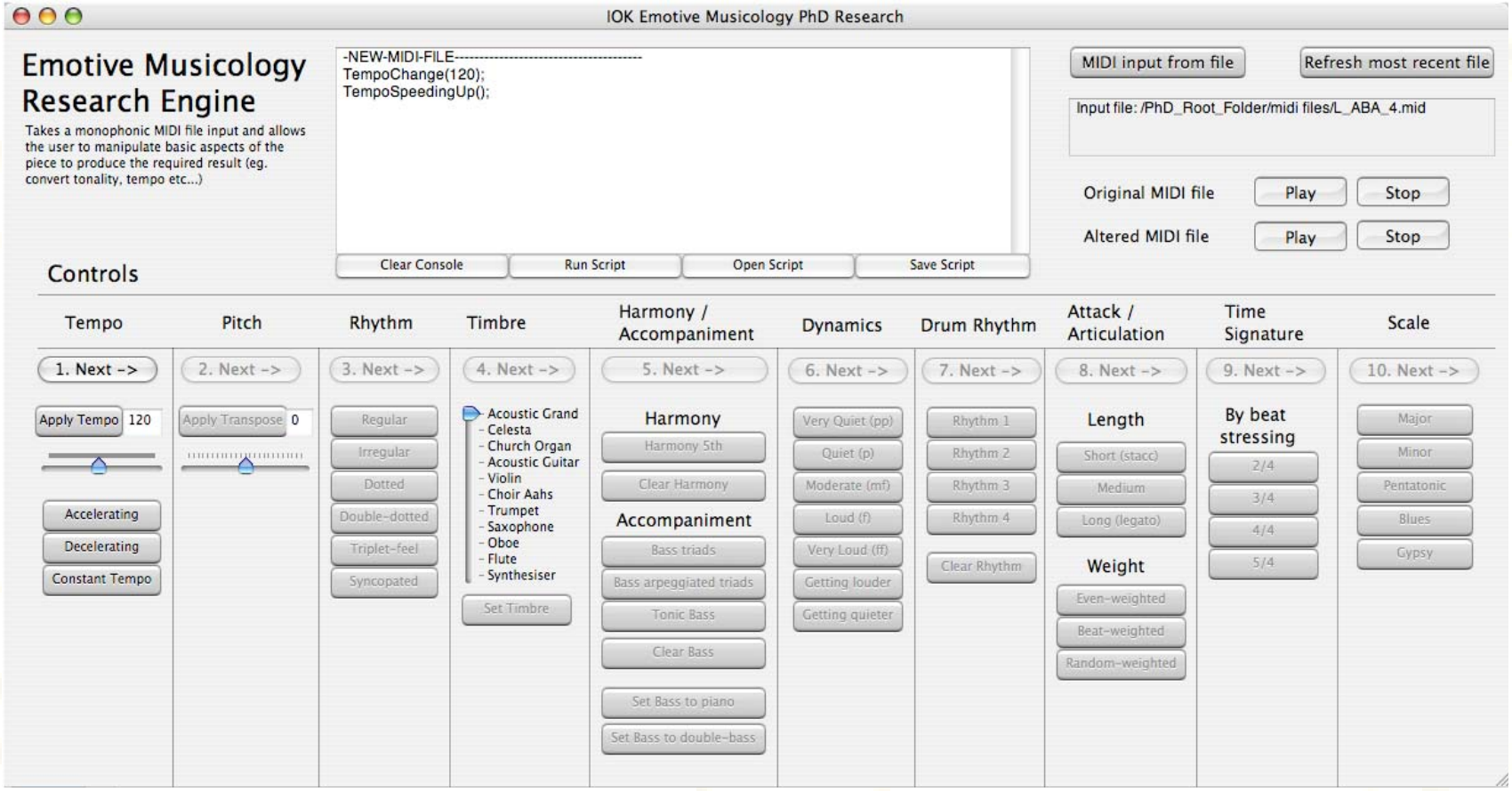
Requirements

- A way to capture musical “templates” in music, perhaps analogous to a translation memory, or the rules embedded in machine translation systems, that could be stored for later use
- A way to leverage these templates on musical digital content as required

In pursuit of Music Localisation

- Create a system capable of modifying music via a set of basic, low-level musical operations
- Wrap this system in a user-friendly U.I.
- Allow users from differing cultural background to experiment with this system to see if they could create different moods or emotions in sample pieces
- Capture these ‘macros’ or ‘templates’ of the user actions for re-use

