TOWARDS AUTOMATIC MUSIC RECOMMENDATION FOR AUDIO BRANDING SCENARIOS

Martin Herzog
Audio Communication Group
TU Berlin
herzog@tu-berlin.de

Steffen Lepa
Audio Communication Group
TU Berlin
steffen.lepa@tu-berlin.de

Hauke Egermann
York Music Psychology Group
University of York
hauke.egermann@york.ac.uk

ABSTRACT

Within the MIR community, most prediction models of musical impact on listeners focus on *mood* or *emotional effects* (perceived or induced).

The ABC_DJ project investigates the associative impact of music on listeners from the specific perspective of *music branding* that surrounds us in our everyday lives. We present a general concept for applying automatic music recommendation within this domain. Creating a scientifically validated basic terminology for communicating brand attributes and human emotions in this field is the key challenge.

As a first result, we introduce the Music Branding Expert Terminology (MBET), a comprehensive terminology of verbal attributes used in music branding, upon which a prediction model will be developed to facilitate automatic music recommendation in the context of music branding.

1. INTRODUCTION

Within the MIR community, a significant amount of research has been carried out in the past years in order to continuously improve predictions of mood and emotion effects [7,9,11]. These scientific results can be seen as essential ground work for enhancing music recommendation in general. Music streaming services used by people around the world in almost every listening context profit from this research in particular.

Music Branding: In the recent years, companies and brands become more and more involved in automated music recommendation activities. Marketing strategists' goal is to transport specific meaning using music in order to convey a certain brand image within consumers. To conceptualize this scenario, music branding can be interpreted as a special case of sign-based communication. An adopted version of Egon Brunswik's (1956) 'lense model' [2] exemplifies this approach.

[1] Artist to Business to Business to Consumer Audio Branding System (ABC_DJ) http://www.abcdj.eu

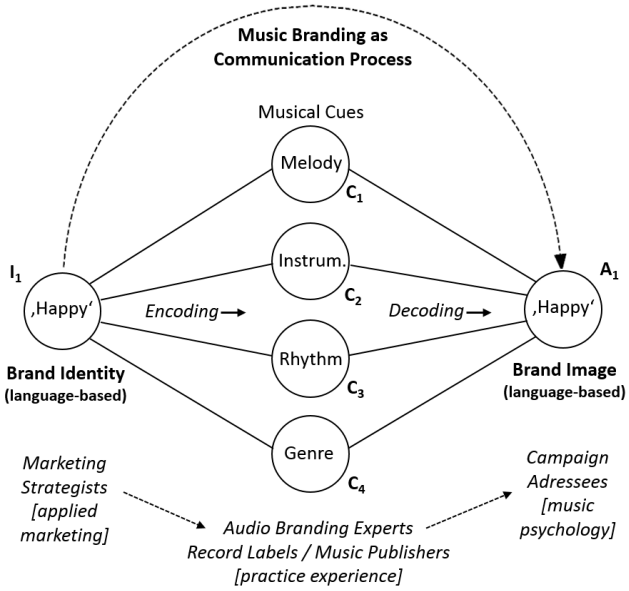

Figure 1. Lens model of music branding interpreted as a special case of sign based communication

The aim of ABC_DJ[1] is to predict brand attributes and emotional expressions (such as 'rebellious', 'reliable', 'sentimental' or 'confident') based on a variety of lower and higher order acoustic features from musical content.

In order to investigate the relationship between audio content on one hand and brand attributes and emotional expressions on the other, a two steps approach is followed:

1) Develop a terminology for audio branding
2) Perform a large-scale online listening experiment where participants use this terminology in order to describe their music-induced associations

2. TERMINOLOGY FOR AUDIO BRANDING

The first major challenge for conducting this listening experiment is to create a comprehensive terminology of attributes used in the context of audio branding. Since no such common terminology has been developed yet on an empirical basis, the approach is to systematically collect and select the most important and most commonly used human attributes and emotions that can potentially be

mapped to music and brands. The approach to achieve this goal addresses two requirements:

- Integration of findings and existing terminologies from existing research literature in the field of marketing research and music psychology
- Integration of relevant practice experiences from the audio branding domain

To address the first requirement, a comprehensive literature review was carried out and existing terminologies were analyzed. Within the field of marketing, two concepts were identified as particularly relevant: The *brand personality concept,* referring to a set of human personality traits associated with each brand [1,3] and the *brand value concept,* referring to a set of universal human values associated with each brand [8,13]. Results within the field of music psychology could be categorized in either research works dealing with the *expressive dimensions of music* [4,6] or drawing on the *emotional effects of music* [5,10,12].

To address the second requirement, an expert focus group was set up including stakeholders from the marketing, audio branding and music label sectors. Since a lot of practice strategies of the audio branding field are not covered in scientific literature yet, we asked them to translate their informal practitioners' knowledge into a list of concrete terms which complement the existing terminologies from marketing and psychology.

2.1 MBET - Music Branding Expert Terminology

The preliminary Music Branding Expert Terminology (MBET) consists of 130 attributes grouped into 18 dimensions. Table 1 represents the expressive dimensions of music suitable for branding.

