

# Chapter 12

## Emotion, Content, and Context in Sound and Music

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### ABSTRACT

*Computer game sound is particularly dependent upon the use of both sound artefacts and music. Sound and music are media rich in information. Audio and music processing can be approached from a range of perspectives which may or may not consider the meaning and purpose of this information. Computer music and digital audio are being advanced through investigations into emotion, content analysis, and context, and this chapter attempts to highlight the value of considering the information content present in sound, the context of the user being exposed to the sound, and the emotional reactions and interactions that are possible between the user and game sound. We demonstrate that by analysing the information present within media and considering the applications and purpose of a particular type of information, developers can improve user experiences and reduce overheads while creating more suitable, efficient applications. Some illustrated examples of our research projects that employ these theories are provided. Although the examples of research and development applications are not always examples from computer game sound, they can be related back to computer games. We aim to stimulate the reader's imagination and thought in these areas, rather than attempt to drive the reader down one particular path.*

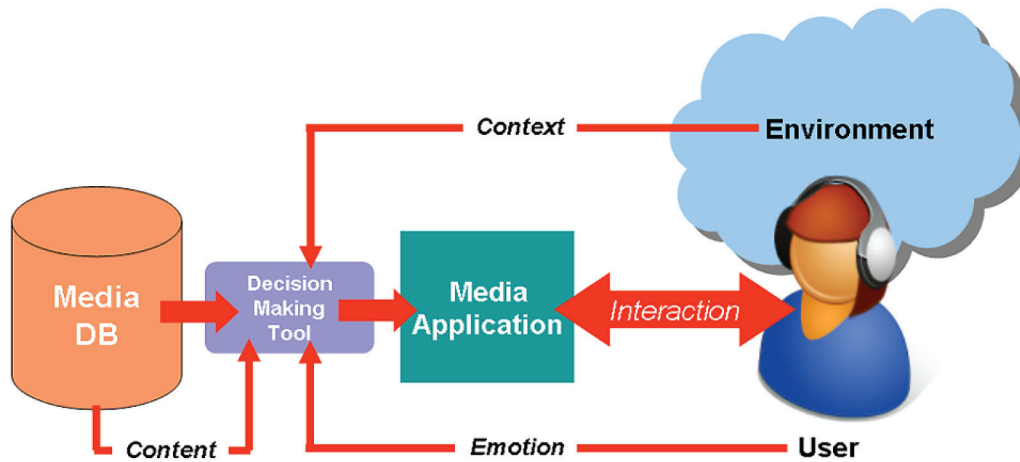
### INTRODUCTION

Music and sound stimulate one of the five human senses: hearing. Any form of stimulation is subject to psychological interpretation by the individual

and a cause-and-effect relationship occurs. Whilst this relationship is unique to each individual up to a point, it is safe to assume that broad, often shared, experiences occur across multiple listeners. It can be argued that the emotional reaction and response of a listener to a sound or piece of

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Figure 1. Idealised Role of Emotion, Content and Context in a Computer Application



music is the single most important event resulting from that experience.

The goal of this chapter is to explore the relationship between sound stimuli and human emotion. In particular, this chapter examines the role sound plays in *conveying* emotional information, even from sources that may be visual in origin. Equally, the chapter seeks to demonstrate how human emotion is able to flip this paradigm and influence music and sound selection, based on *emotional state* and consideration of the *context* of the user.

The *content* being represented digitally provides the opportunity to gain a greater understanding of the information present in a data set. Information being stored often has a number of characteristic features and structural elements that can be identified automatically. For example, music generally contains an identifiable structure, which might consist of several movements, parts, or, more commonly, verses and choruses. However, such structure can almost be considered *fractal*, in that there are microscopic and macroscopic levels of organisation and also repetition, ranging from musical beats, bars, verses and choruses to the level of the song itself.

*Contextual* data provides additional information about factors that contribute to making the user interaction experience much more relevant and effective by acquiring knowledge of the external factors that influence decision making and the emotion of the user.

The conceptual diagram of Figure 1 shows an idealised situation in which a large database of audio media is presented to the user through a suitable application (such as a computer game). In this scenario, the user's *emotion* and *context* are analysed and compared against analysis of appropriate media *content*. This provides selection of the 'best fit' media that will further stimulate and engage the user in the most effective way.

The chapter explains the fundamentals of emotional stimulation using sounds and music, whilst retaining relevance to the audiologist. We demonstrate that by analysing the information present within media and considering its applications, significant advantages can be gained which improve user experiences, reduce overheads, and aid in the development of more suitable, efficient applications: whether they be computer games or other audio tools.

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