Existing PhD System



Original melody

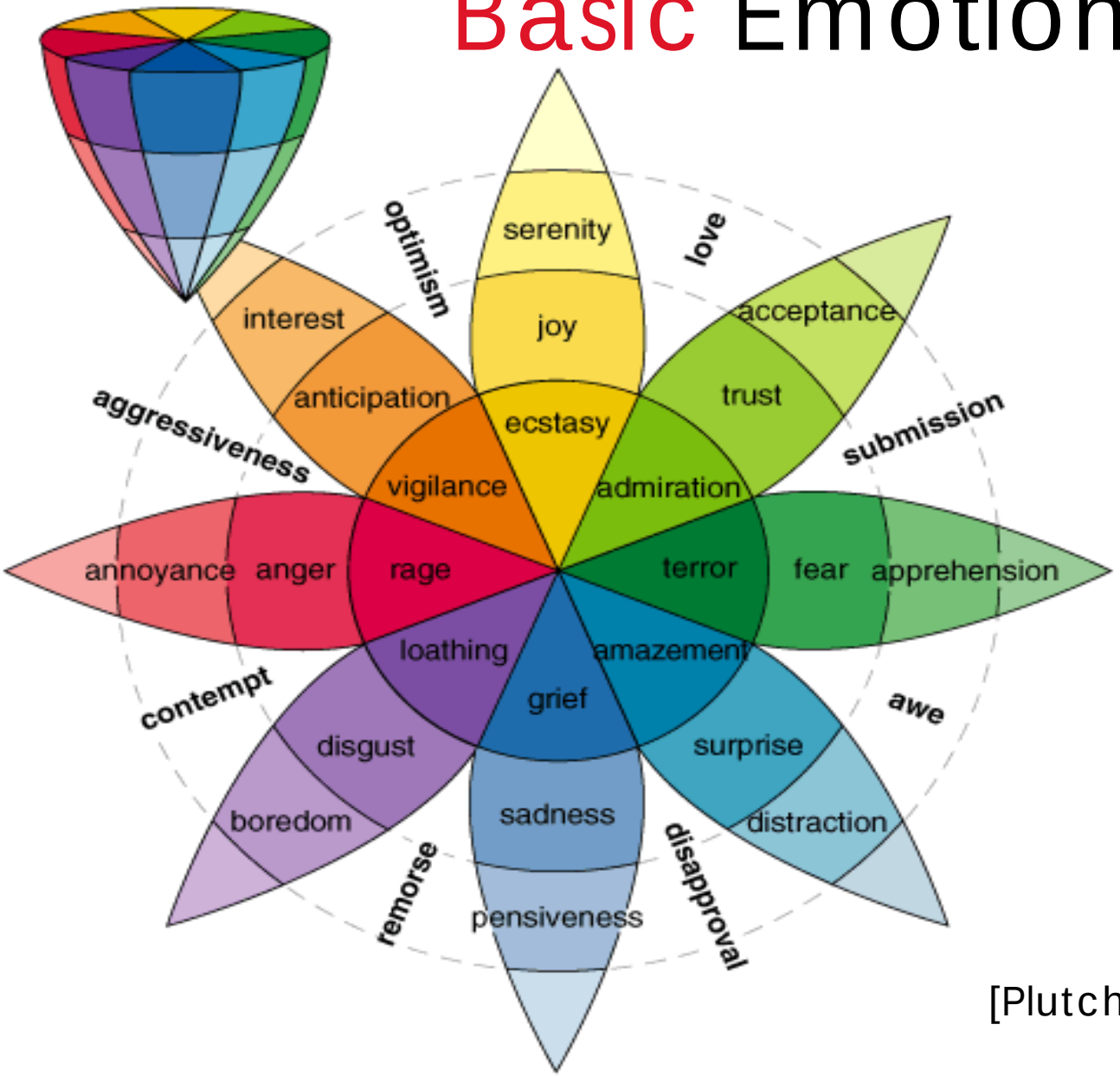
Joy

Anger

Sadness

Fear

Basic Emotions