Dimension	**Description**
Emotional Expression	Very specific emotions expressed
Emotional Valence	Positive or negative emotional expression
Emotional Energy	Arousing or calming potential
Complexity	The degree of complexity
Sophistication	The degree of perfection
Intellectuality	An intellectual demanding or cognitively inspiring potential
Traditionalism vs. Progressiveness	The reliance on traditional vs. progressive values
Inclusiveness vs. Exclusiveness	The assumed breadth of addressees
Conformity vs. non-Conformity	The degree of (non-)conformity
Hedonism vs. Seriousness	The degree of seriousness
Gender	A gendered appeal
Eros	Erotic and sexual qualities
Scale	The felt impact
Inspiration	Felt emotional and creative challenge
Time Reference	References to time epochs in abstract words
Culture / Location Reference	References to cultures or locations in abstract words
Style Reference	References to subcultures in abstract words
Dynamic Expression	The temporal character of changes in speed, intensity, complexity, etc.

Table 1. MBET dimensions: expressive dimensions of music relevant for audio branding

This preliminary version of MBET needs to be further refined. Thereto, we will conduct a survey with marketing experts in order to reduce the current terminology to a number of 60 most relevant attributes.

3. LARGE-SCALE ONLINE LISTENING EXPERIMENT

As a next step, a large-scale online listening experiment with 6.000 participants will be conducted in which the participants will annotate a corpus of several hundred music excerpts from 15 different genres using the MBET terminology. The unique and comprehensive empirical ground-truth resulting from this study will also include listener characteristics such as socio-demographic data and milieu affiliation.

4. AUTOMATIC PREDICTION MODEL

Finally, based on the results of this experiment, a statistical model will be developed in order to predict semantic connotations of musical pieces in a comprehensive music archive. Software tools, using this prediction, will be developed that enable brands and branding agencies to identify brand-fitting music titles from large music archives in order to automatically create music selections that can be used for various marketing activities like point of sale music branding or audiovisual advertisements.

5. CONCLUSIONS AND OPPORTUNITIES

This article introduces the concept and challenges of applying automatic music recommendation to the audio branding domain. It introduces the Music Branding Expert Terminology (MBET), a dimensioned list of brand attributes suitable for annotating music within the context of audio branding. This forms the first step of a music branding prediction model to be created in a later phase of the research project ABC_DJ. Recommender Algorithms derived from such a model have the potential to vastly stimulate not only the music branding sector and cooperation within related industries, but will also form a whole new future research field for the MIR community.

6. ACKNOWLEDGEMENT

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 688122.

7. REFERENCES

[1] J.L. Aaker, "Dimensions of Brand Personality," *Journal of Marketing Research*, vol. 34, 1997, pp. 347–356.

[2] E. Brunswik, "Representative design and probabilistic theory in a functional psychology," *Psychological Review*, vol. 62, Mai. 1955, pp. 193–217.

[3] M. Geuens, B. Weijters, and K. De Wulf, "A new measure of brand personality," *International Journal of Research in Marketing*, vol. 26, Jun. 2009, pp. 97–107.

[4] K. Hevner, "The Affective Character of the Major and Minor Modes in Music," *The American Journal of Psychology*, vol. 47, Jan. 1935, pp. 103–118.

[5] C.E. Izard, *The face of emotion*, New York: Appleton Century-Crofts, 1971.

[6] P.J. Rentfrow, L.R. Goldberg, D.J. Stillwell, M. Kosinski, S.D. Gosling, and D.J. Levitin, "The Song Remains the Same: A Replication and Extension of the MUSIC Model," *Music Perception: An Interdisciplinary Journal*, vol. 30, Dezember. 2012, pp. 161–185.

[7] E.M. Schmidt, J.J. Scott, and Y.E. Kim, "Feature Learning in Dynamic Environments: Modeling the Acoustic Structure of Musical Emotion.," *ISMIR*, Citeseer, 2012, pp. 325–330.

[8] S. Schwartz, "An Overview of the Schwartz Theory of Basic Values," *Online Readings in Psychology and Culture*, vol. 2, Dec. 2012.

[9] Y. Song, S. Dixon, and M. Pearce, "Evaluation of Musical Features for Emotion Classification.," *ISMIR*, Citeseer, 2012, pp. 523–528.

[10] D. Watson, L.A. Clark, and A. Tellegen, "Development and validation of brief measures of positive and negative affect: the PANAS scales.," *Journal of Personality and Social Psychology*, vol. 54, 1988, pp. 1063–1070.

[11] Y.-H. Yang and H.H. Chen, "Machine recognition of music emotion: A review," *ACM Transactions on Intelligent Systems and Technology (TIST)*, vol. 3, 2012, p. 40.

[12] M. Zentner, D. Grandjean, and K.R. Scherer, "Geneva Emotional Music Scale (GEMS-45)," 2008.

[13] J. Zhang and J.M.M. Bloemer, "The Impact of Value Congruence on Consumer-Service Brand Relationships," *Journal of Service Research*, vol. 11, Nov. 2008, pp. 161–178.