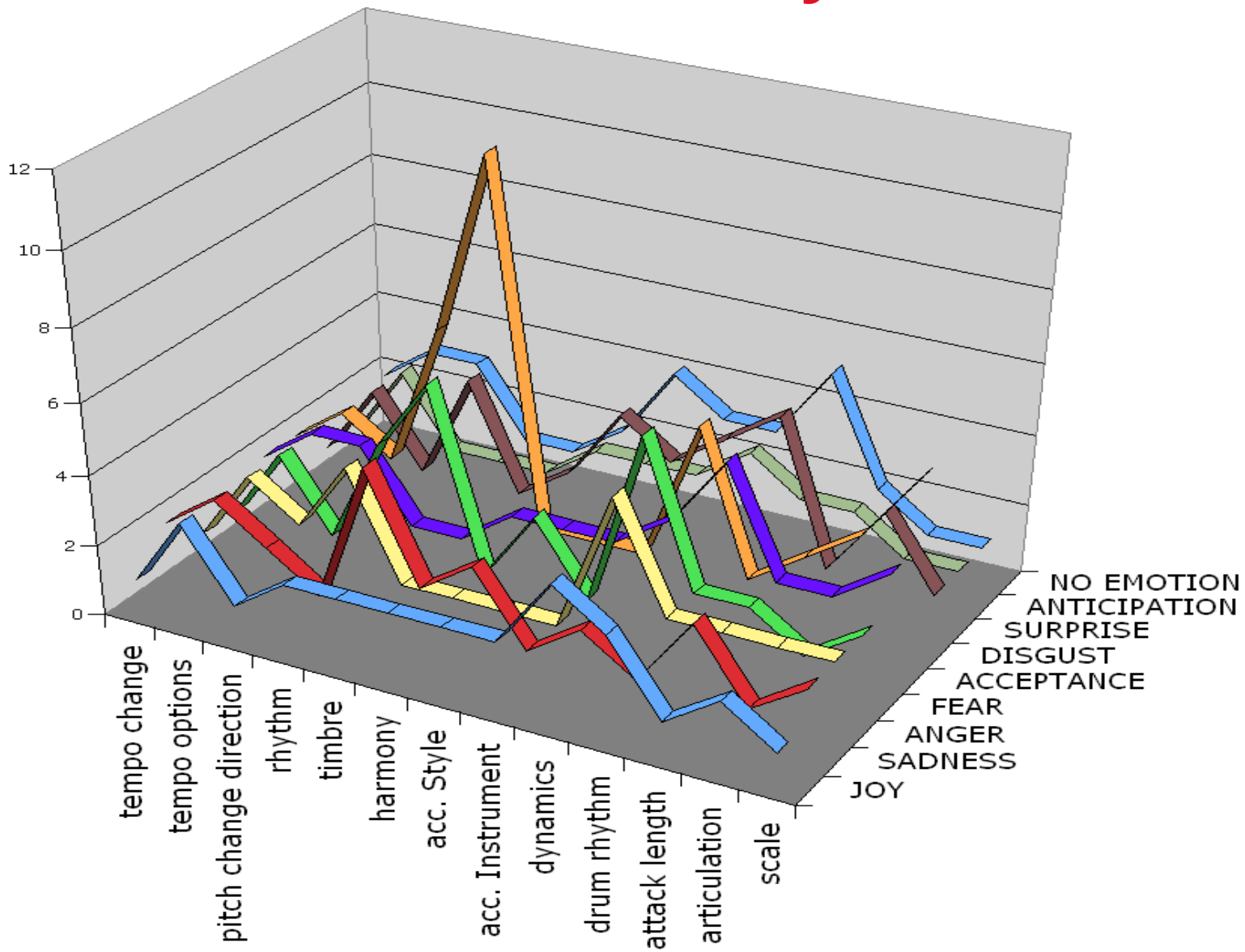


Joy, Sadness, Anger, Fear, Acceptance, Disgust, Surprise, Anticipation and No Emotion*

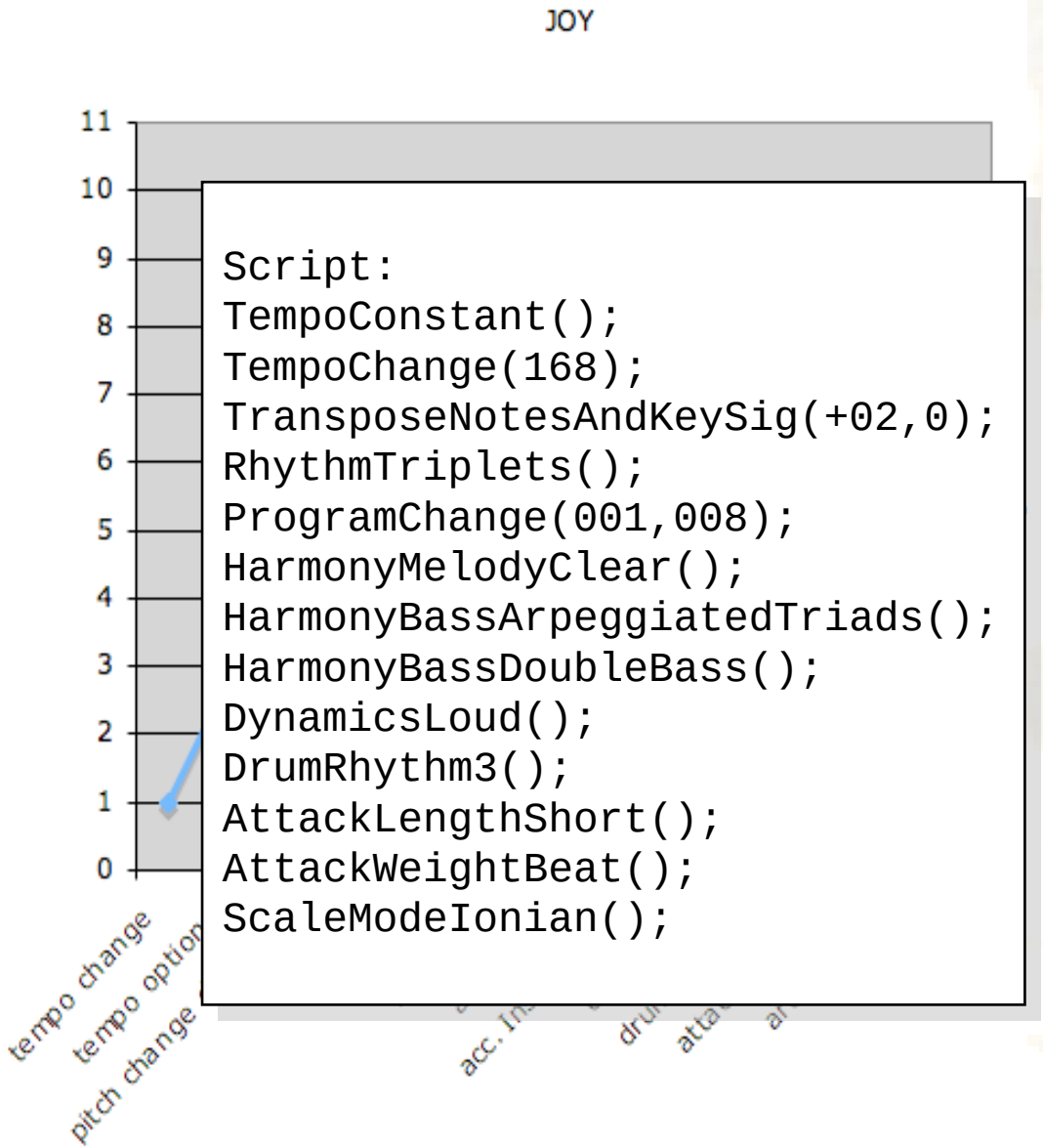
(* control emotion)

[Plutchik 2001]

Overall Main Study Results



Main study - Joy

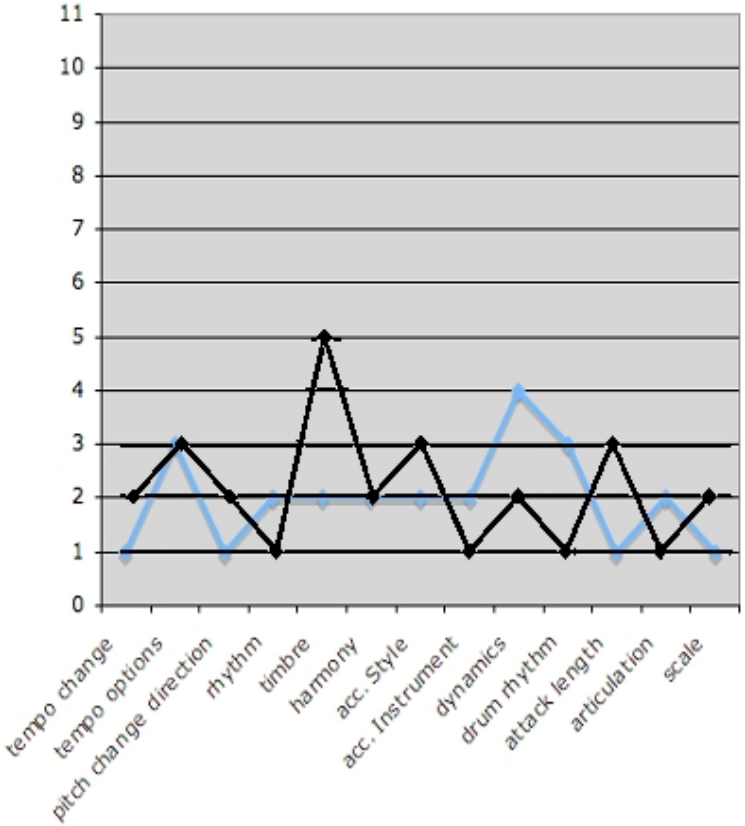



```
Script:
TempoConstant();
TempoChange(168);
TransposeNotesAndKeySig(+02,0);
RhythmTriplets();
ProgramChange(001,008);
HarmonyMelodyClear();
HarmonyBassArpeggiatedTriads();
HarmonyBassDoubleBass();
DynamicsLoud();
DrumRhythm3();
AttackLengthShort();
AttackWeightBeat();
ScaleModeIonian();
```

Tempo: *Constant*
Beats per Minute: *Increase tempo.*
Recommended tempo: *168*
Pitch: *Move up 2 semitones*
Rhythm: *Triplet or Dotted rhythm*
Timbre: *Celesta*
Harmony: *None*
Accompaniment: *Arpeggiated triads*
Instrument: *Double-Bass*
Dynamics: *Loud*
Drum Rhythm: *Rhythm 3*
Attack Length: *Short*
Articulation: *Beat Stressed*
Scale: *Major*

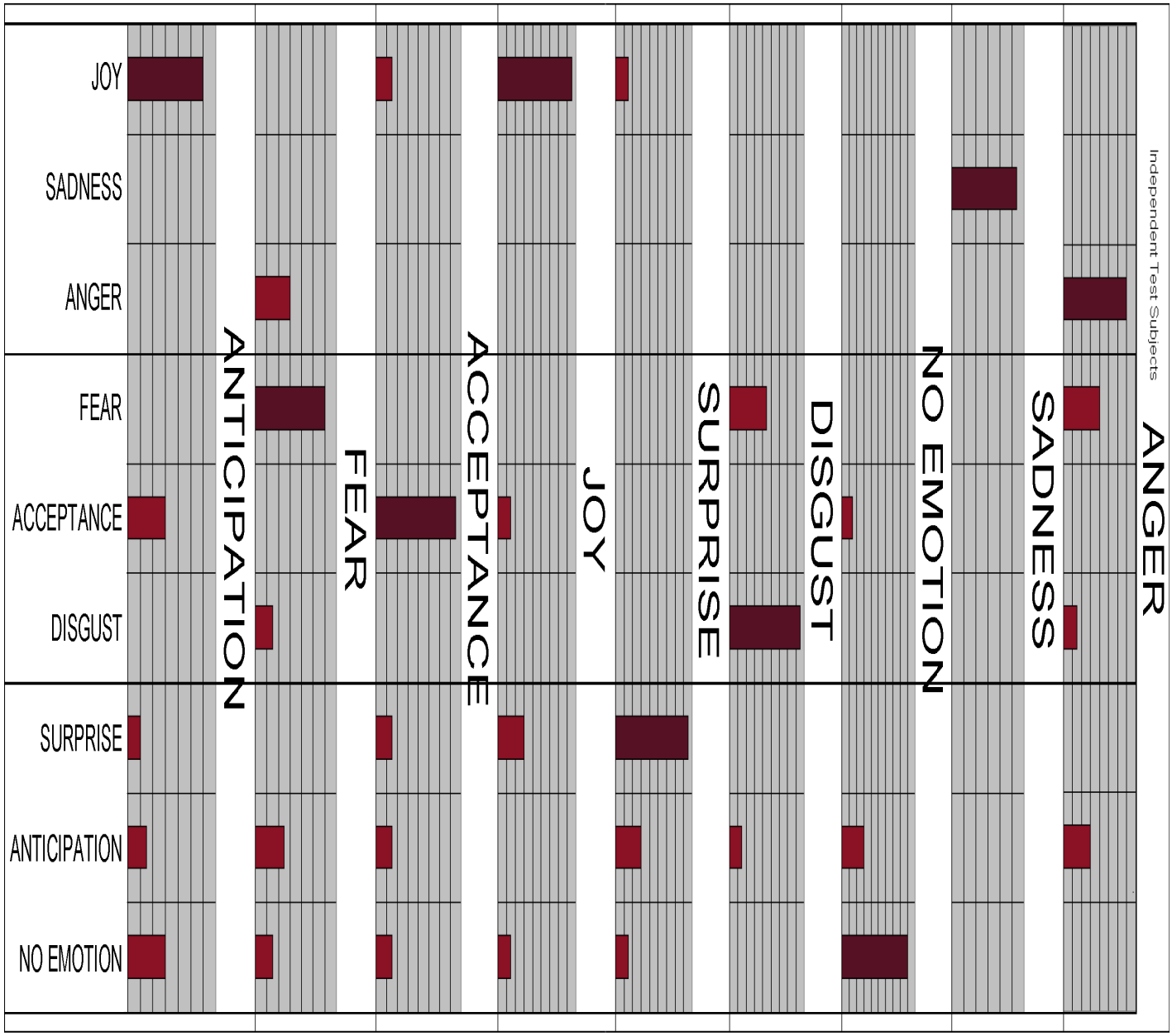
Main study: comparison of Joy and Sadness

Example: comparison of Joy and Sadness



Joy	Sadness
Tempo: Constant	Tempo: Constant
Beats per Minute: ***Increase* tempo.**	Beats per Minute: ***Reduce* tempo.**
Recommended tempo ***168***	Recommended tempo ***67***
Pitch: **Move *up* 2 semitones**	Pitch: **Move *down* 19 semitones**
Rhythm: ***Triplet or Dotted* rhythm**	Rhythm: ***Regular* rhythm**
Timbre: ***Celesta***	Timbre: ***Violin***
Harmony: None	Harmony: None
Accompaniment: ***Arpeggiated triads***	Accompaniment: ***Tonic bass***
Instrument: ***Double-Bass***	Instrument: ***Piano***
Dynamics: ***Loud***	Dynamics: ***Quiet***
Drum Rhythm: ***Rhythm 3***	Drum Rhythm: ***Rhythm 1***
Attack Length: ***Short***	Attack Length: ***Long***
Articulation: ***Beat Stressed***	Articulation: ***Even***
Scale: ***Major***	Scale: ***Minor***

Follow-up Study Results



Adaptation to Music Localisation

- Stage 1: *Setup*
  - Data gathered in study was emotive data for european listeners
  - Proposal is to change requested emotions/moods as required and run study again in differing cultures, to create a database of musical templates
  - Online musical content would need to be tagged, so that the required response from the user was established in advance.
  - This tag could represent the emotion of the music required (happy or sad?), or perhaps its category or mood (upbeat, youth culture, news, corporate and so on).

Adaptation to Music Localisation

- Stage 2: *Realisation*
  - Initial trials:
    - Static approach
    - Musical content created in advance
    - Matched to user profile
    - If unavailable, default fallback behaviour could be used
  - Final version:
    - Music transformation routines held on website servers
    - Specific cultural versions of emotional templates held on user's machine as part of their profile
    - Web server reads user templates to select correct transformation functions, and output a culturally-localised music stream

Data gathering – The Cloud?

- Emotional template creation
  - Commission studies to create musical templates for all required locales or cultures, or
  - Enable users to create their own templates, with the opportunity to upload these new templates so others can use them also
- The former approach is similar to commercial localisation practice
- The latter could be regarded as being a variant of the crowd-sourcing model, where users would be able to create their own cultural templates for music, possibly with the option of uploading these templates for use by the global community
- The template creation system could be hosted as a web service
- Online peer voting could establish the templates viewed as most suitable by the listening community

Questions ?

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